M-Learning: A Prospective Learning Process of Bangladesh of Today

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ABSTRACT
In this paper, it is tried to introduce a new learning system in respect of Bangladesh. Country-spread cellular network has already created a wide opportunity of centralize controlling. And in this instance, M-Learning (Mobile Learning) implementation in Bangladesh will act as a sturdy weapon against illiteracy of today. In addition, it also highlights the aforementioned issues and offers of ways to overcome the need of learning by employing today's the most advanced features of mobile technology that will act as a bridge in between human and learning.

KEY WORDS: M-Learning, Mobile SMS, Distance Learning, Wide Cellular Coverage Area, Adult Education Rate, Literacy Rate.

1.0 INTRODUCTION

Learning is a fundamental cognitive process of mental and social change over an entire lifetime [1, 2, 3]. Today, the organization of learning is changing, especially in secondary schools and universities. However, in this context, new technologies offer the opportunity for pupils and students to communicate and interact with multimedia learning resources and simulated environments [4]. Consequently, technology can enhance motivation, which is a vital aspect of learning [5], delivers information when it is needed, and encourages solving problems and satisfies curiosity [6,7]. Most of all, new technologies also offer the possibility to scaffold learners through an extended process of capturing and organizing situated activities.

To date, the use of computers in education has mostly been focused on enhancing learning in formal settings, typically in the traditional classroom or computer lab [8]. However, learning does not only take place within such formal learning settings. The use of mobile devices could expand learning possibilities and solve the problem of being tied to a particular location.

Generally, the combination of e-learning and mobile computing is called *mobile learning* (M-Learning) and promises the access to applications that support learning anywhere, anytime [9]. M-Learning has become an attractive target application area for corporate mobile devices. However, meanwhile hardware is considered as a solved problem; innovative, affordable and usable software cannot be the greatest challenge in today's techno heaven.

Converse to the approach of using handhelds or personal digital assistants (PDAs), *we have mainly proposed in this paper the support of pupils at secondary schools and universities by use of* mobile phones: Whereas PDAs, handhelds or small laptops are relatively expensive and consequently lack availability especially amongst pupils that is the core advantage of mobile phones is the high availability of such devices. But the matter of consideration is that this M-Learning process can be applied in possible sector of education in Bangladesh like in the entry level of literacy where the children or illiterate people can learn alphabet as well in MOBILE screen with audio visual enhancement.

The market penetration of mobile phones in Bangladesh is currently at a high level and the numbers are still increasing [Fig: 2.1(a)]. About 15% [12] of the total population is now using mobile which indicates the great revolution in the communication sector of Bangladesh and so it can be emphasized that the majority of the population in general and the young-generation in particular have a mobile phone available, which they have at *hand* most of the time. Considering this fact, M-Learning can be an important instrument for lifelong learning, thus a challenge for research and development in the area of mobile computing is utmost needed in the context of Bangladesh.

In this paper, we have revealed the different feasibility studies of M-learning in the following section followed by description of our proposing scheme.

2.0 FEASIBILITY STUDY OF M-LEARNING IN CONTEXT OF BANGLADESH

The feasibility of M-Learning in Bangladesh has been analyzed in respect of Nation Wide Coverage of Mobile Service, High Density of Illiteracy in Total Population, Low Higher Education Rate and Enhancing Adult Education Rate due to numerous advanced technological features in today's digital mobile phone with customizing functionality. In addition, it will also be handy way in distance learning.

2.1 Nation Wide Coverage of Mobile Service

The numerous numbers of people of Bangladesh (about 15%)[12] are enjoying mobile communication service throughout the country. And the number of mobile subscriber is increasing exponentially day by day. From the figure 2.1(a), it can clearly be stated that mobile subscribers' number is much larger in recent days in comparison with users of another popular communication networks like PSTN (Public Switch Telephone Network). Hence, M-Learning is right choice to be implemented in current context considering this most popular communication media of Bangladesh.

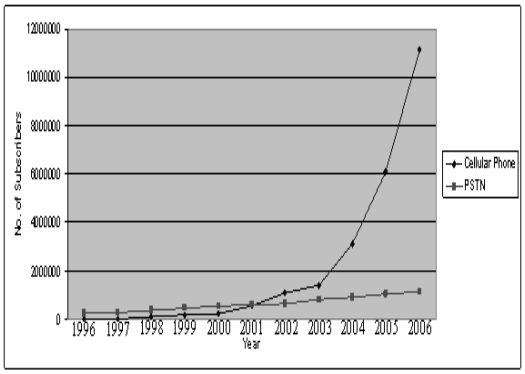

Fig 2.1(a): The recent growth of the phone subscribers in Bangladesh [11].

The number of mobile phone users in Bangladesh rose 135 percent in 2006 to 21.76 million [10] and can nearly be double this year. Six cell phone providers in our impoverished country of 140 million people added a record of 12 million customers last year, with some 2.6 million new subscribers who has signed up in December alone [10]. The exponential indication of mobile users in Bangladesh shows that it will grow up to 50 million by 2009.

GrameenPhone, majority owned by Norway's Telenor, has doubled its subscriber base to 10.76 million from 5.5 million in December 2005. But its market share has declined to 50 percent from 60 percent in 2005. Aktel, majority owned by Telekom Malaysia International, maintained its second place position, with the number of subscribers rising to 6 million from 2.07 million. Egyptian Orascom Telecom's Banglalink saw its client base grow by 2.61 million to 3.64 million customers. The only CDMA carrier CityCell, a joint venture between Pacific Bangladesh Telecom Limited and Singapore Telecommunications, grew to nearly 1 million users from 440,000 in 2005. State-run Teletalk attracted 400,000 customers by December. And the recent sixth operator, Warid Telecom International (LLC) of the United Arab Emirates, has recently launched its Bangladesh operations. And it has already achieved subscription of 0.1 million mobile users.

Name of the Operator	Subscriber(Jan 2007)
City Cell	967,972
Grameen Phone	10,758,708
Banglalink	3,641,811
Aktel	6,000,005
Teletalk Bangladesh ltd	403,172
Warid Telecom Int. LLC	1,002,063
Total	22,773,731

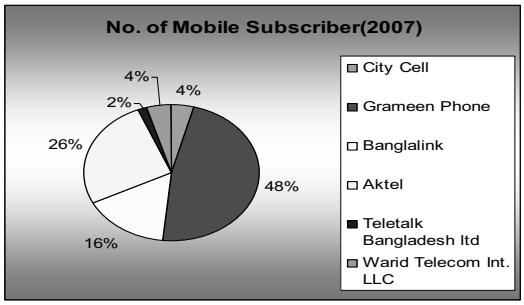

Fig 2.1(b): List of Telecom Operators and their subscriber numbers [12].

It can easily be realized from the above the figure 2.1(b) that Bangladesh is the country of huge amount mobile subscribers and it proves the proper feasibility of implementation of our proposed M-Learning.

2.2 High Density of Illiteracy in Total Population

Bangladesh is a developing country where only 41.1 % people [13] of total population are literate. It indicates that the larger portion of population (58.9%) of our country is still deprived from education. In this context, M-Learning can be a revolutionary education process against illiteracy.

Year	Literacy Rate
1961	17.00%
1974	26.80%
1991	32.40%
2006	41.10%

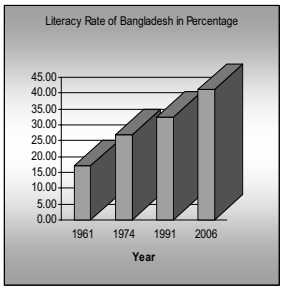

Fig 2.2: Literacy Rate at different years in Bangladesh [14].

It can be boldly said that the increase factor at Literacy Rate in Bangladesh (Fig 2.2) is quite linear where the increase of mobile subscriber in last recent years (Fig 2.1(a)) is exponential that also indicates the feasibility of implementing of M-Learning, an amplifying factor of the literacy rate.

M-Learning can be used for inaugural basic learning just like alphabet learning as well as for advanced level learning. Besides this, it has the higher probability to be a popular learning method due to the scope of deploying audiovisual learning material in simple digital phone.

2.3 Low Higher Education Rate

In Bangladesh, even illiterate people are now habituated of using mobile phone. In this instance, M-Learning will play a significant role to enhance higher education rate in Bangladesh.

Higher Education Level	Numbers of Students
University Student	207577
College Student	1367246

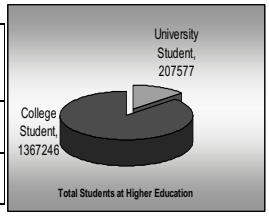

Fig 2.3: Overviews of higher education statistic in Bangladesh [17].

The current students at higher level (College & University Level) are 1,574,832 that are very small in comparison to the whole population of Bangladesh [17]. For, building our country as a strong and developed nation, higher education rate should be increased and so M-Learning implementation will be right choice for Bangladesh of today.

2.4 Enhancing Adult Education Rate

About 60.03% people [18] are adult in total population of Bangladesh among which only 41.1% are literate. Till the year 2005, 59.7% of total adult population in Bangladesh is literate which is very small in comparison to others countries of the world.

Adult Population (in thousands) Year	Sex	Literacy rate
1991	Both Sex	35.3
	Male	44.3
	Female	25.8
2001	Both Sex	47.5
	Male	53.9
	Female	40.8
2005	Both Sex	59.7
	Male	71.3
	Female	47.5

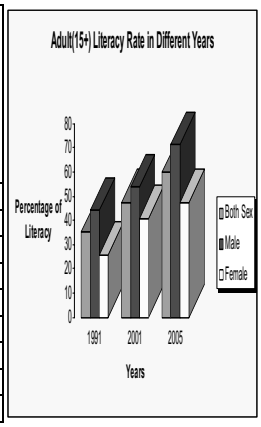

Fig 2.4: Adult Education Rate [15].

Considering the fact of numerous numbers of adult illiterate people and number of adult mobile users, M-Learning will play a vital role to increase the overall education rate.

In addition, a handsome amount of aged people is not in interaction with education due to shyness where distance learning doesn't have a large scope to make them educated one. So, M-Learning is undoubtedly the absolute choice of providing education facilities for aged person.

2.5 Distance Learning with Recent Technology

Nationwide Mobile Communication already shows the lenience of Distance Learning with our proposed M-Learning concept.

And distance-learning concept for Bangladesh is not a new one since it has started its journey in 1956[15]. It began with distribution of 200 radio receivers throughout the country, which led to the creation of an Audio-Visual Cell (AVC) and later the Audio-Visual Education Centre (AVEC) in 1962. In 1978-1980, a pilot project entitled 'School Broadcasting Program (SBP)' was undertaken. In 1983, the SBP and EVEC were merged to form National Institute of Educational Media and Technology (NIEMT). In 1995, Bangladesh Institute of Distance Education (BIDE) was established and NIEMT was incorporated into BIDE. In 1989, as per the request of the Government of Bangladesh, Asian Development Bank (ADB) sent a 'fact finding mission on open university' to Bangladesh Then a feasibility study on open university has been conducted through a 'Technical assistance Project (TAP)' under the assistance of ADB. At the end, Bangladesh Open University (BOU) was established in 1992 by an Act passed in the Bangladesh National Parliament (BOU Act – 1992, No – 38). BIDE merged with it. BOU came under government budget in 1999 with a condition that it will generate sufficient revenue for its survival.

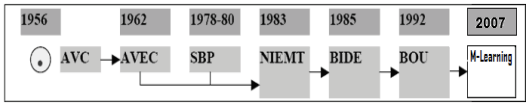

Fig 2.5: Evolution of Distance Education in Bangladesh.

Bangladesh Open University is now the only university in Bangladesh that offers a number of distance and open learning programs. But distance learning not yet gets the massive success to reduce illiteracy due to lack of wide coverage throughout the country. So M-Learning has the possibility to overcome the situation since it has widest network in Bangladesh. In this regard, the increasing popularity of the mobile phone has provided an additional medium for the distribution of distance education context.

2.6 Advanced Mobile Technologies

With the advancement of science and technologies, Telecommunication industries specially Mobile Sectors has changed a lot and has brought these services of recent mobile technology within in the cost limit of all global people. And so, there are so many digital mobile phones with enhancement of a platform-independent application in local market that cost 10,000BDT (Maximus v90, Motorola 270 etc) in Bangladeshi market in recent days. These mobile phones can be used on a variety of different operating

systems for the MLE (Mobile Learning Engine), has been developed by using J2ME (Java 2 Micro Edition). Its platform-independency enables the handling of different operating systems (Symbian OS, Microsoft MS Pocket PC, Palm OS, etc.), a variety of different screen resolutions, different input possibilities (keypad, keyboard or pointer device) with the feature of formatted continues text, integration of images within text, hyperlinks and elements with specific actions, audio and video bars for playback (also streaming from a server is possible), interactive questions and intelligent help which includes: checkbox questions (single choice, multiple choice), order questions, inserting characters questions (text match and numbers match) as well as graphical marking questions (Certain regions within a picture as hot spots). In a word, it strongly justifies the absolute feasibility of implementation of M-Learning in the current milieu of Bangladesh.

3.0 DESIGN AND IMPLEMENTATION

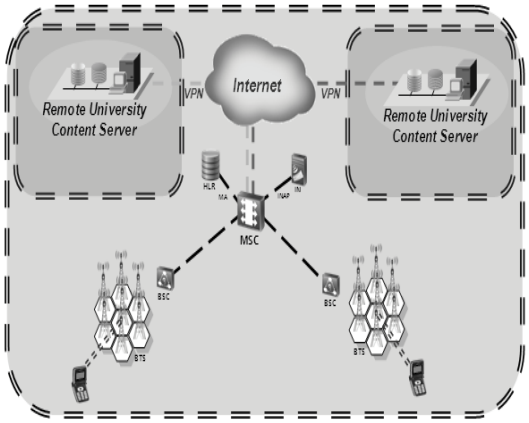

Fig 3: Proposed Network Diagram of M-Learning**.**

M-Learning core network is already a matured solution in developed countries like Japan, USA, and UK. In this paper, our proposed M-Learning network architecture will be quite similar to Intelligent Network (IN) network architecture, 3rd Party Web Solution migration in today's telecommunication industries. In this platform, the existing mobile service operator's Mobile Switching Centre (MSCs) will communicate with educational institution end's Content Servers for supporting the registered subscribers of M-Learning process with relevant resources. But, in core network layer, the interaction between the MSC's softswitch and Content Servers will be done through the Virtual Private Network (VPN) through internet rather than with direct physical media connectivity (Fig 3). Even though in our proposed network architecture of M-Learning platform, Content Servers are belong to University Level but those may also belong to any level of education industry.

In proposed network, every subscriber of M-Learning solution has to be registered to its service. When a subscriber will dial for such specific service of M-Learning, the MSC or SoftSwitch of the corresponding operator will first decide the authentication user validity of incoming number through HLR (Home Location Register) or not. If the person is authenticated from HLR, after that the MSC or SoftSwitch will make a request to University Content Server through SMTP (Simple Message Transfer protocol). After verification of authenticated user, University Content server will start sending resources according to the requirement of subscriber to core network of mobile operator. Mobile operator will then forward the requested contents to subscriber end.

In this instance, an authenticated subscriber is bound to do registration by any specific text format with a specific short code number defined by operator through SMS to SMSC as for getting the subscription of this Value Added Services. Registration Code as well Registration Text Format of SMS may vary by different operators. Such as, If GrameenPhone is going to provide M-Learning service; a user may need to type "***reg mlearning 0171XXXXXXX"*** (Registration text format) as a message and to send ***1XXX*** (Short Code of SMSC) for registration. For getting service of M-Learning, a registered user will need again to type sub specific text format of SMS and will have to send it in specific Short Code to SMSC. When SMSC of the operator will find that the requested SMS format and Short Code for getting service is matched with predefined format of SMSC, it will communicate with Remote University Content Server through SMTP for getting resource contents. The Communication between University Content Server and Mobile Operator through SMTP message format will have to be predefined as well. This communication is going to be secured between these two entities since it is proposed to use of VPN (Virtual Private Network) through Internet. Different sorts of encryption algorithm may also be applied to SMTP message for enhancing message transfer security. M-Learning Content Server at university end will be equipped with Education Material like lectures, e-Book and assessment material.

In our proposed M-Learning, each subscriber may go through download process in their mobile terminal for accessing academic contents in weekly basis as those academic contents may be inaccessible automatically after one week in accordance to that educational institution policy. In this term, if any subscriber fails to get the material in time and wish to download previous week's content, he will have to send SMS to program relevant coordinator who will be responsible to allow him to get those. If the coordinator decide to give access to that particular student, he will need to send him an unlock key for

the specific week material. By this manner, a registered student of M-Learning service will be bound to be sincere at his studies. Besides this, as a part of study, assessment is a mandatory component of a learning process that can be announced to the registered subscriber earlier a week by SMS. And the examination date should be fixed but not specific in time because it will be dependant on the concurrent capacity of the operator. In this context, the responsible institution will be bound to make several sets of questionnaire (MCQ format is preferred). In addition, multiple times logging to the exam materials of single student should be restricted which is very easy to deploy in current technological context and definitely ensures the transparency of the exam. In essence, a student of our proposed M-Learning method will be a active constructors of knowledge with mobile devices embedded in a realistic context at the same time as offered access to supporting tools of J2ME. On the other hand Educational Authority will evaluate not only education materials or contents but also existing curriculum to ensure new resources whether they are relevant to mobile technologies in accordance to telecommunication optimized infrastructure or not.

4.0 CONCLUSION

In this paper, we mainly focused the prospective use of mobile phones as a possible support for the organizational changes of learning at secondary schools and universities in Bangladesh. But our proposed M-Learning can be implemented in every sector of education level as well to enlarge literacy rate drastically by taking the advantage of the widest coverage of today's mobile communication in Bangladesh. Statistically, over half of the total populations are non-literate and ten percent semiliterate [17]. Hence for Bangladesh, it is the high time to adopt M-Learning since the Bangladesh telecommunication industries are in matured stage for providing M-Learning's supporting infrastructure. In concise, this paper relates to conceptualization of literacy efforts, the need for making literacy activities an integral part of a comprehensive vision for informal and adult learning, and the study for providing a strong endorsement to struggle against illiteracy through M-Learning in Bangladesh.

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