

Smart Phones: A new modality to enhance knowledge for medical students

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ABSTRACT

Background: A fascinating thing about humans is to explore new things and ideas. In the recent past information technology has given new ways to human being in all spheres of life. If anybody in this era is unaware of information technology, he shall be left far behind others in particular among his peers. Mobile phones have impacted to human life in an unbelievable way. A shaken phenomenon was given by smart phones. It has all the features of a computer anything which could be achieved on a computer is available in the smart phone. Smart phone keeps a doctor in touch with all the day to day changes in the medical field for which he used to consult a large number of books. Smart phones provide students the opportunity to keep abreast with the current knowledge and learning round the clock concept.

Rationale: Literature about the usage of smart phone usage among medical students in Pakistan is scarce and leaves room for further research.

Study design: It is a descriptive cross sectional study.

Study instrument: Modified IS Success (Adapted from Seddon and Kiew (2007) and literature attitude.

Conclusion: The rising trend and the adaptability of smart phones for learning purposes by medical students is encouraging. Smart phone has developed interest in learning among medical students which students can modify according to their need, so that they can maximize the benefit. In the current scenario this study provides useful information about smart phone users for educational purposes.

Keywords: Smart phone, medical student, information technology

INTRODUCTION

New technologies have always revolutionized human life. In the recent past information technology has given new ways to human being in all spheres of life. Not a single entity of life has so far been left untouched by this new technology¹.

It has got many branches; it is not possible to claim that a person has mastered a specialty because within a short span of time that specialty will further be divided into some other branches. This revolutionary change has gripped the world so strongly that in this era it is not possible to live without information technology. If anyone doesn't adopt this technology, he shall be left far behind².

With the rapid pace this technology has progressed some very useful and mind blowing inventions, which has also made life easy for a large group of population^{2,3}. Introduction of mobile phone has altogether changed the concept of traditional phone⁴. A few steps ahead are the smart phone technology, which is a mini computer in itself, because it keeps you connected to the rest of the world round the clock⁵.

Smart phone has all the basic qualities of a traditional phone, additional features are that, it has all the features of a computer, anything which could be achieved on a computer is available in the smart phone⁶. Calls can be

made through this phone, messages can be sent through it, it can capture a movie which can be sent to anyone having a phone of similar caliber⁷.

Initially the cost of smart was quite high which limited its access to large group of population. In the recent past many versions of smart phone manufactured from china has made it available to anybody⁸. Next step is an internet connection, which is also quite cheap making it easy for everyone to have access to this technology. It is difficult to find a person without smart phone now a day⁹.

The perception about the usage of smart phone technology among medical students and doctors need to be explored¹⁰. Smart phone keeps a doctor in touch with all the day to day changes in the medical field for which he used to consult a large number of books. All such books, latest articles and journals are available to him through smart phone. Large books in different format such as (pdf) can be stored in this small phone which can later be used for consultation, even in the absence of internet^{11,12}.

In the modern world smart phones are considered to be pocket companion who is available round the clock. These devices have given a new way of living style particularly to the new generation. None of the communication tools has influenced our lives so quickly as smart phones have done. Smart phones provide students the opportunity to keep abreast with the current knowledge and learning round the clock concept^{13,14}.

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The problems faced with the excessive use of smart phones is lack of physical communication among people as they feel more comfortable to be connected to their colleagues, relatives and friends through net rather than meeting them personally¹⁵. Physical activity among the users of smart has also been reduced considerably leading to multiple physical problems. However, with all these problems the use of smart phone usage has increased rather than decreasing^{16,17}.

METHODOLOGY

Rationale: Limited research in Pakistan regarding this important topic leaves a gap for research. Literature about the usage of smart phone usage among medical students in Pakistan is scarce and leaves room for further research. This research was approved by our departmental Ethical committee.

Study design: It is a descriptive cross sectional study.

Study instrument: Modified IS Success (Adapted from Seddon and Kiew (2007) and literature attitude (new scale). The questionnaire comprises of five sections. First section caters with nominal scale which highlights statistic information of the answerer and the uses of IT modify smart phone devices. From second to fifth sections using 7 point Likert scale in which 1: strongly disagree and 7: strongly agree.

Data analysis: IBM SPSS version 22 was used to analyze the data.

Demography: Study is carried at Allama Iqbal Medical College, Lahore. Total 300 students from all classes i.e. from 1st year to 5th year MBBS participated in the study. Students were briefed about the research and informed consent was obtained before the start of the research.

RESULTS

Academic source highlights high percentage 82.1% of the students use smart phones for academic purposes which is shown in table-1

Table-2 shows the use of smart phone by students for different activities such as social networking, reading content, getting news alerts, accessing emails, text messaging, searching new information summative as always and frequently as 100% which are high. Getting directions occasionally as 83.7%, uploading content falls between 83- 97% as always and frequently. Playing games occasionally, rarely and never summatively as 82% which shows low percentage. Listening music or watching videos also shows occasionally and rarely and never as 100% which is low for this particular use as above by playing games. In the end participation and completing course work is 100% as always and frequently which shows high percentage.

The second sections known as Unified theory of Acceptance and use of technology which include execution anticipation, cause anticipation, Social and Behavior motive to use. All the variables under these headings have high number of percentages except one variable under performance expectancy that smart phone learning improves my study efficiency is 9.7% neutral. And first two variables under behavioral intention to use have 5-9%

disagree and 6-15% neutral response rest having high level of percentage as shown in Table-3.

The third section of IS Success consists of variables under Information quality and System quality. Section III variables highlights level of frequencies and percentages as shown in Table-4.

Section five Lecturers attitude consist of variables under User satisfaction. First and second variable of this section shows high esteem of frequencies and percentages however neutral response is observed in section three for smart phone usage which can be distracting and some slightly disagree as shown in table-6.

Fourth section Modified IS Success contains various variables under User satisfaction, Information statistics and System statistics. All the uses of section IV shows high level of frequencies and percentage as shown in Table-5.

Fig. 1: The study participants are between age of 18-24 years

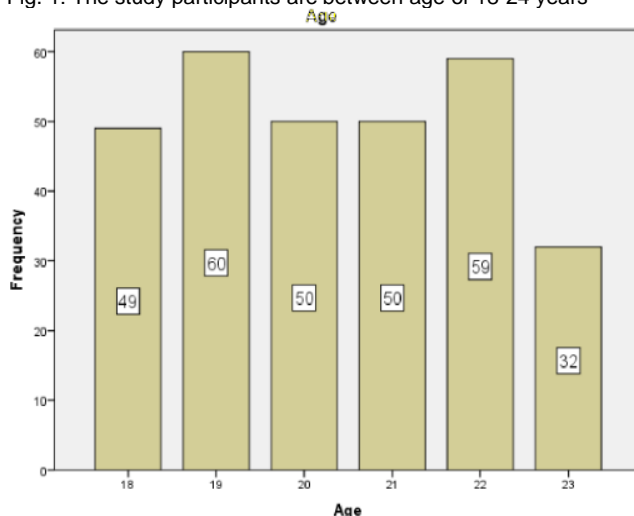


Fig. 2: Percentage of gender distribution

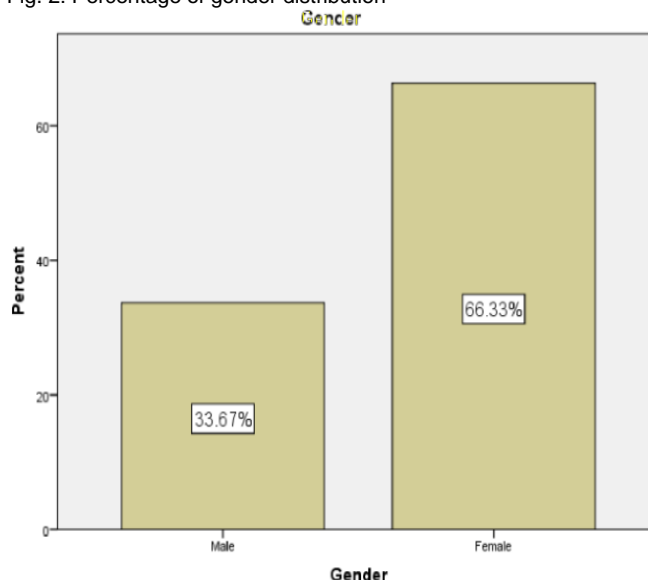


Table 1: Academic information about the use of smart phone

	Frequency	%	Valid%	Cumulative%
Valid question enquired	40	14.0	12.0	12.0
Time table justification Text files, Videos a	23	6.7	6.6	19.6
Applications	239	79.3	81.4	100.0
Total	300	100.0	100.0	

Table 2: Uses of Various Activities by Smartphone

What is the use of mobiles in the learning of students? Frequency & Percentage	Always	Frequently	Occasionally	Rarely	Never	Total
Societal communicating	253(84.3%)	47(15.7%)				100%
Learning content	137(45.7%)	143(47.7%)	20(6.7)			100%
Getting news alerts	179(59.7%)	105(35%)	16(5.3%)			100%
Accessing email	211(70.3%)	89(29.7%)				100%
Text messaging	300(100%)					100%
Searching for information	212(70.7%)	70(23.3%)	18(6%)			100%
Getting directions	31(10.3%)	18(6.0%)	251(83.7%)			100%
Uploading content	163(54.3%)	86(28.7%)	44(14.7%)		7(2.3%)	100%
Playing games	26(8.7%)	25(8.3%)	36(12%)	101(34%)	112(37%)	100%
Entertaining with music or videos			61(20.3%)	113(37.7%)	126(42%)	100%
Task accomplishment or engaged in lectures	188(66.2%)	112(37.3%)				100%

Table-3 (UTAUT variables)

Stem Frequency & Percentage	SD	MD	SLD	N	SLA	MA	ST	Total%
Performance Expectancy								
Usefulness of mobile phone					25(8.3%)	122(40.7%)	153(51%)	100
Educational performance improves with mobile					27(9.0%)	72(24.0%)	172(57.3%)	100
Mobile learning makes my study easy						127(42.3%)	173(57.7%)	100
Study related tasks saves my time						68(22.7%)	232(77.3%)	100
Effort expectancy								
Tactful use of mobile is a handy task						107(35.7%)	193(64.3%)	100
Mobile learning is comfortable						53(17.7%)	247(82.3%)	100
To handle mobile, learning is made easy.						201(67.0%)	99(33.0%)	100
My objectives to use mobile learning are clear						119(39.7%)	181(60.3%)	100

x SD=Strongly Disagree, MD=Moderately Disagree, SLD=Slightly Disagree, N=Neutral, x SLA=Slightly Agree, MA=Moderately Agree, SA=Strongly Agree

Table-4: IS success variable

Stem Frequency & Percentage	SD	MD	SLD	N	SLA	MA	ST	Total%
Information quality								
Mobile learning gives accurate information (Content Accuracy)						104(35%)	196(65%)	100%
Mobile learning system provides information that is time required (Availability)						128(42.7%)	172(57.3%)	100%
Relevant information to your course is provided (Usability, relevance)						121(40.3%)	179(59.7%)	100%
Sufficient information is provided (Quantity of information)						89(29.7%)	211(70.3%)	100%
Easily digestible information is available (understandability)						20(6.7%)	280(93.3%)	100%
Accurate information is provided (accuracy)							300(100%)	100%
Well formatted, clear information is provided (user interface)						143(47.7%)	157(52.3%)	100%
Updated information available on time						92(30.7%)	208(69.3%)	100%
Relevant information is available.						144(48%)	156(52%)	100%
System quality								
It provides custom made information						133(44.3%)	167(55.7%)	100%
It provides information in personal based presentation					22(7.3%)	152(50.7%)	126(42%)	100%
It is convenient to use						11(3.7%)	289(96.3%)	100%
It is user friendly (easy to learn)					51(17%)	24(8%)	225(75%)	100%
It is easily accessible (Access)					47(15.7%)	107(35.7%)	146(48.7%)	100%
It provides an appropriate level of on-line assistance and justification (User requirements)					89(29.7%)	105(35%)	106(35.3%)	100%
It provides effective features for good experience					124(41.3%)	25(8.3%)	151(50.3%)	100%
It provides customer satisfaction (help & training)						76(25.3%)	224(74.7%)	100%
It provides wide range of support (flexibility)					121(40.3%)	53(17.7%)	126(42%)	100%
It is highly reliable						146(48.7%)	154(51.3%)	100%
Information provided is at high pace (efficiency)						34(11.3%)	226(88.7%)	100%

x SD=Strongly Disagree, MD=Moderately Disagree, SLD=Slightly Disagree, N=Neutral x SLA=Slightly Agree, MA=Moderately Agree, SA=Strongly Agree

Table-5 (Modified IS Success variables)

Stem Frequency & Percentage	SD	MD	SLD	N	SLA	MA	ST	Total%
User satisfaction								
Smartphone learning is effective.						36(12%)	264(88%)	100%
Smartphone learning is efficient.						96(32%)	204(68%)	100%
Over all Smartphone learning is satisfying.						72(24%)	228(76%)	100%
Information Statistics								
Smartphone learning gives satisfying information.						131(43.7%)	169(56.3%)	100%
The information which I retrieved from smart phone learning is satisfying.						10(3.3%)	290(96.7%)	100%
System Statistics								
Smart phone learning is satisfying to all things.						223(74.3%)	77(25.7%)	100%
Interaction between Smartphone learning and me is satisfying						23(7.7%)	277(92.3%)	100%

x SD=Strongly Disagree, MD=Moderately Disagree, SLD=Slightly Disagree, N=Neutral x SLA=Slightly Agree, A=Moderately Agree, SA=Strongly Agree

Table-6 (Lecturers attitude)

Stem Frequency & %age	SD	MD	SLD	N	SLA	MA	ST	Total
User satisfaction								
Smartphone learning is used in formal learning environment.						225(75%)	75(25%)	100%
Smartphone learning encourages me to do internet browsing.						140(46.7%)	160(53.3%)	100%
Smartphone learning sometimes be very distracting.			36(12%)	236(78.7%)	28(9.3%)			100%

x SD=Strongly Disagree, MD=Moderately Disagree, SLD=Slightly Disagree, N=Neutral, LA=S lightly Agree, MA=Moderately Agree, SA=Strongly Agree

DISCUSSION

This study aims to explore the student's perception about smart phone technology, whether this technology is helpful for the students to achieve their educational objectives¹⁸. The population selected to explore this view point is among the medical college students having smart phones studying at University College of medicine, The University of Lahore. The study explores the challenges and acceptance of smart phone technology in given population. The objective this study is to get students perception about smart phone usage on their acquiring for educational impact¹⁹. This study showed the higher percentage of participant's as females.

The format used by students in their smart phones for educational purpose was in the form of text files, mini and videos²⁰. These formats are in vogue among students because they are easily accessible and are available free of cost²¹. These formats can easily be stored in the memory of smart phones and are available even when internet facility is not available. In addition, various applications are available which are free of cost and are helpful for medical educational purposes such as medical dictionaries, e-books, drug index and lab tests etc²². We also found in our study that most of the medical students use android based system smart phones and mostly all the students used their smart phones for learning²³. As the smart phones are always with the students where ever they are or on the move so students constantly learn and update their selves.

Smart phones will always connect the students to online world, accessing emails, doing research and checking updates^{24,25}. As in the class when students are busy in lectures it's a smart phone that takes a picture of any comment of important discussion which is carried out in the class and scribbled on white board or in group discussion. Smart phones also provide memo recording for

the problem based discussion and the constructive feedback which is going on in the class. Smart phones always help to take short videos of key lecture moments instead of carrying handy cams in the class.

Smart phones application like Evernote is very much helpful to store our important catalog and annotate smart phones pictures to free the memory of smart phone for further functioning. The other application like Response ware which convert the smart phones into class rooms and Clickers which is very useful application for multiple choice questioning ultimately updating and improve learning the students and helpful for the exams preparations.

It also provides an opportunity to update online with a single click. The increase trend of smart phone usage approximately crossing 5 billion globally, this resulted in decrease in the cost of smart phones thus favoring the student's interest in smart phones. Because the cost of software available for phones are cheap the difference lies with the quality of the smart itself, depending on the quality which further is exhibited as screen display, processing speed of the phone etc. Smart phones learning is very popular in the students because it provides more flexibility in the defined course content, interaction with the professorial staff and distance education. This is the time that we should train the educational staff and students for proper communication and start pedagogical practice.

The smart phone educational activities used by students commonly include uploading the course content, assignments and study material which they share in the form of groups. It is open to all the group participants for open discussion which strengthen their educational activities to meet the purpose of this study. It is encouraged that teaching staff should be included in all such groups so that ethical norms should be followed and feedback and educational advice by such staff is available when ever required. By continuous use of smart phones uploading the computing data can be transferred to cloud known as storing

data. Instead of local data in hard drives or memory card the cloud is very useful because after connecting online from smart phones everybody can access the learning content for use and get benefit from it.

The main constructs of this study are Demographics, UTAUT, IS SUCCESS, Modified IS Success Lecturers attitude. The finding of this study is supported by researchers. Different sections in the study were demonstrated considerable significance. The analysis shows participant's "behavioral purpose to use a mobile learning system" is considerably impressed by their attempt expect, psychomotor expect, data satisfaction, organization gratification and data and organization character. On the other hand, the less likely attributes which include social influence and lecturer's attitude have less influence on one's behavioral intention. A study has been conducting in United States of America in 2007 on Smartphone technology used by students. It shows that learning pedagogies from different constructive approaches can be adapted for smart phone learning environment.

The other study has been conducting in Kenya 2015 which shows tremendous popularity of smart phone technology among the medical students. This study also shows the incorporation of smart phone technology in the field of medical education for the betterment of its quality and approach. There is another study in Ghana 2014 which teachers and students both want to use smart phone technology for better learning and their expertise during working hours. One more study conducting in Canada 2012 on smart phone learning which shows tremendous achievement regarding the awareness of learning and teaching strategies.

In Spain 2012 a research was conducted on distance learning with Smartphone and its application in the Spanish National University of distance education. This study shows that Smartphone learning with its application improve learning of students but also fostering collaborative effort among students and with their mentor. These findings are supported by similar studies in other parts of the world. Similarly, studies from United States, Australia, Kenya, Thailand, Ghana, Germany, Canada and Spain shows accelerated degree of smart phone learning among students of different medical colleges.

Learning through smart phones is an emerging trend and medical students at University College of Medicine, The University of Lahore, Pakistan has shown keen interest for the use of this technology to enhance their learning. By using smart phones educational learning which is a new educational gadget, day to day educational activities can be enhanced which keep the students updated with other students and educational institutional through group learning and activities by updating with other educational groups involved in such activities.

CONCLUSION

Current study highlights the popularity of smart phone learning among medical students. The rising trend and the adaptability of smart phones for learning purposes by medical students is encouraging. Being a new technology it appears to be a great helping hand in educational activities provide guide line for future improvement. Smart phone has

developed interest in learning among medical students which students can modify according to their need, so that they can maximize the benefit. In the current scenario this study provides useful information about smart phone users for educational purposes.

This study provides a guideline for medial bodies such as PMDC in Pakistan to plug in the gaps left in the educational area. It also emphasizes the need to change make required changes in the current curriculum of Pakistan medical and dental counsel.

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