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Mobile Communication as a Platform for Learning Science from Peers: Possibilities in Bangladesh

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Abstract: Wireless and mobile technologies have become an inseparable part in our daily life and we are being depended on their related services which have added new dimensions in our way of thinking. Numerous applications for mobile technologies make m-learning flexible and convenience to the learner and now it becomes easy to interact and communicate for the learners. This study offers to analyze the possibilities of creating 9 and 10 graders' learning communities through mobile communication which would also emphasize to promote free tutoring. The concepts of Mobile learning and positive peer influence are the main analytical tools to answer the research questions. This study followed a qualitative approach to emphasize on young students' voice regarding the effect and possibilities of using mobile in understanding science and anchored within Social constructivism theory. Fifteen students from seven different schools of Dhaka city and parents were selected using convenience sampling technique to conduct interview and focus group discussion respectively. Three educationists from different mobile and software companies were chosen purposively to conduct semi-structured interviews. The study revealed peer support as an important aspect in understanding science contents. The effectiveness of mobile communication among peers in learning science contents has discovered in a way that it not only helps both students and parents in getting more time from daily routine but also bears the potentiality in reducing extra unwanted monthly expenses. The complex relation in terms of Youth-Technology-Culture revealed as an important aspect to be addressed and considered while introducing and implementing the interventions of m-learning for 9 and 10 graders.

Keywords: *Mobile communication; M-learning; Science learning; Peer influence; Secondary education*

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Introduction

The power of wireless communication increased the rate of mobile user 6 billion globally by the end of 2011 (Martin & Ertzberger, 2013). The Bangladesh's telecom authority revealed that the total number of Mobile Phone subscriptions has reached 135.982 million at the end of June, 2017 (BTRC, 2017) whereas Mobile Phone Importers' Association (BMPIA) estimated 57.44% smart phone users have risen from January to June 2016 (Future Startup, 2017). Wireless and mobile technologies have become an inseparable part in our daily life and undoubtedly we are being depended

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on their related services which have added new dimensions in our way of thinking. Wireless technologies and applications are replacing e-commerce to m-commerce, m-business to e-business, booking flights the WAP way, instant mortgages over WAP, banking with WAP etc. (Keegan, 2002).

In education sector, the revolution of wireless technologies and access of mobile phone also have significant impact where experiment with various mobile devices for teaching and learning is taking place (Keegan, 2002). It is acknowledged that distance learning is associated with e-learning. Nationally and internationally recognized university, college or training institute run distance education through computer screen and provide certificate but now the new trend m-learning is getting popularity globally (Keegan, 2002). M-learning is the concept where mobile device recognized as millennium approach whereas next generation are moving from distance learning (d-Learning) and electronic learning (e-Learning) to mobile learning (m-Learning) (Keegan, 2002; ICDE world conference, 2003). Numerous applications for mobile technologies make m-learning flexible and convenience to the learner and now it becomes easy to interact and communicate for the learners living in rural or remote area mainly (ICDE world conference, 2003).

In Bangladesh, students have to face four board examinations among which passing Secondary School Certificate (SSC) takes the students to college level (Ahmed, Nath, Hossain, & Kalam, 2006). That is why guardians of 9 and 10 graders engage their offspring to receive private tuitions and the rate is alarming (Nath, Haq, Begum, Ullah, Sattar & Chowdhury, 2008). This scenario is not uncommon in global context as well. According to a survey in Honk Kong, result showed that over 60% of students received tutoring in Mathematics and tutoring was most common for 53.8% of Grade 9 students (Zhan, Bray, Wang, Lykins & Kwo, 2013). It is worth mentioning that, students and their parents have a fear regarding the stereotyped masculine subjects i.e. mathematics and sciences which they find difficult and depend on private tutor largely for academic achievement, improving examination grade or school performance (Nath et al., 2008; Mim, 2016; Zhan et al., 2013). Since private tutoring is considered as a parallel education and it is expanding massively across the world

but policymakers and educationalist has mixed reaction on private tutoring because of social inequalities where wealthy family could afford more tutor than middle class (Dang & Rogers, 2008; Davies, 2004). In addition, the rural students do not have access in practical classes where teachers demonstrated scientific experiments (Nath et al., 2008). Overall, secondary enrolment rate in Bangladesh has raised but poor achievement and low quality of students in secondary education or in public examinations indicate the deficiencies in quality of education (Ahmed et al., 2006). Research indicates that m-learning could be a way to facilitate students in achieving good grades who usually are pressurized to do well in public examinations (Cui & Wang, 2008).We are hoping that the anytime-and-anywhere-access of m-learning to information, processes, and communication (Martin & Ertzberger, 2013), would help the secondary level students to sort out the difficulties in studies.

Problem of the Study

The curriculum that 9 and 10 graders have to follow to complete Secondary School Certificate (SSC) provided by National Curriculum and Textbook Board (NCTB) Bangladesh, is often difficult to complete within the school hours (Ahmed et al., 2006). Some issues i.e. teachers' absenteeism and lateness, double shifting of schools, unscheduled closure of academic activities during natural calamities, political instability, teaching post vacancy and teachers' scheduled and unscheduled leaves, large number of students in the classroom etc. play a vital role in not only shrinking the teaching time but also in reducing effective contact between teacher and students (The Bangladesh Cronicles, 2017; Karmakar, 2013; Ahmed et al., 2006). Ahmed and Hossain (2010) examined a total dropout of 83% at secondary level, which rises to 86% for girls. As a result of the combination of all the mentioned factor, coaching and private tutoring became a buzzword where Nath et al. (2008) found that learning achievement has a positive co-relation with the time and money spent on private tuition. This is ultimately a great tension for the low and middle income families since Cameron (2010) identified that majority of the parents in Bangladesh context face difficulties in paying their children's private

coaching and tuition fees. These overall situations of the country shaped our concerns for almost a free tuition in Bangladesh through mobile communication and impacted what we wanted to do as educators.

Purpose and Research Questions

The present study offers to analyze the possibilities of creating 9 and 10 graders' learning communities through mobile communication which would also emphasize to promote free tutoring. To address this issue, this study sets three research questions. These are:

- To what extent the student of grade 9 and 10 can access to mobile technology in Bangladesh?
- How do the students perceive mobile communication as a learning platform?
- How do the education experts perceive the possibilities of implementing mobile communication as a platform for learning from peers?

Framework for analysis

The concepts of Mobile learning and positive peer influence are the main analytical tools to answer the research questions.

Mobile learning. Mobile devices have added a new dimension and capabilities for the learners in communication and interaction. The term ‘M-learning” describes learning content that is delivered on a mobile device, here mobile use as a medium to learn where learners can share their experience and learn from each other in anytime and anywhere’ (Martin & Ertzberger, 2013). Mobile learning supports the learner to participate in educational activities without the restrictions of time and place and also support to provide information, tools, learning feedback, advice, learning materials (ICDE world conference, 2003). The development of wireless and mobile technologies generate the potentialities for the learner especially those do not have the access of infrastructure; students in rural or remote area or continually on the move (ICDE world conference, 2003). Mobile learning provides a way for learners to disseminate information and learn without the Internet connections (Motiwalla, 2007). Thus the concept of m-learning guided us to analyze the perception of students, their parents

and education experts on accepting the mobile communication as a platform to learn under the mainstream education system.

Positive peer influence. 'A peer group is defined as a small group of similar age, fairly close friends, sharing the same activities' (Castrogiovanni, 2002 as cited in Korir & Kipkemboi, 2014, p.242). Peer influence is natural which has both positive and negative influence at any age; especially for adolescence because this time peer plays an important role and teens see some of their peers as role models which influence their social behavior and academic performance (Zimmerman, 2003; Korir & Kipkemboi, 2014). Such influence can also be referred as pressure which pressurize to do something that anyone normally wouldn't do; in terms of fitting in peer's group whom they value or be accepted by them (Raising Children Network , 2015); which affect adolescents' output and outlook of life (How Positive Peer Pressure Works, 2013). People often refers it negatively which associated adolescent risk taking behavior; such as crime, drug abuse and sexual behaviours but positive result also seen in achievement, voluntary charity, public work etc. (Deepika & Prema, 2017). Since the concept of 'positive peer influence' deeply rooted in motivating each other to do something positive or growth building, this allowed us to critically look into the issue on the possibilities of learning from peers by using mobile communication as a platform.

Methodology

This study followed a qualitative approach to explore the possibilities of creating 9 and 10 graders' learning communities through mobile communication. Such approach guided us to investigate the deeper meaning of the research questions rather concentrating on the numerical facts (Creswell, 2010).

Social Constructivism Theory: Adjusting Lens

The study emphasizes on young students' voice regarding the effect and possibilities of using mobile in understanding science and anchored within Social constructivism theory. Vygotsky emphasizes on social interaction to understand the ways of thinking and behaving (Woolfolk, Hughes & Wakup, 2008). Under this theory, his concept of the zone of proximal development provides us a lens to investigate how a learner can solve a problem with the help (scaffolding) of more able peer (Cole, 1985). Thus using Vygotsky's theory helped to analysis whether the learners can get benefits in understanding science's concepts. According to Bruning et al., 'Most constructivists share two main ideas: that learners are active in constructing their own knowledge and that social interactions are important to knowledge construction' (2004, p.195). 'Social constructivists see learning as increasing our abilities to participate with others in activities that meaningful in the culture' (Windchitl, 2002 cited in Woolfolk, Hughes & Wakup, 2008, p.412). Moreover, Vygotsky believed that 'social interaction, cultural tools and activity shape individual development and learning. By participating in a broad range of activities with others, learners appropriate the outcomes produced by working together; these outcomes could include both new strategies and knowledge' (Paris, Byrnes & Paris, 2001 as cited in Woolfolk, Hughes & Wakup, 2008, p. 413). Since Vygotsky's theory heavily relies on the social interaction and the cultural context, it potentially guided us to collect primary data from the adolescents in Bangladesh context.

Sampling Technique and Data Collection Procedure

The primary data was collected from Dhaka district of Bangladesh, dated1st January to 10th February 2018. The reason behind choosing Dhaka among Bangladesh was that being the capital city it is technically more advanced then rest of the districts (Hossain, 2008). We used "Convenience Sampling" to select 15 students of either grade 9 or 10 from seven different schools of the city. Considering for inclusion was based on availability and willingness to participate in the study (Mertens, 2010; Robson, 2002). Each of the students was interviewed using a semi-structured

interview guideline. Such in-depth interview helped us to prioritize their voices in this research. We conducted 3 Focus Group Discussions (FGD) consisting 5 parents (either father or mother), each session lasts for 30 minutes. The parents were also selected using Convenience sampling technique. We purposively selected 3 educationists currently working in either Mobile Phone Company or Information Technology (IT) sector to conduct in-depth interview regarding the prospects of m-learning in Bangladesh.

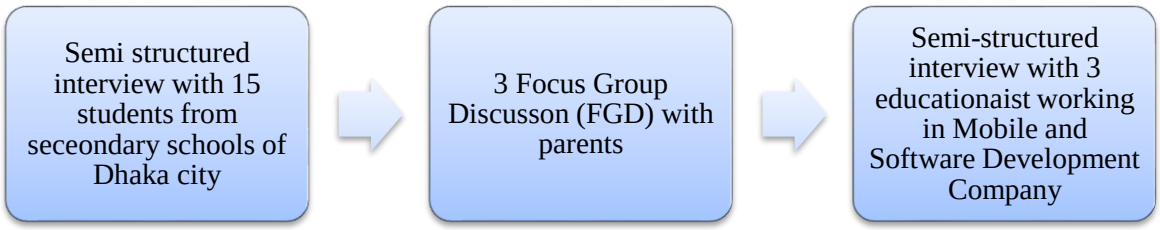

Figure 1: Steps of Data Collection

After collecting all the data, we triangulated them to ensure the validity of the research (Laws, Harper, & Marcus, 2003). We also have ensured respondent validation where we have invited the educationist (respondents) to comment on the interview transcript and whether the final themes adequately reflected the phenomena being investigated. The ethical issues were maintained in all the phases of the study. The interviews were audio taped that were later transcribed for the smooth analysis. The interview time, date and place were fixed according to the demand of the participants and we took consents before recording or taking pictures. The participants were free to take breaks and exit from the interview any time. Pseudo names were also used to ensure the confidentiality of the participants (Creswell, 2011).

Results and Discussion

This section presents the findings in a thematic approach emerged from the primary data by using Vygotsky's Social Constructivist Theory and discusses the themes by drawing on the concepts of Mobile communication and Positive peer influence.

Peer influence as a means to make science easy

Peer support has revealed as an important aspect in understanding science contents. The learners found science comparatively difficult than other subjects which is consistent with many other researchers in global local context (Mim, 2015; Hill et al., 2010; Kelly, 1985). This difficulty of science made the learners dependent on their peers to comprehend the subject knowledge. Nila (pseudo name), a student (age 15), stated, 'My friends can make some science contents easier to me because they know my feelings and lacking very well'. Sakib (pseudo name), age 14, said, 'My friends' words and explanation are easy to understand rather than my teachers' at school'. Another student, Rahib (pseudo name), age 15, stated, 'Since sciences seem a bit difficult to me, discussing with friends over phone regarding this helps me a lot'. Such data reveals not only a dependency through better understanding but also how peer communication can play a great role in knowledge sharing. Such interaction, while happen through face to face communication and hands on experiences, is very significant in learners' cognitive development according to Piagetian perspective (Kerwin & Day, 1985). But when it comes to over-phone communication where the learners would specifically get help from more able peers rather than teachers outside school setting to develop their conceptual level in science, Vygotsky's social constructivism theory reflects on this issue more precisely. Educationists of this study also mentioned that, peer to peer learning can help students learn effectively because it is easy to communicate with same age groups and they feel free to share ideas as well as develop interpersonal relation and teamwork skills. By drawing on Vygotsky's concept on Zone of Proximal Development (ZPD), here the learners enjoy solving the science problems with the help of more able peers (Cole, 1985). Moreover, prior findings showed that peers have influence on students' academic

engagement and also affect students' academic outcomes (You, 2011; Wonglorsaichona, Wongwanichb & Wiratchai, 2014). Not only that, Allen and Feldman found that serving as a tutor could be 'a particularly useful method for enhancing the academic performance of low-achieving children' (1973, p.1). Thus irrespective of their academic achievements, this study's participants of grade 10 can be benefited by tutoring to grade 9 participants, however the only condition of this tutoring would be to have a better conceptual understanding. It has also been revealed that being adolescences, the learners had the tendency to see some of their peers, involved in problem solving, as role models which is consistent with Korir and Kipkemboi (2014).

Mobile Communication as 'Here and Now' Approach for Students: Time and Cost Effective

The effectiveness of mobile communication among peers in learning science contents has revealed in a way that it not only helps both students and parents in getting more time from daily routine but also bears the potentiality in reducing extra unwanted monthly expenses.

The students found it challenging to complete and comprehend the syllabuses, especially the science subjects, within the class hours. This inability in understanding the science contents is not only related to the mentioned time factors but also to teachers' lack of proficiency and efficiency in making the contents understandable to the students. Tapan (2010) noted that, school teachers' heavy workload, poor salary structures and unrest political situation often fails to motivate them in conducting classes fruitfully in the context of Bangladesh. As a result, both students and teachers found it useful to arrange private tuitions in their own ways, the former – in terms of understanding content and the later – in terms of income generation. The parents expounded that, taking their children for private tuitions requires a lot of time and energy with the growing speed of traffic jam at Dhaka city. Both parents and their children did not get enough time to socialize and even could not enjoy their holidays where they eventually become dependent on fast foods since mothers found it difficult to cook meals for whole day. The young learners could not get the chance to play outdoor games after school since they have to run for tuitions bearing the tension of getting their study problems to be solved. To overcome this

situation where a learner need study support despite killing huge time outside school, an education experts of this study stated, ‘without having the students carry or purchase many books mobile has made information easily accessible and time effective. M-learning could be used in multiple ways and this will make education more interesting and diversified for every student’. Apart from the time effective part, mobile communication in learning science contents can reduce the extra tuition expenses of guardians. One of the parents (aged 40) expressed,

‘I have to spend about 25 thousand taka (BDT) in my daughter’s tuitions per month. Though me and my husband, both are service holders, find it very challenging to bear that cost. What we do is, we keep that money apart at the very beginning of the month and then go for other expenses. Not only that, we have settled in an area where the house rent is very low. This is how we are managing. No idea how people are raising two or more kids with the growing expenses’.

This scenario of a middle income family emphasizes on the need of m-learning where the learners have the space to communicate with each other in problem solving. This notion of communication and interaction in learning is consistent with Vygotsky who believes social interaction is crucial in generating knowledge which make the learners active (Woolfolk, Hughes & Wakup, 2008; Bruning, 2004).

The interview data with students revealed the high demand of mobile communication or mobile applications in solving science problems. The education experts from different organizations of Bangladesh also stated the followings,

‘By using this intervention one can challenge his/her friends on any topic to give test with the same question paper and compare marks. We can analyze our own performance and achievements and also show off our hard earned skills to others. In thus way m-learning collaborates peer learning among learner groups’.

‘Apart from using mobile phone as a tool for speaking to each other, mobile based apps could help peers to solve problems together, for example they can play or challenge each other on different educational games on language, mathematics, science or social studies’.

Such statements show how the adolescences living in building blocks in city like Dhaka can still have the chance of peer interaction outside the school premises. Our argument here is consistent with Woolfolk, Hughes and Wakup (2008) who highlighted that peer interaction within the same context and culture is significantly important in generating knowledge and problem solving in a collaborative way. This is how through mobile communications and applications, considering both online and offline facilities, the learners can get a platform to influence each other very positively towards intellectual growth.

Youth, Technology and Culture: A Complex Relation as a Barrier to Learn Through Mobile Communication

All the students participated in this study did not have direct access to mobile which seems as a cultural barrier where the parents are afraid of giving them the space to use individual mobiles. A majority of the parents believed that, the all-time access to mobile in learning could lead the young learners to be misguided in many different ways. For instance, they could be engaged in unwanted chatting, trapped through watching inappropriate videos and so on. This is consistent with Deepika and Prema (2017) who have mentioned such actions as negative peer influences. Many other researchers have revealed such negative aspects of technology over the years but nowadays technology is also capable to block any sorts of unwanted activities in the mobile (Motiwalla, 2007). Apart from the technology's negative role, the findings revealed that there exists a gender barrier in the cultural context of Bangladesh where the students might find it difficult to open up while communicating with opposite sex which is consistent with Gherardi (1985). Not only that, the results showed that boys have more access of mobile then that of girls in the age range of 14-17 which also reflects the notion of gender hierarchy and discrimination.

Conclusion and Implication

This research started with the tension of how private tuitions hamper the life of young learners and their parents in this 21st century in an urban context. Having the image of a masculine subject according to Kelly (1985), we have selected science to explore the possibilities of mobile

communication as a platform to learn from peers. The study revealed several socio-economic dimensions of real life by adopting Vygotsky's notion of how social interaction plays crucial role in students' learning. With the existing problems of teachers' burden and poor salary structure in school context, this research came up with a possibility of mobile communications' role in learning science contents which can positively influence peers. The anytime and anywhere access of mobile applications would not only reduce the extra expenses of guardians but also help the young learners to enjoy much free time which they essentially need to develop themselves through outdoor playing and socializing. Moreover, the complex relation in terms of Youth-Technology-Culture revealed as an important aspect to be addressed and considered while introducing and implementing the interventions of m-learning for 9 and 10 graders.

As this research sheds light on the future possibilities and importance of mobile communication in learning sciences from peers, the study findings would allow the policy makers of Bangladesh to take initiatives in implementing this considering various societal dynamics. Since this research emphasized on young learners' voices and their demand, it bears the possibilities to encourage the mobile application specialist along with the educators of the country who could take new initiatives in mobile technology, i.e. developing online and offline apps. The study would, therefore, contribute in ensuring quality education in Bangladesh. However, on the basis of the study's Youth-Technology-Culture relationship future research can be done through a gender lens in this developing country context to understand if there is any gender discrimination exist in peer communication through mobile technology.

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