International Journal of Library and Information Science Vol. 3(6), pp. 104-114, November 2012
Available online http://www.academicjournals.org/ljlis
DOI: 10.5897/IJLIS12.018
ISSN 2141 – 2537 ©2012 Academic Journals

Full Length Research Paper

Problems and prospects of the information services based on the mobile phone in Bangladesh

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Accepted 3 July, 2012

The purpose of this study was to discuss the mobile phone based information services in Bangladesh and then describes the telecommunication facilities (and hence information access and provision) of mobile phone-based information services companies in Bangladesh including Grameenphone, Robi (Aktel) Banglalink, Citycell, Airtel (Warid) and Teletalk. The paper then highlighted problems and prospects, in rural areas of Bangladesh, of providing information services through mobile phones. This study used qualitative approaches along with review of related literature. The conceptual and textual information related to the present study were collected from personal visit, primary and secondary sources of information such as books, journals, magazines, newspapers, conference proceedings, official documents and unpublished sources. Web sites were also used for collecting related information. The paper highlights the existing mobile phone based information services in Bangladesh and discusses their problems and prospects.

Key words: Mobile phone, information services, grameenphone, robi (aktel), banglalink, citycell, airtel (warid) and teletalk.

INTRODUCTION

Information is an essential resource and can play a fundamental role in the socio-economic development of a country like Bangladesh (Islam, 2010). Ngulube (2000) pointed out that information is a prerequisite to raising educational standards, advancing democracy, participating in decision making, developing the economy and enhancing the quality of life. For the development of Bangladesh, a number of information sources like Radio, TV, Newspaper, Internet, Mobile phone, GOs and NGOs, community information centres as well as library delivery information services. But methods of providing information services may vary according to need of the people of Bangladesh. Mobile telephones will enhance the extension of information support to those who will need it. Bangladesh enjoys the facility of using mobile telephone along with landline telephone. “Teletalk” is the state owned mobile telephone service. There are five private mobile telephone service providers in the country. These are Grameenphone, Citycell, Robi (Aktel), Banglalink and Airtel (Warid). The private mobile operators have been made a contract with Bangladesh Telecom Company Limited (BTCL, 2012). As a result, all the private mobile operators have incoming and outgoing facilities with BTCL’s landline telephone. According to the BTRC, the mobile operators call charges now range between maximum Tk 2 and minimum Tk 0.25 per minute. The average mobile industry call rate now is Tk 0.70 per minute (Islam and Hasan, 2009). According to Bangladesh Telecommunication Regulatory Commission (BTRC) statistics (March 2012), the total number of cell phone users is 89.457 million. The mobile phone density in Bangladesh is 44.6 phones per 100 inhabitants in March 2011 (Bangladesh Economic Review, 2011). Grameenphone is the largest mobile phone service provider in Bangladesh, with 37.633 million subscribers. Besides, subscribers of other five operators are Banglalink 24.741 million, Robi 17.664 million, Airtel 6.345 million, CityCell 1.786 million and TeleTalk 1.285 million (BTCL, 2012).

Objectives of the study

The main aim of this study was to discuss the mobile

phone based information services in Bangladesh and then describes the telecommunication facilities (and hence information access and provision) of mobile phone-based information services companies in Bangladesh. In addition, the study also aims to attain the following objectives:

1. To find out the problems of using mobile phone in rural areas in Bangladesh;
2. To investigate the prospects of using mobile phone in rural areas in Bangladesh; and
3. To highlight the existing mobile phone based information services in Bangladesh.

METHODOLOGY

Primarily this study was based on case study methods. It used only qualitative approach along with review of related literature. The conceptual and textual information related to the present study were collected from personal visit, primary and secondary sources of information such as books, journals, magazines, newspapers, conference proceedings, official documents and unpublished sources. Web sites were also used for collecting related information.

WHAT IS MOBILE PHONE?

The whole world is going mobile. Phones, computers and media devices now fit in our pockets and can connect us to a variety of information sources and enable communication nearly everywhere we go. There is considerable interest in exploiting almost the universal appeal and abundance of these technologies for their various usages (Naismith et al., 2006). An electronic telecommunications device often referred to as a cellular phone or cell phone. Mobile phones connect to a wireless communications network through radio wave or satellite transmissions. Most mobile phones provide voice communications, Short Message Service (SMS), Multimedia Message Service (MMS) and newer phones may also provide Internet services such as Web browsing and e-mail. The first hand held phone was demonstrated by Martin Cooper of Motorola in 1973, using a handset weighing in at two kilos (Heeks, 2008a). By the end of 2009, the number of mobile cellular subscriptions worldwide reached approximately 4.6 billion, penetrating the developing economies and reaching the bottom of the economic pyramid (Heeks, 2008b).

MOBILE PHONE BASED INFORMATION SERVICES IN BANGLADESH

Mobile phone based information services in Bangladesh (Table 1) are noted as follows:

Health information and advice services

Most of the operators in Bangladesh provide health information and advice services through mobile phone. As a result, one can easily get into health service round the clock through mobile phone.

Table 2 reveals that Grameenphone, Banglalink and Airtel provide health information and advice services on 24 h respectively, by name HealthLine, HealthLink and Tele Health. It also shows that the service line of Grameenphone, Banglalink and Airtel are 789, 789 and 10600, respectively. Only Banglalink provides the Blood Bank Service through 8008 service line.

Case study 1: Access to mobile phone and health information services

Sumi Khatun, Age - 32 years, Village - Sulunga, District - Rangpur, is a mother of one son and one daughter. Few months ago, one of her child got sick of severe fever and vomiting at the midnight. She used cell phone of Grameenphone and she knew the Grameenphone's heath line number. She talked to the doctor and got suggestion about the disease of her child. With that suggestion her child got well within short time. Mobile health information service removed her anxiousness and helped her child to get better at dead of night.

Social awareness through mobile phone

Most of the mobile phone companies in Bangladesh provide social awareness services in various kinds of national day, international day, etc.

The Table 3 shows that most of the operators provide the health awareness, roads and highway, use of electric bulb, *namaz* (prayer) timing, news service etc. regularly in time.

Educational information through mobile phone

Most of the mobile phone operators in Bangladesh provide educational and institutional information to its users/clients regularly. These are given as follows:

Publication of results

All the education boards of Bangladesh now publishing their results of various exams through mobile phone. For example, SSC Result! Type: First 3 letters of Board name<space>Roll Number and SMS to 16222. That is, Dha 123456. Charge and conditions apply.

Information on admission in foreign popular universities

Mobile phones are providing information on admission in

Table 1. Mobile phone companies and their services in Bangladesh.

Name of the operators	Year of established	Features of services	Website
1. Citycell (Pacific Bangladesh Telecom Limited)	1989	Call back service, citycell online self care	www.citycell.com
2. Banglalink (Orascom Telecom Bangladesh Limited)	1996	Information based services, entertainment, data based services, call management services, mobile financial services	www.banglalinkgsm.com
3. Grameenphone (Grameenphone Ltd.)	1996	Health line, Grameenphone Community Information Center, missed call alert, business SMS, stock information, call services, messaging information services, e-bill services, Internet and data services, Wireless Internet services, call block services, cricket update, stock information, business directory, voiced-based services, SMS based alerts/services, Bill pay, Mobile back up, customer services	www.grameenphone.com
4. Robi (Aktel) (Axiata Bangladesh Limited)	1996	BBC janala, SMS services, Internet sites, buzz TV, accessing the audio services, religious services	www.robi.com.bd
5. Teletalk (Teletalk Bangladesh Ltd.)	2004	GPRS, push-pull services, SMS services, ISD and EISD services, DESA load shedding push-pull service, Mobile Applications through GPRS, Mobile Applications through GPRS, Voice SMS	www.teletalk.com.bd
6. Airtel (Warid) (Airtel Bangladesh Limited)	2005	Messaging services, data services, news and up dates, astrology, finance, devotional, information service, emergency information, recharge and bill payment, telemedicine services	www.airtel.com

Ascending by the year of establishment.

Table 2. Health information and advice services through mobile operators.

Type of the service	Operator	Service line	Duration (h)
Healthline services	Grameenphone	789	24
Healthlink services	Banglalink	789	24
Tele health services	Airtel	10600	24
Blood bank services	Banglalink	8008	24

Table 3. Social awareness through mobile phone.

Types of awareness	Operator	Example
Health awareness	Grameenphone	National immunization programme
Roads and Highway	Grameenphone	Obey all traffic signals, lights and signs. Drive your vehicle in designated lane and keep center of the lane. Use indicator to change lane. – DMP Traffic
Use of electric bulb	Grameenphone	Govt. distributed FREE CFL bulb. Grameenphone provided message to its consumer: Collect it from CFL distribution center by submitting normal bulb and recently paid electric bill.
Namaz (prayer) timing	All operators	Such as Grameenphone provides daily namaz timings through IVR. Please dial 2200 to listen daily namaz timing.
News service	Most of the operators	For this just dial 2000 to listen to latest news. (ATN Bangla, Channel I, Ekushey TV, Bangla Vision, BDnews24.com, Alzajeera)
Right to information	Grameenphone	Grameenphone aware its consumer about right to information.

foreign popular universities and IELTS/TOFEL/GMAT/GRE exams every day from 8 am to 10 pm. For this service, any Grameenphone operator can dial just 2255.

University admission process through mobile phone

Teletalk launched the services of university admission through mobile phone messaging recently. In 2010, more than 20 public universities of Bangladesh completed application procedures for the university admission through Teletalk.

BBC Janala (English learning way)

Most of the mobile phone operators in Bangladesh are committed to encourage English learning in the people of Bangladesh.

Case study 2: Access to mobile phone and education information services:

2a. Sahjahan, Age - 40, Village - Vendabari, District - Rangpur, is a father to a student. He said, earlier, results anxious for result. But, now the situation has been changed. Now the students get Exam result through mobile phone just after publishing the result at the web-site.

2b. Ruhul Amin, Age - 45, Village - Panbari, District - Rangpur, a father to a student. He gave this information that, 2 years earlier, it was not possible to apply for Honours admission in university without going to the concerned university. My son applied for Rajshahi University, which was 200 km far from Rangpur. He went there and completed the application procedure. But, in 2010, my daughter applied for Rajshahi University through mobile phone. Such a way, she completed application procedure. She got admission test information and her result from my house.

Commerce

Most of the operators in Bangladesh are providing commerce facilities to its clients. Such as:

Mobile banking

Mobile banking (also known as M-Banking, mbanking, SMS Banking etc.) is a term used for performing balance checks, account transactions, payments etc. via a mobile device such as a mobile phone. Mobile banking today is most often performed via SMS or the Mobile Internet but can also use special programmes, called clients, downloaded to the mobile device (Tiwari et al., 2007). In one academic model, mobile banking is defined as: "provision and availment of banking and financial services with the help of mobile telecommunication devices. The scope of offered services may include facilities to conduct bank and stock

SMS banking

Enjoy hassle-free account updates from renowned banks like Standard Chartered Bank, BRAC Bank, Bank Asia,

Prime Bank, Dutch Bangla Bank, etc.

SMS information service

When subscribers can not find the time to check up on the latest news, share market information, currency exchange status or directory information, operators SMS information service can update users.

Purchase of lottery tickets

Some of the mobile phone operators in Bangladesh are providing their subscribers with the help of purchasing tickets easily through mobile phone. For example, Bye each Tk.10 Bangladesh Scouts Lottery and WIN Tk.25 lacks! Type BDS and send to 16208 now. Type BDS <no. of ticket> for multiple tickets. Condition: apply.

E-bill – a new dimension for receiving bill service

E-bill is softcopy invoice distribution to customers through email to their subscribed email address. All postpaid customers are eligible for this service. Summary bill for Business Solution companies only Individual bill for all postpaid customers. waited for and were received after a long time. The result for S.S.C., H.S.C. and Degree (Pass) examination were to the students of rural area in evening. The students, teachers and guardians were

Community information centre (CIC) of Grameenphone

The Grameenphone Community Information Centre (CIC) is a shared premise where rural people may access a wide-range of state of art services such as internet, voice communications, video conferencing and other information services. The main aims of CIC are bridging the "digital divide" by providing information access to rural people, alleviating poverty, educating the underserved and underprivileged on information-based services, etc. (Grameenphone, 2006). The first 16 CICs were launched in February, 2006 as a pilot project in different parts of the country. Of these, four each were set up in Sylhet, Rajshahi and Khulna divisions and two each in Dhaka and Chittagong divisions. In May, 2006, another ten CICs were established, of which seven are in Chittagong, two in Dhaka and one in Rajshahi divisions (Raihan, 2007). The CICs are equipped with at least one computer, a printer, a scanner, a web cam and an EDGE-enabled modem to access the internet using the EDGE connectivity. Currently it has set up more than 550 CICs in rural areas. These centres have narrowed the gaping digital divide between the urban and rural populace, giving over 20 million people access to the internet and other information-based services (Raihan, 2007). The CICs help rural people to stay in touch with their friends and relatives living abroad using email, fax and instant messaging. The CICs also help students and professionnals in gathering reports and news suiting their requirements. The CICs also provide the following services – content on health, agriculture, etc.; chatting with voice, picture; video conferencing; typing, scanning, printing; commercial mobile call; e-governance services; GP value added services such as Flexi Load, ring tones downloading, CD writing, telemedicine and multimedia education for children (Meena Cartoon, courtesy of UNDP). The CICs are run as a franchise of Grameenphone (Grameenphone, 2006).

Case study 3: Access to mobile phone and social bondage

Jabbar, Age - 40, Village - Sharifpur, is a school teacher. He informed that mobile phones are now extensively used for communication and are the most popular sources of information, in particular, when we need to contact our relatives living abroad, or for children studying outside the community.

Tathya Tari (information boat) services

As part of a future initiative, Grammenphone and CARE Bangladesh have entered into a contract to launch a project titled "Tathyo Tari" (information boat), designed to provide necessary livelihood information in the riverine communities of Bangladesh. The main objective of this project is to educate and empower rural communities with necessary and appropriate livelihood information (Grameenphone, 2007). The information boats will work as an information hub to meet the communication needs of rural communities, especially the Char and Haor (shoal and water body) areas, as people of these areas have limited access to up-to-date livelihood and other information due to their remoteness. These boats will be equipped with digital content such as livelihood and agricultural information, suited for the specific areas serviced by the designated boats, which will move from one place to another. Moreover, skilled persons from CARE Bangladesh (part of CARE international) will provide training to the local community on different livelihood options. A typical information boat will also be equipped with computers, internet and email facilities, photocopiers, fax machines, printers, camera, TV and video machines, scanners and much more depending on the needs of the community. Grameenphone will provide support to build four such information boats and also provide necessary technological support for providing information (Grameenphone, 2007) (Figure 1).

Figure 1. Tathyo Tori (information boat).

Business information services

Business information through mobiles are noted as follows:

Babsha jigyasha (Banglink)

Banglalink brought babsha jigyasha 7677, a one stop solution for existing and potential SME owners in need of business related advice. Now it is possible to just dial 7677 and get useful advice on important issues relating to business, 24/7, which not only saves valuable time and effort but also minimizes operational cost.

Business directory (Grameenphone)

All contact information is now in subscriber's hands! Business directory is an index of all user required addresses, phone numbers and websites of business organizations. Now all necessary contact information is just a click away, anytime, anywhere!

Just go to "Business City" in GP WORLD (grameenphone.com/business) from handset, and search for the contact information under "Business Directory" in the following manner:

- Business directory now makes business communication easy.
- All grameenphone subscribers can avail this service.
- This service is available for EDGE/WAP enabled handsets only.
- Bracnet bears all responsibilities for the information.
- Standard browsing charges applicable.
- Conditions apply.

Mobile phone internet and data services

Almost all the operators in Bangladesh are providing the following services through mobile phones to its clients.

High speed data service

Grameenphone's high speed mobile coverage, powered by EDGE, allows subscribers enjoy a series of services like e-mailing, downloading, and browsing. If user move out of EDGE coverage the phone automatically switches to GPRS, ensuring you connection without any interruption. Moreover, subscribers EDGE-enable phone functions as a wireless data modem when users connect to any laptop.

Mobile data transfer

People can easily transfer data to share among colleagues, access servers when moving in a remote area, and even connect to the Internet from users own PC by using mobile network.

Mobile fax

It's just like having subscribers own traveling office! All

people need is a computer notebook, business solutions mobile phone, a cellular data card and a connector. Subscribers are ready to send faxes, as well as, retrieve it from any available fax machine.

Mobile internet

With this service user can access a number of mobile Internet sites such as yahoo mail, hotmail, google, msn, for news services, travel information, sports updates and much more.

Mobile E-mail

Mobile e-mail is designed such that subscribers are never far from their business. Access office e-mail, corporate address book, and view business appointments. Mobile email lets we use through mobile as we would our computer.

Wireless internet service (WIS)

Connect all computers and EDGE-enable mobile devices anywhere in the country with intranet. Enjoy all the benefits of securely sharing data within company LAN and save communication costs like never before. Call the key account manger assigned to users' company from business solutions to avail the service.

Case study 4: Access to mobile phone and access to Internet world: Razu, Age - 36, Village - Sulunga, District - Rangpur, is a university teacher. He gave this information, that when I came to village I was out of Internet. But now, when we come to village we can avail the Internet facilities from cell phone and can read email, use face book, chatting with friends. It's really a great invention. Because from my village we read all the English and Bengali newspaper through cell phone and get all necessary information services.

Messaging information services

Most of the operators provide the following information services:

Short message service (SMS)

Short message service is a value added service where one can send message via text. Subscriber can share their feelings; memorable events with another mobile without making any phone call. SMS allows subscribers to send and receive text messages from mobile handset to any other mobile handset. The highest characters of any message are 160.

International SMS

International SMS is a very useful service that allows subscribers to exchange SMS with user's friends, family members and loved ones in foreign countries. Currently, Banglalink covers 172 countries, 644 operators in six continents.

SMS

Fast and affordable messaging through mobile phone is possible. Send a SMS to any mobile phone in Bangladesh and to more than 115 countries with international SMS service.

Voice SMS

Save time and personalize subscribes message through a voice SMS. This service provides user the flexibility to record up to 120 s of audio; so even if user desired number is unreachable, message will reach out live!

Voice mail

When users are unreachable or unable to answer any call within 20 s, the service will automatically divert the call to voice mail. User will receive a SMS notifying us that we have a message and we may retrieve it at a convenient time.

MMS (multimedia messaging)

The MMS service provides subscribers the opportunity to take pictures, customize it with animation, music, video clips and send it across the globe within seconds.

Cell e-mail

Send e-mails without a computer. With cell e-mail, users have the facilities to e-mail any GP number through an SMS and email any PC across the globe.

SMS plus

Stay updated through SMS plus – the service allows subscribers to update and receive information on daily sales (or any user defined updates) through SMS reporting.

Sports

Most of the operators provide sports update to its clients.

Anyone can get the live scores through push-pull SMS, just type "cric" and send to 2002. In return, clients will get the updated scores. To unsubscribe from the service, type "cric off" and send to 2002. Clients will get SMS alerts for fall of every wicket, milestones (like player or team 50 and 100 s) and match summary.

Utility bill service

Grameenphone and banglalink bill pay services

Grameen phone and Banglalink bill-pay service offer a simple and convenient method for us to pay our electricity bills. Now we can easily pay our electricity bills from our Banglalink mobile phone, at any time, 7 days a week, as well as the nearest bill-pay point that has been authorized by Banglalink and Grameen phone.

Agricultural information through mobile phone

Banglalink has introduced krishi jigyasha 7676, which will provide suggestions and answers to any queries related to agriculture, vegetable and fruit farming, poultry, livestock, fisheries etc. Banglalink is the pioneer in Bangladesh in launching such a service. To use this service a Banglalink customer just needs to dial 7676, talk and get expert's advice on the problem. At present, the service can address problems related to harvests, pesticides, agro diseases, information on seeds, fertilizers, poultry and livestock feed, fisheries techniques and much more. Bangladesh, being an agriculture intensive country, this service will make a difference to many earning their livelihood in these sectors. The service will give them easy access to valuable advice and solutions to problems (Banglalink, 2012).

Case study 5: Access to mobile phone and agricultural information

Mazibar, Age - 50 years, Village - Gopallpur, District - Rangpur, is a farmer. He gave this information, that I cultivated betel leaf in my lands. When all the leaves were infested by pests, I made a call over cell phone to local Agriculture Extension Officer for advice. Based on the advice given, I used insecticide. As a result I have highly benefited from mobile phone agricultural information services.

Mobile money transfer service

Bangladesh post office (BPO) launched its mobile money transfer service throughout the country to ensure easy and fast money transfer. The BPO has signed an agreement with Banglalink for the total connectivity of the service. Now, anyone can send money within two or three minutes through this mobile-based money transfer service while manually it takes at least three to 5 days and even seven days. To avail this service, an interested sender will have to fill up a form mentioning his or her name, address and mobile phone number and also the name and address of the recipient.

The money order issuer post office will send the data to the central server, which will in turn send an automatically-generated personal identification number (PIN) through a short message service (SMS) to the mobile phone of the sender.

The sender then will tell or send the PIN number to the recipient through SMS. However, a secret code for the recipient is a must for withdrawing money from the post office nearby (The Financial Express, 2010).

Case study 6: Access to mobile phone and sending money

Rashid, Age - 47, Village - Veemshahor, District - Rangpur is a farmer. His son studies in a university. He sends him money every month. Earlier he would send money through post office. His son would have to wait for a long time to get the money. It would take 15/20 days after sending money. At present mobile phone relieved him from such hazard. He sends money through mobile phone, which helped to get money in short time. Now his son can receive and use money in the time of need.

E-ticketing service for Bangladesh railway

Bangladesh Railway launched electronic ticketing service to ease the sufferings of passengers. Using Grameen-phone's "Mobitaka" service, rail passengers are able to purchase electronic railway tickets 10 days prior to their travel using mobile phones.

To buy an e-ticket a customer have to press *133# in his mobile phone and enter a menu. The menu will generate windows where the customer has to furnish necessary travel information following instruction.

After the input, the customer has the option to either book tickets or purchase them instantly, subject to availability of tickets.

An SMS notification with ticket numbers are sent to the customer which required to collect paper tickets from the train station at least an hour prior to departure.

Case study 7: Access to mobile phone and e-ticketing service

Rubel, Age - 25 years, Farmgate, Dhaka, is a service holder at Chittagong. He gave this information: mobile phone helped me lot regarding railway e-ticketing information services. Just one year earlier, it was not

possible to collect a railway ticket without standing on a long line. It was so hazard and hassle. But, today I can collect the train ticket through a cell phone from my room.

PROBLEMS OF MOBILE PHONE-BASED INFORMATION SERVICES IN BANGLADESH

Mobile phone-based information services in Bangladesh face several problems, including the following:

Poor literacy rate and language barriers

The literacy rate is lowest in rural areas of Bangladesh. There are very few people who can assess or interpret the content on mobile phone in the vernacular Bengali languages. This definitely hinders the use of available relevant world information by the large number of people in Bangladesh as literate people of both urban and rural areas are mostly Bengali speaking.

Financial problem

Most of the mobile phone based information services operators in Bangladesh provide charge based information, which is very difficult to access for the low earning people.

Lack of operating skill

The level of skills about mobile phone navigation is still low in Bangladesh. Thus, people feel awkward to use mobile phones.

Lack of reliable communications infrastructure and insufficient bandwidth

Lack of reliable communications infrastructure and insufficient bandwidth is also a factor hampering effective take-up of services.

An unreliable supply of electric power

An unreliable supply of electric power is another hindrance in the provision of ICT-based services. All the villages of Bangladesh do not have electrical facility. That's why the rural people do not feel the effect of mobile phone based information services.

PROSPECTS OF MOBILE PHONE BASED INFORMATION SERVICES IN BANGLADESH

Mobile phone based information services facilitate sharing of information and help create common, local development visions. Through mobile phones, communities can be accurate and timely information which is a crucial ingredient for successful development is achieved. Mobile phone operators offer opportunities to reduce the isolation and marginalization felt by rural communities. They also offer the opportunity for a dialogue to take place between rural communities and decision making bodies that influence these communities, such as government institutions, planners, development agencies, researchers, educators, etc. Mobile phone operators may also offer the opportunity to coordinate development efforts as well as share experiences, knowledge and "lessons learned" with other communities.

Furthermore and very importantly, mobile phones facilitate the development of individuals' capacities to participate as active producers of information rather than just passive receivers (Crowder, 1998). Mobile phone based information services may provide the following opportunities and advantages for rural development in Bangladesh:

To know the world's up-to-date information

The rural population may know the world's up-to-date information through the mobile phones. As a result the information discrimination between urban and rural areas will be reduced and knowledge and awareness of the greater world outside the village will be increased.

Information services must be free of charge

All the operators provide information by taking a charge. They can provide it free of charge for a better development in Bangladesh.

Work as a unique platform for exchanging ideas

The mobile phone may work as a unique platform for exchanging ideas among the villagers. As a result villagers may undertake cooperative development initiatives to the benefit of the entire community.

To enrich information and knowledge

The rural dwellers may enrich their information and knowledge base by receiving information services from the mobile phones. They may become aware of education, agriculture, health, environment, politics, current affairs, MISs in Bangladesh economics, human rights, the law, etc. As a result this, they will be able to participate fully and successfully in national socio-economic activities.

Easily communicate with relatives

Through mobile phones, the rural population may easily

communicate with their relatives who are living abroad. Besides, students and unemployed adults may take opportunities of higher education and employment through the Internet and e-mail.

To increase the awareness, ability, knowledge and personality

Mobile phone based information services will help increase the awareness, ability, knowledge and personality development of rural dwellers.

Alternative in rural areas for accessing ICT based information services

Most of the people in rural areas cannot afford to pay the maintenance costs of Internet. In this case, mobile phone based Internet services may be the only alternative in rural areas for accessing ICT based information services.

Mobile as a behaviorist

In the behaviorist paradigm, learning is thought to be best facilitated through the reinforcement of an association between a particular stimulus and a response.

Mobile as a constructivist

In the constructivist approach, learning is an active process in which learners construct new ideas or concepts based on both their current and past knowledge. Learners are encouraged to be active constructors of knowledge, with mobile devices now embedding them in a realistic context at the same time as offering access to supporting tools.

Mobile as situated

Situated learning posits that learning can be enhanced by ensuring that it takes place in an authentic context. Mobile devices are especially well suited in context simply because they are available in different contexts, and so can be drawn on those contexts to enhance the learning activity.

Mobile as collaborative

Collaborative learning has sprung out from research on computer-supported collaborative work and learning (CSCW/L) and is based on the role of social interactions in the process of learning.

Mobile as informal and lifelong learning

Research on informal and lifelong learning recognizes that learning happens all the time and is influenced both by our environment and the particular situations we are faced with. Informal learning may be intentional, for example, through intensive, significant and deliberate learning 'projects' (Tough, 1971), or it may be accidental, by acquiring information through conversations, TV and newspapers, observing the world or even experiencing an accident or embarrassing situation. Such a broad view of learning takes place outside the classroom and, by default, embeds learning in everyday life, thus emphasizing the value of mobile technologies in supporting it. An example in this category is the system described by Wood et al. (2003) where breast cancer patients are enabled to access trustworthy information about their condition, to communicate with other patients, and to keep track of the issues that concern them.

Mobile as learning and teaching support

Education as a process relies a great deal on coordination of learners and resources. Mobile devices can be used by teachers for attendance reporting, reviewing student marks, general access of central school data, and managing their schedules more effectively. In higher education, mobile devices can provide course material to students, including due dates for assignments and information about timetable and room changes.

Conclusion

The right to information has become one of the basic needs of all the people of the community. Mobile technologies can have a great impact on learning. Learning will move more and more outside of the classroom and into the learner's environments, both real and virtual. Learning will involve making rich connections within these environments to both resources and to other people. In addition to consulting internet-based resources on the move, learners will be able to manage the administration of their learning through consultations with their personal diaries and institution-based virtual learning environments. The ability to instantly publish their observations and reflections as digital media will empower them to be investigators. Context-aware applications will enable learners to easily capture and record events in their life, aid in recalling and sharing of experiences for collaborative reflection. Opportunities for distributed collaboration and mobile team working will be greatly enhanced. For providing access to information to the population, mobile phone based information services are a major potential platform. Mobile phone-based information services help villagers access the information they need. Mobile phone-based information services armed through mobile phones and internet connection could become the centre for all kinds of information

services such as health and family planning information dissemination and agricultural information services for the rural villagers who play an important role as catalyst for the rural development in Bangladesh. If mobile phone-based information services in Bangladesh successfully overcome the constraints discussed in this paper, they will certainly bring new opportunities for rural people, particularly women to enrich their lives, as well as, create revolutionary changes in rural societies. As a result, mobile phone-based information services will reduce the digital divide between urban and rural areas by improving access to technology, as well as, provide invaluable support through appropriate contents and advisory services in the livelihood struggle of large number of the country's rural population.

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