

*Full Length Research Paper*

## Undergraduate students use of mobile phones: Exploring use of advanced technological aids for educational purpose

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As India has the world's second largest mobile phone user base (over 893.3 million users, May 2011) and Wireless communication has emerged as one of the fastest diffusing media on the planet, fuelling an emergent 'mobile youth culture', it will be interesting to explore the attitude of undergraduate students towards the use of mobile phones for educational purposes. We all know that mobile phones provide multitude of features and services so much so that mobile phone has become an important part and parcel of everyday modern life. Thus, increased popularity of cell and smart phones in recent years has attracted research attention. The present study seeks to discover whether it is blissful for students regarding their studies and whether there remain significant differences in their attitude towards using mobile phones for educational purpose with respect to gender, medium of education, academic discipline and residence of the undergraduate students particularly focusing on the three main dimensions of usability, barriers and preferability of using mobile phones for educational purpose. The study deals with 55 samples comprising both males (27) and females (28) from different colleges under University of Calcutta. Data tools included a General Information Schedule and an attitude scale. Significant differences were noted in the attitude of the students with respect to gender, medium of education and residence while with respect to academic discipline the difference in the attitude of undergraduate students was insignificant.

**Key words:** Attitude, undergraduate students, mobile phone, educational purpose.

### INTRODUCTION

Mobile phones are arguably another revolutionary invention of our time, besides computer and internet technologies. Mobile technology is growing by leaps and bounds. From 1990 to 2014, worldwide mobile phone subscriptions grew from 12.4 million to over 6.9 billion,

penetrating about 97% of the global population with Asia as the fastest growing region and India being the biggest market of cellular phones (after China with 893.3 million users, TRAI [Telecom Regulatory Authority of India], 2014). Mobile phones today go beyond just voice

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communication and provide a multitude of other features and services including short message service (SMS) or text messaging, multimedia messaging (MMS), photo display and recording, video playback and recording, calendaring, reminder (clock and alarm), web-browsing, checking e-mails, retrieving sports scores and news, using online dictionary etc. In other terms, mobile phone has become an essential part of everyday modern life. However, to many, the mobile phone is not a tool for making just phone calls, but rather, a 'lifeline' to the social network and an instrument for smoothly operating and coordinating their everyday life (Matthews, 2004). In education, mobile phones have led to the evolution of new paradigm known as mobile learning or m-learning (Muyinda et al., 2007). Ferry (2009) describes that modern mobile phones can be used to help students to access web based contents, remix it, share it, collaborate with others and create media rich deliverable for the classroom teachers as well as global audience. Rather than seeing mobile phones as troublesome devices, educators should seek to exploit the potential of the technologies learners bring and find ways to put them into good use for the benefit of learning practice (Sharples, 2003). Mobile learning is also considered as a new form of learning distance learning which began to develop in the eighties of the twentieth century. It means learning by correspondence by the use of the latest media technology in education (Al – Fahad, 2009). Many studies (Attewell, 2005; Chen and Kinshuk, 2005; Murat et al., 2008) have already proved that mobile technologies have considerable potential to enhance teaching and learning across all education sectors. Their impact on students' behaviour, enthusiasm, motivation and progress is well acknowledged (Rau et al., 2008), especially in some conventional schools abroad e.g. U.K. (Cook et al., 2007). Over two-thirds of the university students in their study used electronic media (including cell phones) while in class, studying, or doing homework (Jacobsen and Forste, 2011). Hence, the necessity to use mobile phones in education seems to be inevitable especially in higher education.

Now, we have entered in age which cannot be imagined without mobile phone. As young population is the future of the country, their views are of utter importance. As education is regarded as the backbone of any country and in modern times education (whether regular or distance education) is inarguably interrelated with technology, mobile phone has pertinent role to play in the education of the youth population. In this study, we aim to find out whether this device is useful for under-graduate students particularly for educational purpose, whether there are any differences in the attitude of undergraduate students towards using mobile phone for educational purpose with respect to gender, academic discipline, medium of education, area of residence etc., as there is dearth of research particularly on the attitude of undergraduate students to m-learning. From the above discussion it is quite apparent that m-learning is in use

and very popular among students abroad. But this study seeks to throw some light on the attitude of undergraduate students of our own country with a sample size of 100 comprising both male and female students from different colleges under University of Calcutta (West Bengal). Data tools included a General Information Schedule and an attitude scale comprising 28 items; they were divided into three dimensions namely usability, preferability and difficulty of using mobile phone. Data analyses were carried out with the help of SPSS software.

The findings of this study are particularly helpful to students and teachers, as the students can use mobile phones for study purposes and the teachers too may start to look upon the device as a positive reinforcer for education.

### **Mobile phone and its use and utility**

We are moving into an era when mobile devices are not just for talking and texting, but also for accessing the internet and all it has to offer (Pew Research Center, 2010). Mobile phones are used for a variety of purposes, including keeping in touch with family members, conducting business, and having access to a telephone in the event of an emergency. The use of a mobile phone is not limited to speaking alone; it is being used in making video, recording information and transmitting it to a phone or a computer as was being done by a computer, mobile banking and payment, surveillance and GPS services, ticket booking etc. Students can discuss their assignments or project works over phone which otherwise can be lengthy and boring. Over two-thirds of the university students in their study used electronic media (including cell phones) while in class, studying, or doing homework (Jacobsen and Forste, 2011). The usage of phones is not intended for negative purpose and influence; however the attitude and time channelled towards these devices has enslaved students, also making them addicts.

### **LITERATURE REVIEW**

For this particular study related to the attitude of the undergraduate students towards using mobile phones for educational purpose, several extensive research reports or literature were studied. Madden et al. (2013) found that Smartphone adoption among American teens has increased substantially and mobile access to the internet is pervasive. One in four teens are "cell-mostly" internet users, who say they mostly go online using their phone. A study conducted in Nigeria (Utulu, 2012) revealed that mobiles phones were used by students for communicating with lecturer in charge of the course collect data (recordings), sending emails to lecturers, access Online Public Access Catalogue and share knowledge. Indeed, some studies suggest that mobile learning applications

can facilitate students in various ways like not only learning contents easily but also interacting with others anytime and anywhere, at his or convenience. Hence, the development of m-learning as a new strategy for education has implications for the way students and tutors in educational institutions interact (Huang et al., 2010). Findings of a recent study (Javid et al., 2011) showed that mobile phones are helpful for the students for study purposes. Students can use it for exchanging useful information with their classmates about their studies. Results of another study (Ferry, 2009) indicated that modern mobile phones can be used to help students to access web based contents, remix it, share it, collaborate with others and create media rich deliverable for the classroom teachers as well as global audience. Results revealed in an investigation (Thaden, 2007) to determine gender effect or influence on the students' perception focused an overall positive perception regarding the usage of cell phone technology mainly in secondary education. Positive responses from surveys suggest that there is interest in and potential for educational implementation and use of mobile phones as learning tools in schools. The educational advantages of using hand held devices over full-size computers are attractive. A wide variety of devices such as cell phones, PDAs, laptops, but also devices like pen-scanners are used for mobile learning (Trifonova and Ronchetti, 2004, 2006; Trifonova et al., 2006). Another unique study (Bhandari et al., 2006) found that cultural dimensions such as masculinity vs. femininity, absence of individualistic perspective and economic dependence do play a part in creating barriers that prevent easy adaptation of mobile phones particularly in the third world countries like India. Another study suggests that indicated cultural differences in communication style preferences had an impact on the adoption rates of wireless technologies (Castells et al., 2004; Hofvenschiold, 2003). Over the last decade the mobile phone has penetrated in every sector, presenting many opportunities to many areas, including higher education (Campbell and Russo, 2003).

Mobile communication offers a lot of advantages but it has also negative aspects and some studies have tried to find out the negative impacts of mobile phones on the pupils too. In response to a question about mobile-phone addiction, one out of three students said that they felt addicted to their phones. This sense of addiction may be related to dependency and heavy usage (Katz and Sugiyama, 2005). There is scarcity of particularly this kind of study in India. Hence, there is pertinent need of this kind of study here for better understanding of the undergraduate students towards using mobile phone for educational purpose.

## METHODOLOGY

### Research questions

Whether the attitude of undergraduate students towards mobile

phone use (three dimensions namely usability, preferability and difficulty) for educational purposes differs with respect to gender?

Whether the attitude of undergraduate students towards mobile phone use (three dimensions namely usability, preferability and difficulty) for educational purposes differs with respect to academic discipline?

Whether the attitude of undergraduate students towards mobile phone use (three dimensions namely usability, preferability and difficulty) for educational purposes differs with respect to medium of education?

Whether the attitude of undergraduate students towards mobile phone use (three dimensions namely usability, preferability and difficulty) for educational purposes differs with respect to habitat of the undergraduate students?

### Sample

Undergraduate colleges were chosen by purposive sampling and students were chosen randomly for the research study. The total number of sample was 100 comprising students between 18 to 21 years of age and studying arts (B.A.) and science (B.Sc.) streams. The mean age of the samples is 19.11 years. The samples were collected from various undergraduate colleges in and around Kolkata in order to get responses from students with varying cultural, economic and social background as well as different academic disciplines.

### Tools

(a) **General Information Schedule (GIS)** for collecting demographic characteristics (e.g. age, gender, residence etc.)

(b) **Mobile phone usage attitude scale (for undergraduate students):** The attitude scale was a 5 point scale comprising 28 items and divided into three dimensions namely usability, preferability and difficulty to explore the attitudes of the students. Out of these 28 items 15 items dealt with usability, 4 items dealt with barriers and 6 items dealt with preferability of using mobile phone. The attitude scale was validated for content validity through a panel of experts in the field and the reliability measures were found to be .63, indicating high reliability for all of the dimensions.

### Data collection and data analysis

The data were collected from the subjects during January-February months of 2014. Data analyses (t-test) were carried out with the help of SPSS software.

### Definition of operational terms

- An attitude is an expression of favour or disfavour toward a person, place, thing, or event (the attitude object). Attitude is also measurable and changeable as well as influencing the person's emotion and behaviour.
- A college or university student who has not yet received a bachelor's or similar degree is said to be an undergraduate student.
- It means that undergraduates are students of universities and colleges; they have passed out from high schools and have been accepted to colleges, but they haven't graduated yet.
- A mobile phone (also known as a cellular phone, cell phone and/or hand phone) is a phone that can make and receive telephone calls over a radio link while moving around a wide geographic area.

- Activities that are integral, immediate, and proximate to the education of students whether it is purely syllabus-based or out of syllabus knowledge and via any medium like electronic media, print media etc. qualify as “educational purposes”.
- Here, according to residence, students have been categorized as rural and urban. Rural students were those who came from country-side with a rural schooling background (present residence is being ignored) whereas urban students were those who resided in the city or town area. Area of residence is an important variable as the exposure of students to modern technologies depends mainly on the connectivity and communication facilities of the area where he or she resides.
- Here, usability is the ease of use a human-made object or the satisfaction gained due to the effectiveness of an object (here, mobile phone).
- Preferability, here, means favorability or desirability of a product (mobile phone) over others.
- Here, barrier means any obstacle that limits the usage of mobile phone.

## RESULTS AND INTERPRETATION

The results focused separately on the attitude of undergraduate students towards using mobile phone for educational purpose based on the four categorical variables namely, gender (male and female), academic discipline (B.Sc. and B.A.), medium of education (Bengali and English) and area of residence (Rural and Urban). The attitudes of each four variables are again measured based on the three variables namely, usability, barriers and preferability of using mobile phone for educational purpose.

### Testing of null hypothesis

All the null hypotheses were tested at 0.05 level of significance. The analysis in Table 1 shows that the calculated t value for gender-wise attitude towards usability is 1.46 and P value is 0.15 ( $P > 0.05$ ); hence null hypothesis is retained. For barriers the calculated t value is 8.95; P value is 0.00 ( $P < 0.05$ ); hence null hypothesis is rejected. For preferability the calculated t value is 1.32 and P value is 0.19 ( $P > 0.05$ ); hence null hypothesis is retained. The calculated t value for the overall attitude of undergraduate students towards using mobile phone for educational purpose is 5.57 and P value is 0.00 ( $P < 0.05$ ).

Therefore, it can be concluded that with respect to the attitude towards the usability of mobile phone male undergraduate students do not differ significantly from female students whereas in case of attitude towards barriers of using mobile phone for educational purpose, there exists significant difference between male and female students. Again in case of attitude towards preferability, it is seen that male and female students do not differ significantly. However, in overall, the male students possess significantly different attitude from female students towards using mobile phone for educational purpose.

From Table 2, it can be noticed that the calculated t value for academic discipline wise attitude towards usability is 0.17 and P value is 0.87 ( $P > 0.05$ ); hence the null hypothesis is retained. For barriers, the calculated t value is 1.59 and P value is 0.12 ( $P > 0.05$ ); hence the null hypothesis is retained. And for preferability, the calculated t value is 1.93 and P value is 0.06 ( $P > 0.05$ ); hence the null hypothesis is retained. The calculated t value for overall attitude of undergraduate students towards using mobile phone for educational purposes is 1.32 and P value is 0.19 ( $P > 0.05$ ).

Then, it can be concluded that with respect to the attitude towards the usability of mobile phone undergraduate students pursuing science stream do not differ significantly from the students pursuing arts stream. In case of attitude towards barriers of using mobile phone, there lies no significant difference between students of different academic disciplines. Again, in case of attitude towards preferability of using mobile phone for educational purpose, it is seen that undergraduate students pursuing B.A. courses do not differ significantly from the students pursuing B.Sc. courses. However, in overall, the B.A. and B.Sc. students do not differ significantly in their attitude towards using mobile phone for educational purpose.

From Table 3, it is seen that the calculated t value for the medium of education wise attitude towards usability is 1.14 and P value is 0.26 ( $P > 0.05$ ); hence null hypothesis is retained. For barriers the calculated t value is 3.66 and P value is 0.00 ( $P < 0.05$ ); hence null hypothesis is rejected. For preferability the calculated t value is 0.24 and P value is 0.81 ( $P > 0.05$ ); hence null hypothesis is retained. The calculated t value for the overall attitude of undergraduate students towards using mobile phone for educational purpose is 2.81 and P value is 0.01 ( $P < 0.05$ ).

Therefore, it is concluded that with respect to the attitude towards usability of mobile phone for educational purpose Bengali and English medium undergraduate students do not differ significantly whereas in case of attitude towards barriers of using mobile phone, there exists significant difference between English and Bengali medium undergraduate students. Again, in case of, attitude towards preferability, it is seen that the attitudes of English and Bengali medium undergraduate students do not differ significantly. However, Bengali medium undergraduate students possess significantly different attitude from the English medium undergraduate students towards using mobile phone for educational purpose.

The analysis in Table 4 shows that the calculated t value for residence-wise attitude of undergraduate students towards usability is 3.08 and P value is 0.00 ( $P > 0.05$ ); hence null hypothesis is retained. For barriers the calculated t value is 2.80 and P value is 0.01 ( $P < 0.05$ ); hence null hypothesis is rejected. And for preferability the calculated t value is 0.81 and P value is 0.08 ( $P > 0.05$ ); hence null hypothesis is retained. The calculated t value for the overall attitude of undergraduate

**Table 1.** Attitude of the undergraduate students with respect to gender.

Dimensions	Gender	Mean	S.D.	t-value	P
Attitude towards usability of mobile phones	Male	60.74	6.98	1.46	0.15
	Female	63.07	4.68		
Attitude towards barriers of mobile phones	Male	8.41	2.24	8.95*	0.00
	Female	13.86	2.27		
Attitude towards preferability of mobile phones	Male	24.78	2.59	1.32	0.19
	Female	25.71	2.66		
Overall attitude of undergraduate students	Male	93.93	7.31	5.57*	0.00
	Female	102.64	3.81		

\*=Significance at 0.05 level.

**Table 2.** Attitude of the undergraduate students with respect to academic discipline.

Dimensions	Academic discipline	Mean	S.D.	t-value	P
Attitude towards	B.Sc.	62.08	7.12	0.17	0.87
Usability of mobile phones	B.A.	61.80	4.96		
Attitude towards barriers of mobile phones	B.Sc.	10.36	3.40	1.59	0.12
	B.A.	11.87	3.57		
Attitude towards preferability of mobile phones	B.Sc.	24.52	2.68	1.93	0.06
	B.A.	25.87	2.50		
Overall attitude of undergraduate students	B.Sc.	96.96	8.26	1.32	0.19
	B.A.	99.53	6.16		

\*=Significance at 0.05 level.

**Table 3.** Attitude of the undergraduate students with respect to medium of education.

Dimensions	Medium of education	Mean	S.D.	t-value	P
Attitude towards usability of Mobile Phones	Bengali	61.44	6.33	1.14	0.26
	English	63.67	4.31		
Attitude towards barriers of Mobile Phones	Bengali	10.35	3.34	3.66*	0.00
	English	14.17	2.55		
Attitude towards preferability of mobile phones	Bengali	25.21	2.82	0.24	0.81
	English	25.42	2.02		
Overall attitude of undergraduate students	Bengali	97.00	7.40	2.81*	0.01
	English	103.25	3.84		

\*=Significance at 0.05 level.

students towards using mobile phone for educational purpose is 5.27 and P value is 0.00 ( $P < 0.05$ ).

Hence, it can be concluded that with respect to the attitude towards usability and preferability of using mobile phone, the undergraduate students residing in rural areas do not possess significantly different attitude from the undergraduate students residing in the urban areas; while, in case of, attitude towards barriers of using mobile phone for educational purpose, there exists significant difference between rural and urban undergraduate

students. Still, rural undergraduate students possess significantly different attitude from that of urban undergraduate students towards using mobile phone for educational purpose.

## DISCUSSION

From the present study, it has been found that the attitude of undergraduate students towards using mobile

**Table 4.** Attitude of the undergraduate students with respect to area of residence.

Dimensions	Area of residence	Mean	S.D.	t-value	P
Attitude towards usability of mobile phones	Urban	64.03	5.20	3.08	0.00
	Rural	59.40	5.97		
Attitude towards barriers of mobile phones	Urban	12.33	3.58	2.80*	0.01
	Rural	9.80	3.03		
Attitude towards preferability of mobile phones	Urban	25.83	2.59	1.81	0.08
	Rural	24.56	2.60		
Overall attitude of undergraduate students	Urban	102.20	4.51	5.27*	0.00
	Rural	93.76	7.27		

\*=Significance at 0.05 level.

phones for educational purpose varies according to gender, medium of education and residence though the academic discipline (science or arts) does not impose any significant difference according to the study. Mobile phones have a potential of improving the teaching and learning processes as the tools are cheap compared to other ICTs which can be used for teaching and learning (Mtega et al., 2012). Though most scholars agreed that the gender gap in internet use had narrowed significantly among students in college age-group (Goodson et al., 2001; Odell et al., 2000) and also among general population (Brenner, 1997; Jackson et al., 2001; Ono and Zovodny, 2003; as cited in Ozoemelem, 2010), there are contradicting views too. Several studies reported that technologies were not utilized in similar ways by men and women and as a result some differences still existed (Mitra et al., 2005; Smith and Necessary, 1996; as cited in Economides and Grousopoulou, 2008). And likewise, this study has also found significant difference of attitude between male and female undergraduate students. In a third world country like us the gender gap in technological aspect like using mobile phone is much prominent but interestingly this study shows that the mean responses of female students in all the three dimensions are greater than that of their male counterpart. Hence, the female undergraduate students have more positive attitude towards using mobile phones for educational purposes than the male undergraduates.

According to this study, there is a meager difference between the mean responses of B.A. and B.Sc. students. As a result, there exists no significant difference between the attitude of undergraduate students pursuing arts and science discipline. But there should also lay significant differences in the attitude of students according to academic discipline (B.Sc. or B.A.). It may be due to the fact that students pursuing technical course like B.Tech, M.Tech or BCA, MCA or medical courses were not surveyed. Hence this may be considered a major loophole of the study. In different countries also science students have considered m-learning as an effective

method gaining knowledge (Al-Fahad, 2009). As technology is a necessary pre-requisite for better understanding of different scientific realities and theories, hence, it is quite predictable that e-learning and/or m-learning provide the students their much-needed data and vast knowledge base at a time and place. Therefore, they should have more positive attitude towards the use of mobile phone for educational purpose.

From this study, it can be concluded that Bengali and English medium students have significant difference in the attitude towards using mobile phone for educational purpose. The mean responses of English medium students are greater than Bengali medium students. Therefore, it can be concluded that the English medium undergraduate students have more positive attitude towards using mobile phone for educational purpose than the Bengali medium undergraduate students. It may be due to the factor that lately it has become a trend that children of well-to-do or in fact middle (and upper) class families go to the English-medium private schools (DISE, 2010-11) where use of technology is an important pre-requisite and a common happening. It can be easily noticed that English-medium students have much easier and much earlier access to various technological improvements like computer, laptop, iPads etc. Hence the difference of attitude may be attributed by the fact that the students with English medium background may have more resources and privilege of using technology like mobile phones not only for talking but also for educational purpose.

Residence-wise difference of attitude among students towards the use of mobile phone for educational purpose can be recognized as the people living in the rural areas throughout their lives find it difficult to cope-up with the new technology (RTBI, 2008). Other factors can also be counted such as the residents of rural areas consider technology such as mobile phone as an instrument of necessity and mainly useful for connecting with people whom they cannot visit regularly. Besides, the students residing in the rural areas are not aware of the advan-

tages of e-book, e-journal in contemporary higher studies. Hence, the rural folks have lesser positive attitude towards using mobile phone than the urban students, as par this study.

### Suggestion for further study

Further researches can be done to find out among the multitude of applications and services provided by mobile phone which one is the most convenient and popular among college students particularly for educational purpose. Studies may also be directed to explore the difference of attitude towards using mobile phone between the students of literature on one hand and technical, medical and engineering students on the other hand. Purposeful research can be done to measure the attitude of students of various ages like children, adolescents, teenagers, young-adults and adults towards the use of mobile phone for educational purpose and thus we can get a better scenario of comparison and contrast regarding various age-groups. Thus, various interesting and purposeful researches can be done regarding attitude of students towards using mobile phone.

### Conflict of Interests

The authors have not declared any conflict of interests.

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