# Blended learning: how to flip the classroom at HEIs in Bangladesh?

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## Abstract

**Purpose** – E-learning is a very popular concept in the education sector today, and one of the best ways to implement this is through blended learning. However, the implementation of blended learning program at Higher Education Institutions (HEIs) is quite new in Bangladesh. The purpose of this paper is to explore the concept of blended learning, how to construct a blended learning program, the benefits of blended learning and some prerequisites to implement blended learning program successfully at HEIs in Bangladesh.

**Design/methodology/approach** – Nature of the study is explanatory, descriptive as well as evaluative. Primary data were collected through face-to-face interviews using structured questionnaire having both open- and close-ended questions including personal observations. Secondary data comprise relevant documents available from government agencies, archives, and library and research organizations.

**Findings** – By utilizing the blended learning tools, HEIs in Bangladesh can achieve radical improvements in education quality as well as in the accessibility and cost-effectiveness of learning programs. Moreover, any innovative educational reform will be successful only when it is fully accepted and adopted by all the key stakeholders: students, parents, teachers, academic administrators, researchers and policy makers.

**Practical implications** – Several practical solutions have been presented in this paper: how to create a blended learning program, how to overcome the obstacles for successful implementation of blended learning and how to create a flipped classroom with the aid of technology.

**Social implications** – A country's soul and economic well-being depends to a large extent on the quality of their citizen's education. Implementing innovative teaching programs within the education system will enhance the quality of education at HEIs in Bangladesh, creating more efficient labor force hence benefiting the overall society.

**Originality/value** – Originality in terms of exposing the hurdles that needs to be addressed for successful implementation of blended learning programs at HEIs in Bangladesh and providing an easy guideline to educators on how to create flipped classrooms.

**Keywords** Innovation, Blended learning, Flipped classroom, Educational technology, HEI in Bangladesh

**Paper type** Research paper

Creativity is thinking up new things. Innovation is doing new things. (Theodore Levitt)

## 1. Introduction

Any innovation can be assessed by its novelty, originality and effect. Innovation is the successful introduction of a new thing or method. Innovation can be categorized as evolutionary or revolutionary (Osolind, 2012). Evolutionary innovation arises from small incremental improvements over a long period of time while revolutionary innovation requires a complete replacement of the old system with the new within a short period of time. Similarly, innovation can be tangible such as new technological tools and gadgets; while it can also be intangible such as new methods, strategies and techniques. Innovations may arise either from the bottom of the society (grass root level) or from the top

(administrative level). Moreover, innovations can be homegrown (from within the system) or imported (adopted from abroad). Sometimes even excellent innovative projects can face critical roadblocks and not implemented on a larger scale as these new projects can be time-consuming and resource-demanding hence it is important to evaluate the short-term and long-term consequences of implementation (Serdyukov, 2017).

According to Brewer and Tierney (2012), when we think about innovations in the education system, we cannot deny the fact that most of these innovations are intangible such as technology-based learning systems, learning management systems (LMS), educational software and web based resources. Furthermore, due to the advancement of information and communication technology (ICT), we can retrieve information in various ways and develop new skills. With the help of communication tools such as iPhone, IPad, Skype and Facetime, today we can communicate around the world in real time with anyone. According to Organization for Economic Cooperation and Development (OECD) report, pressure to increase equity and improve educational outcomes for students is growing around the world (Vieluf *et al.*, 2012).

Any sort of innovation in education will lead to an increase in productivity, efficiency and enhancement in the overall quality of education. However, successful implementation of an educational innovation, requires active involvement and support of all stakeholders: students, parents, teachers, academic administrators, researchers and policy makers. According to Shelton (2011), "education not only needs new ideas and inventions that shatter the performance expectations of today's status quo, in order to make a meaningful impact, these new solutions must also grow large enough to serve millions of students and teachers." The benefits of any innovation in education can be measured in terms of productivity (enhanced learning outcomes (LO) achieved within a given time), time efficiency (shorter time in covering the same materials) and cost efficiency (less cost per student).

In tertiary level education, technology can be used to improve the teaching and learning process.

Due to technological advancement, many past assumptions about how students should be taught in higher education institutions (HEIs) are challenged today. According to Toffler (1990), HEIs must prepare their students to continuously learn, unlearn and re-learn with the help of new technologies.

Since the enactment of Private University Act of 1992, Bangladesh has experienced a massive growth in the number of HEIs, with the figures rising to 103 for private universities and 45 for public universities (UGC, 2019). However, the Government of Bangladesh has raised concern as the rise in the number of universities is not accompanied by adequate improvements in the quality of higher education. The quality of education has a greater impact on economic and social development than universal enrollment. A country like Bangladesh, which has to maintain high end growth in agriculture, manufacturing and services throughout the next several decades if it expects to be globally competitive and find a seat in the developed nations' club by 2041, has to substantially overhaul its faulty education system and redefine the role of education in creating talented and highly skilled human resources (Islam, 2019). The current Government of Bangladesh has a vision to make the country "Digital Bangladesh" and every sector of the economy including education must become digitalized (Rahaman and Akter, 2017). Hossain *et al.* (2016) state that most of the universities in Bangladesh have computers along with internet connection. However, to realize the full potential of digital technologies, high-speed internet is a basic requirement. According to Islam and Salma (2016), although technology in education can improve the quality of learning, nevertheless, it is not adequately applied in most of the HEIs in Bangladesh.

With the vision to improve the higher education system in Bangladesh towards a global standard, the Ministry of Education with the assistance of World Bank has undertaken

a Higher Education Quality Enhancement Project (HEQEP) that aims to improve the quality of teaching and learning by redesigning the teaching strategies and abandoning the prevalent chalk and talk teaching method. In response to this vision and goal set by the current Government, at present the higher education system in Bangladesh is in a transitional phase, in which most of the HEIs are trying to adopt new innovative teaching strategies to achieve the goal of high quality education. The authorities at HEIs in Bangladesh feel that there is a need to adopt a fresh new process for teaching and learning that can be utilized as a substitute for the conventional teaching-learning method. According to Professor Andaleeb "quality is a major challenge in Bangladeshi HEIs. Both infrastructure and faculty need continuous improvement. We also need to introduce state-of-the-art technology, tap into a good supply of quality students entering the universities, fill up the missing middle (i.e. lack of assistant and associate professors), introduce modern academic governance, build pedagogical sophistication, and shun the culture of providing (even selling) certificates (with focus on memorization)" (Wadud, 2018). Professor Haque points out that digital technologies are facilitating higher education across all learning areas and domains hence to match the global shift it is vital to move towards online learning and teaching (*The Daily Star*, 2017).

In recent years, most HEIs around the world have adopted blended learning approaches to enhance the quality of teaching and learning in their institutions. Blended learning, which is a fusion of online learning and face-to-face learning between teachers and students, has been encouraged in many HEIs (Graham *et al.*, 2013). Initially, the term "blended learning" was mostly associated with linking traditional classroom teaching to e-learning activities, however, this has evolved over the years. Today, blended learning is a combination of various learning dimensions, many of which have overlapping attributes. From an educational perspective, blended learning refers to the integration of online teaching activities with traditional face-to-face class activities in a planned, systematic manner. Here, the primary focus is on integrating two separate paradigms, synchronous and online-asynchronous learning (Laster, 2005). The implementation of blended learning tools in HEI can result in significant improvements in the effectiveness, reach and cost of providing education in comparison to traditional learning approaches. These improvements can be so profound that they have the potential to change the overall competitiveness of the entire organization.

The crucial factor in blended learning is electronic support from e-learning, which includes collaborative learning, constructive learning and computer-assisted learning. E-learning provides a new dimension to the teaching and learning process, as it introduces students to a wide pool of knowledge and opens innumerable opportunities for communication, collaboration and socializing through online tools. According to the findings of National Education Association (2011), the need for robust learning has become apparent amid a perceived technology gap highlighted in a survey where half of the school teachers in Bangladesh stated that technology used in their schools was outdated. To integrate blended learning in the education system, it is necessary to incorporate technology with education at every level. However, for developing countries like Bangladesh, the integration of technology into the education system depends on certain prerequisites, such as better infrastructure, a reliable power supply, strong user technical knowledge, a change in mindset and sufficient funding for training programs. Hence, inadequate logistical support and an inability to change outdated mindsets are the main impediments to overcome for establishing blended learning programs in Bangladesh. However, in recent years online mode of teaching has been lauded by many, as a viable vehicle for scaling up student-centered learning in Bangladesh. In a workshop held at one of the private universities in Bangladesh, Barrister Shameem Haider stated that modern universities must implement blended learning to accommodate huge number of upcoming students. He also

added that online learning and flipped classrooms are the key elements to change the trends of traditional learning culture in Bangladesh.

By leveraging technology to personalize learning, instructors can avoid the limitations of teaching (*The Daily Observer*, 2017). Students who come from rural areas in Bangladesh which are geographically isolated or those students who are medically unfit to attend formal classes can benefit from blended learning programs. According to Christensen (2017) more than 70 percent of higher education students can be considered "non-traditional" which means they may engage in some form of work while attending their studies. Blended learning can help such students to learn at their own pace and review lessons at home. Parents will also benefit from this teaching model as they gain a better understanding of what their children are learning in the classroom and can be better equipped to assist their children in the learning process.

However, compared to other countries in the world, blended learning is quite a new concept in the teaching and learning arena in Bangladesh. While there is substantial evidence for the effectiveness and merit of blended learning in the education system, there is also sufficient proof that blended learning may not be fully implemented by most of the HEIs in Bangladesh. To some extent, this failure can be explained by the resistance of teachers to online teaching tools as well as lack of awareness of new innovative teaching pedagogies.

At present most teachers at HEIs in Bangladesh have very limited opportunities to incorporate online tools in their teaching process. In most cases, teachers only post their teaching materials, such as lecture notes in online platforms and submit online grades to students.

In this paper, we will discuss the concept of blended learning, the steps to create a blended learning program, the benefits of a blended learning environment, some hurdles in implementing blended learning programs at HEIs in Bangladesh and finally recommendations to overcome the identified obstacles.

## 2. The concept of blended learning

From an educational perspective, blended learning refers to courses that are taught by integrating two separate paradigms: classroom-synchronous and online-asynchronous learning. In a blended learning environment, teachers integrate online work with traditional face-to-face activities in a planned systematic manner that adds value to the overall learning process. According to Graham (2006), blended learning can be defined as an organic integration of thoughtfully selected and complementary face-to-face and online approaches and technologies. Blended learning integrates physical and virtual components, which can be seen as critical strategies for HEIs (Cobcroft *et al.*, 2006). In simple terms, blended learning can be described as a learning program in which more than one delivery mode is utilized in order to optimize the learning outcome and reduce the cost of program delivery. Blended learning provides a full scope to teachers to utilize the benefits of both traditional classroom teaching and online teaching.

Traditional classroom teaching allows face-to-face interactions between teachers and students, which help in synchronous communication. In a traditional teaching setup, teachers can give immediate feedback to their students on any query, while students are positively influenced by their teacher's personality, behavior and value system. On the other hand, virtual classrooms provide students the option to learn anywhere at any time from anyone. In blended learning, students can always meet in virtual classrooms with their co-students and teachers regardless of any form of geographical barriers. They can learn and share their knowledge without hesitation or fear of being ridiculed. Moreover, as the advancement of technology has turned our world into a global village, it is possible for students to communicate with experts from other parts of the world and enhance their knowledge.

The experiences of pioneers in blended learning indicate that, by implementing such an innovative learning program, one can achieve radical improvements in the effectiveness, reach and cost of learning. The effectiveness of blended learning in education systems is further demonstrated in various observations that blended learning courses offer students a greater range of affordance, thus enhancing the learning experience beyond either online or face-to-face modes alone. According to Norberg *et al*. (2011) today blended learning is often referred to as the "new normal" in higher education. This trend is supported by the findings of Means *et al*. (2010) where they reported a meta-analysis of 50 studies that shows students who were taught in a blended learning environment performed much better than those taught in a non-blended environment. Blended learning, which integrates online and face-to-face components, provides students with a unique experience by enabling flexibility with regard to time, place and pace of student learning. Ramsden (2003) argued that blended learning provides students greater choice in selecting the right learning mode that suits their individual requirements.

Blended learning maximizes the educational impact for students by combining in-class and out-of-class teaching. It allows educators to break the one-size-fits-all model of teaching by taking education beyond the physical classroom setting and allowing students to learn anytime and anywhere. In a traditional teaching setting, teachers deliver lectures and students are the passive recipients in the class. However, a blended learning program redefines the roles of a teacher and a student.

## 3. Different models of blended learning program

Today due to the advancements in technology, teachers can restructure their classrooms and teach students in new ways. Blended learning is the combination of in-class instructional learning and online technology that enables student-centered learning. However, there are different models for blended learning instruction and no singular model can be a perfect fit for all institutions. Some of the common blended learning models are station rotation, lab rotation, remote blended learning, flex blended learning and flipped classroom model.

Various research conducted in the past have provided evidence of costs and benefits associated with different blended learning models. For example, Dziuban *et al*. (2018) study focused on the USA Department of Education approach to blended learning, which involves combining online and in-class instructions with reduced in-class time for students. Bralic and Divjak (2018) research involves integration of a Massive Open Online Course (MOOC) along with campus based courses where students can have option to participate in an MOOC instead of doing project work. On the other hand, the article by le Roux and Nagel (2018) focused on flipped classroom model which reverses the traditional learning environment by delivering the instructional content online so that class time can be utilized for other activities. In this study students were delivered lectures through online videos with in-class time focused on seminars using a Harvard-style case method. Hence, academic institutions and teachers will have to select the right blend model that they find most effective to create something unique in order to meet the needs of their students.

Nevertheless, in general, the blended learning can be divided into two separate groups: in the first group of blended learning models, the face-to-face instruction time remains unchanged but the class time is used differently due to various online tools. On the other hand, in the second group of blended learning models, the face to face interaction time is minimized as most of the instructional sessions are provided through online platforms. These models can be more cost-effective for the academic institutions and it can also provide greater flexibility to students. Here some of the classes are taken outside the traditional brick-and-mortar settings; hence, here students can have greater control over time, place, path or place of learning. However, for the first category of blended learning model where face-to-face instruction time remains unchanged, the process of implementation may not be

that easy. Faculties will have to spend more time in implementing such models because they have to prepare both in-class materials and online resources. Hence, it is not surprising that the flipped classroom model of blended learning is not yet implemented by most academics at HEIs in Bangladesh. Nevertheless, flipped classroom can be a very useful model of blended learning, where most of the students are weak and fail to understand lectures in traditional settings. Hence, this model can be cost-effective where high numbers of students are re-taking the same courses to improve their grades.

## 4. How to construct a blended learning program and flip the classroom
Due to the advent of various educational technologies, such as Google Classroom, Moodle, Edmodo, and Schoology, today, educators are trying to utilize various online tools to replicate the physical classroom experience in a digital environment. However, a common misconception among most educators is the belief that they can teach any content using any form of technology. Such a flawed perception can result in poor planning and wastage of valuable time and resources. Hence, before incorporating any new technology in education, it is crucial to consider its pedagogic and psychological effects.

Serdiukov (2001) points out that overestimating the power of technology can lead to deterioration of human element. According to UNESCO Innovative Teaching and Learning (ITL) research project, "ICT has great potential to support innovative pedagogies, but it is not a magic ingredient." They also point out that when considering the use of ICT in education sector, it is important to focus not on flash but on student learning and twenty-first-century skills that ICT can enable. Zhao and Frank (2003) argue that when integrating technology in education, it is important to emphasize not only on how much computers are used but also how they are being utilized to enhance the education quality. According to Professor Aminul Hoque, "universities in Bangladesh should not only adopt technology for skills improvement but also provide a right platform to make the best use of it" (Bari and Chowdhury, 2018).

It is important for educators to realize that technology alone cannot ensure productive and enriched learning as human elements are still needed in technology enhanced environment. Educators should develop blended learning programs in which one can match every type of content to the most appropriate medium of technology. Here, the process is to use learning outcomes (LO) and assessment techniques (AT) to determine the best technological aids for specific content taught in the class using models such as Bloom's Digital Taxonomy of Learning for guidance. This will ensure that students gain mastery of both lower-order level learning and higher order level learning with the help of both self-paced technologies and collaborative technologies. Another major benefit of creating a blended learning program at HEIs is the fact that one can flip the classroom. Bergmann and Sams (2012) described this model as an instructional strategy that reverses traditional learning environment by delivering the instructional content in an online platform. In a traditional classroom, students need to attend the classroom lectures and go back home to perform certain tasks, such as assignments given to students as homework by the course instructor. However, in a flipped classroom, some of the lectures can be delivered by the instructor in an online platform so that students can utilize most of the class time on brainstorming, doing group activities such as group projects or conducting experiments, which will eventually help them to learn how to practically apply their book knowledge in real life scenarios.

### 4.1 Three steps to create a flipped classroom model of blended learning

- First, set clear learning outcomes (LO) and select appropriate assessment techniques (AT).

- Second, match the LO and AT to appropriate teaching technological aids using Bloom's Digital Taxonomy of Learning.

- Third, transform the classroom from a "traditional" one to a "flipped" one.

*4.1.1 Determine learning outcomes and assessment techniques.* To construct a successful blended learning program, one must start with a clear identification of what goals he or she wants to achieve from a particular course and how they want to assess the students' mastery of that course.

Here, it is critical that educators must set clear measurable instructional goals that are accurate and complete. The LO are statements about what the instructor expects the students will learn after completing a particular course of study. To set appropriate LO, it is best to use proper action verbs with the help of Bloom's Taxonomy of Learning. Finally, the last step is to determine which AT should be selected to evaluate students' mastery of the course. This is a crucial step, as there is a direct correlation between teaching assessment techniques and the type of technology that is appropriate for delivering the content to students.

For example, if an instructor wants to assess his/her students by conducting some form of short exam such as one with multiple-choice questions, then the use of self-paced delivery technologies will be more appropriate than collaborative technological aids. Hence, in blended learning, one can match teaching assessment techniques to the most appropriate online tools.

*4.1.2 Matching learning outcomes to teaching technological aids using Bloom's digital taxonomy of learning.* Once the instructor has set clear LO and selected the AT, next he or she needs to find out which technology is the best fit for each of the LO. The best way to match LO to technological aids is to use Bloom's Digital Taxonomy of Learning. Bloom's Taxonomy was originally developed in the 1950s under the leadership of educational psychologist Dr Benjamin Bloom. He proposed that learning fits into one of three domains of intellectual behavior: cognitive, affective and psychomotor. In total, forty years later, Lorin Anderson and David Krathwohl revised Bloom's Taxonomy and pointed out that learning objective under the cognitive domain can be categorized into one of six levels of learning: remembering, understanding, applying, analyzing, evaluating and creating. In 2007, Andrew Churches updated Bloom's work one step further, introducing Bloom's Digital Taxonomy of Learning. His intent was to marry Bloom's cognitive levels to twenty-first century digital skills. Churches added ways to use Web 2.0 technologies to each cognitive level in Bloom's revised Digital Taxonomy. Using the Digital Taxonomy of Learning, one can easily identify appropriate technological aids for each level of the learning outcome.

For example, if the learning outcome is that students should be able to define various concepts after attending a lecture, then using Bloom's Taxonomy of Learning, we can easily find out in which of the three domains and at which level of the domain this learning outcome will be categorized. Students should be able to "define" the concepts taught in-class, so this is the first level of the cognitive domain of Bloom's Taxonomy of Learning, which is "Remembering." Remembering is the level in which students become familiar with certain concepts and theories and later try to recall this knowledge by performing some task. In the "Remembering" stage, students do not need to collaborate with other students, but rather they need to acquire subject knowledge through self-directed efforts, such as attending lectures, reading books, notes, etc. To ensure that "Remembering" level of learning is achieved in the class, instructors can use self-paced technological tools such as online OTQ exams. On the other hand, if the instructor wants to ensure that "Understanding" level of learning is acquired in the class, then he or she must utilize a different technological tool. "Understanding" occurs when students cannot just recall knowledge but explain it in contexts to someone else. To ensure this level of learning is achieved in the class, instructors can use online collaborative tools such as ProofHub, MindMeister and BigMarker, whereby all students in the class can come together in a common digital platform and discuss a particular topic or project and exchange their ideas and views.

*4.1.3 Transforming the classroom from "traditional" to "flipped".* Due to the advent of new technologies and digital learning platforms, flipping the classroom has now become easier and more effective. In a traditional teaching model, students learn theories and

concepts from lectures delivered by instructors in the class, and later students are required to do practice assignments at home. The concept of a flipped classroom is to turn this entire process around. Here, the main goal is to utilize most of the class time for conducting high-cognitive activities and achieve a higher order level of learning. As a prerequisite to creating a flipped classroom, the course instructor must first set up a virtual classroom. For example, if an instructor wants to finish a particular chapter of a course and ensure that students have achieved a higher order of learning, a flipped classroom is beneficial. At first, the instructor will have to create a video of his or her lecture explaining the key theories or concepts that he or she wants to cover in the next class. The teacher will then upload the video lecture on an online learning platform as an assignment for the students. The students are required to watch the video lecture and complete a quick online exam based on the video lecture content. The test report from the online exam will tell the teacher which areas of the video lecture students struggled to understand, and this information will help the teacher to properly plan for his or her next in-class lecture more effectively. Hence, the teacher can utilize most of the face-to-face class time to focus on those critical areas in which students need more attention. Moreover, by flipping the classroom, teachers can spend more time with their students in the class solving problems, answering any questions from the online lectures or helping students to complete group projects. Hence, this style of teaching makes learning more efficient, as the class time is utilized to conduct high-cognitive activities instead of low-cognitive tasks. This will eventually help students to achieve higher order learning from the course. For instance, attending an online lecture is a low-cognitive activity that only requires absorbing information with little critical thinking. However, completing projects, assignments and solving problems require both critical thinking and analytical skills. Hence by flipping the classroom, a teacher can ensure that the high-cognitive activities are conducted in the classroom with the teacher's presence in order to assist and guide the students.

## 5. Benefits of blended learning at HEIs in Bangladesh
### 5.1 Improved learning outcomes
Teachers are the gatekeepers to learning experiences. Teachers can influence the nature and quality of student learning through their selection and design of learning delivery modes. What students learn is a by-product of what experience is provided by a teacher through his or her teaching style. In blended learning, teachers use both online tools and classroom teaching modes. Garrison and Kanuka (2004) point out that the key to a successful blended learning program is the thoughtful integration of classroom face-to-face learning with online interactive tools. Classroom lectures often move at one pace, and students who are timid or shy often lag behind in the class. This problem can be solved by adding more components to the teaching and learning environment. By adding online learning tools, teachers can optimize the benefits of both traditional and online learning. In a blended learning environment, students gain advantages from online learning along with traditional classroom lectures. Hence, blended learning improves learning outcomes by providing greater options to students regarding how they want to learn the material from their selected courses. For some students, their desired learning style is better suited to interactive online delivery mode rather than traditional in-class lectures. As such, blended learning improves the performance of students because they get to learn the required course materials in a way that is most suitable for them.

Research on blended learning conducted by Stanford University and the University of Tennessee has demonstrated that blended learning is better than both traditional methods and online learning modes implemented alone. According to Professor Andaleeb, digital needs to be the new reality in Bangladesh and by using technologies in education,

teachers can get the opportunity to be much more creative. He further states that if teachers serve as role models to demonstrate digital skills, students will learn fast (*The Daily Star*, 2017).

*5.2 Greater access*
Traditional classroom teaching limits the reach of a learning program to only those students who can participate in the class at a fixed time and location. However, in blended learning where E-learning is integrated with conventional teaching, students who live in geographically isolated areas or those who are physically unfit to attend formal classes can have access to all the lectures through online portals. Almost all teachers agree that virtual classrooms do not suffer from the time and space limitations of a physical classroom setting. In an online environment, teachers can access their students and share materials from anywhere at any time.

Additionally, some teachers also point out that, in a formal classroom, all of the materials may not be completely covered by the teacher due to time constraints. In this respect, the online classroom can be beneficial, as it allows teachers to share extra teaching notes and give additional feedback to students' questions, which may not always be possible in a physical classroom setting due to time limitations. Hence, by incorporating blended learning in the education system, HEIs can easily increase the enrollment of their students irrespective of geographical boundaries. According to Professor Omar Rahman, they have plans to introduce distance learning courses like MOOC (Massive Online Open Courses). He states that it is not possible to set up brick-and-mortar universities everywhere hence distance learning can revolutionize the whole learning system of the country (*The Daily Star*, 2017).

*5.3 Upgraded and better quality education*
Due to continuous development in technological and scientific fields, it is important to stay updated with fast-changing markets and new innovations. Teachers must ensure that the content transmitted to students is regularly revised and that the syllabus is frequently updated. However, in Bangladesh, where formal classroom teaching is more prevalent, teachers often fail to update their course syllabus. Use of blended learning at HEIs in Bangladesh will help teachers to easily update their course content with little time and effort using online tools.

According to Islam (2019), education today in Bangladesh is failing to understand the future of work which will necessitate both radical curriculum changes and quality shifts in teaching and learning practices in order to be really competitive.Blended learning enhances individualization, personalization and relevance in teaching. It allows the course instructor to tailor the course content in order to meet the unique needs of the diverse group of students in his or her class. Students' learning experiences improve as they benefit from both face-to-face classroom teaching and online learning. Although formal classroom settings add a human touch to the teaching process, online tools can help instructors to create a high level of active participation and greater flexibility in learning. As blended learning provides students with a more dynamic learning experience and a high-quality education, learning eventually becomes more purposeful.

## 6. Challenges to overcome for implementation of blended learning at HEIs in Bangladesh
Blended learning which combines in-class teaching with e-learning is not a simple system to implement in Bangladesh. Learning through technology demands reliable hardware, user-friendly software, high bandwidth network along with proper knowledge and skills.

Porter *et al.* (2016) investigated drivers and barriers to blended learning at the institutional level. Galvis (2018) later build upon this research in his article. He also provided a blue-print for supporting institutional decision-making process related to Blended learning. According to Hossain (2013), some barriers to overcoming the problems to implementing blended learning in Bangladesh includes political instability, electricity supply, poor infrastructure and limited funds of academic institutions.

In this section, we discuss the different barriers to blended learning and demonstrate how to cope with these barriers.

*6.1 Weak infrastructure*
In order to make knowledge and education correspond with the present digital world, it is essential to increase the exposure of all parties – students, teachers and administrators – to technology-supported learning tools. However, at present most of the teachers and students in Bangladesh face various difficulties on using technology in the classroom including slow internet connection, system crash and hardware problems. Moreover, frequent electric power failure is another problem which makes the digitalization process more challenging (Khalid *et al.*, 2011). Furthermore, Zamari *et al.* (2012) point out that the slow internet speed hinder the classroom atmosphere in Bangladesh. To overcome this barrier, it is important for all HEIs in Bangladesh to build and expand their network infrastructure. Moskal *et al.* (2013) point out that blended learning requires strong IT infrastructure and network services supported by highly qualified technical staffs. Therefore, it is apparent that without IT infrastructure, it is not possible to implement blended learning at HEIs in Bangladesh.

*6.2 Resistance to technology*
The role of teachers is crucial in the successful implementation of blended learning at HEIs in Bangladesh. It is vital that all teachers are motivated and competent to conduct their teaching in online portals.According to Swenson and Redmond (2009), the vital transformation from a classroom-only context to one that includes online components requires adjustment from both teachers and students. There are several factors that may discourage academic staff from teaching in an online environment, such as inadequate technical knowledge, insufficient time to develop online content and fear of student rejection.

In Bangladesh, most teachers lack basic knowledge on computer operation and do not understand how to use basic online applications and programs to enhance their teaching quality. According to Mahmuda (2016), lack of training on using new technology and absence of teachers' interest in adopting new pedagogy in teaching, are the main hindrances to digitalization of education at HEIs in Bangladesh. Nevertheless, she also affirms that most of the students in Bangladesh feel comfortable with using various online tools for learning. To overcome this problem, it is important for government authorities and HEIs to provide appropriate trainings to all teachers. Teachers should be well-acquainted with the concept of blended learning and fully trained on how to utilize online tools as part of their teaching process. Teachers should attend workshops where they can learn about how to blend traditional teaching with online tools. They should know how to create digital learning content using various online aids such as Google Talk, Google Classroom, Moodle, EdexB, etc., for educational purposes. As a keynote speaker in a lecture session organized by one of the private universities in Bangladesh, Sarker pointed out that Google Classroom is a popular learning system in developed countries but in Bangladesh it is still not a commonly used educational tool hence it is important to update the current education system (Majumder and Sarker, 2017).

*6.3 Lack of proper planning and funding*
Implementation of blended learning at HEIs in Bangladesh requires full dedication on the part of government authorities and university management in Bangladesh. Individuals at every level of the hierarchy must contribute and formulate a well-designed plan regarding how to implement innovative teaching program. Skilled and qualified teachers can be asked to provide their inputs for integration of blended learning tools in various courses. In Bangladesh, with the exception of a few, most HEIs do not have sufficient funds to initiate such new, ground-breaking concepts. Nevertheless, small- and medium-sized academic institutions can accept support from NGOs and also collaborate with industrial and corporate bodies to raise the necessary funds. For instance, BRAC University in Bangladesh has some valuable innovations on the digital front such as Onnesha and Global Development Learning Network (GDLN).

*6.4 Rigid mindset of some teachers*
Another important factor that may prevent successful implementation of blended learning at HEIs in Bangladesh is the rigid mindset and attitude of some teachers. There are still some teachers who strongly believe that the conventional way of teaching using chalk and board is the best way to teach students and that all other new teaching aids are ineffective. Teachers need to have a more open outlook and be more willing to utilize online teaching aids in their classroom.

Some researchers, such as Heaton-Shrestha *et al.* (2009) point out that, teachers are less positive about the benefits of online learning components. Allen *et al.* (2012) found in their study that 65 percent of faculty members were afraid to use technology in their teaching. Some studies have found that beliefs about the effectiveness of technology in teaching are a factor that can influence whether teachers integrate technology into their teaching (Asl. Ozgun-koca and Ilhan Sen, 2006). Becker and Jokivirta (2007) also found that academics worldwide have shown less enthusiasm about using technology in learning. Thus, teachers who fail to recognize the benefits of online tools are less likely to create an effective blended learning environment.

Academic institutions in Bangladesh can organize awareness programs, seminars and discussion forums on the concept of blended learning to create the right mindset for its successful implementation. Moreover, HEIs in Bangladesh should provide teachers with mandatory trainings on the use of latest educational technologies to educate teachers about innovative teaching with the aid of technology. Professor Majumder, addressing at a lecture session on the use of Google Classroom in Blended Learning at one of the private universities in Bangladesh said that to build Digital Bangladesh, it is important to use latest innovative teaching and learning as well as information technology in education system. He also urged all faculty members to become habituated with Google Classroom (Majumder and Sarker, 2017).

## 7. Conclusion
Many in Bangladesh today recognize that education at HEIs needs renewal and innovation. HEIs are social institutions that serve to meet the needs of the society hence it is vital for these institutions to meet the challenges of the fast changing and unpredictable globalized world. Due to this dynamic environment, teachers, administrators, researchers and policy makers must adopt new theories and practices of teaching and learning. In the last few years some important projects have been undertaken by the Government of Bangladesh such as HEQEP signaling to everyone in the education sector that a revolution is in the process.

In the education sector, innovation can arise as a new pedagogic theory, methodological approach, teaching technique, instructional tool, learning process or institutional structure.

It is unquestionable that in the future, technology-based education will grow hence HEIs in Bangladesh must prepare for educational reforms. Massy and Zensky (1995) stated in their paper, technology should be used to boost academic productivity. By conducting appropriate research and experiments, HEIs should explore new technologies which can be fitted into the classrooms to enhance the quality of teaching and learning process. In this paper we have discussed about blended learning, an education program in which students learn at least part of the course materials through online delivery of instruction. In blended learning while students still attend the traditional brick-and-mortar classroom, however a portion of the course is covered through computer-mediated activities. Such education programs allow students to have some control over time, place and pace of their learning. No matter what technology we devise into the learning process, the significance of human element in the entire process is undeniable for its ultimate success.

In this paper we have discussed how to implement a blended learning program and what are the prerequisites for its successful implementation at HEIs in Bangladesh. We found that blended learning cannot be successfully implemented at HEIs in Bangladesh unless teachers are encouraged to re-think and re-design their courses in order to provide better learning experience for the diverse groups of students. Teachers must understand that classroom facilities and online tools serve very different functions in the teaching and learning process. Teachers should use online portals to teach additional materials or share resources that may not be possible in formal classrooms due to time constraints. Some of the resources that teachers often share online with their students include E-books, PowerPoint slides, lecture notes and YouTube videos. Teachers can also open online forums and discussion blogs for their respective courses where students can brainstorm and share ideas with their peers. Virtual classrooms can also be utilized to conduct online quizzes, short exams and other forms of assessments. Moreover, it is also important for HEIs in Bangladesh to design their online learning portals in a well-structured manner so that students can easily navigate and find the appropriate content. Lastly, we have also discussed the benefits of implementing a blended learning program and how innovative teachers can use technology to create "flipped classrooms" at HEIs in Bangladesh. Thus, integration of blended learning at HEIs in Bangladesh is vital, as it incorporates both physical and online learning components to provide better quality education for all.

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