

# Mathematical Modelling of Teachers' Intention to Participate in Online Training During Covid-19 Lockdown: Evidence from Emerging Economy

<https://doi.org/10.3991/ijet.v17i12.30465>

Ejaj-Ur Rahaman<sup>1,2</sup>, Imran Mahmud<sup>1,2</sup>, Md. Ar Rafi Himel<sup>3</sup>, Afsana Begum<sup>1,4</sup>(✉),  
Nusrat Jahan<sup>1,4</sup>

<sup>1</sup> Daffodil International University, Dhaka, Bangladesh

<sup>2</sup> Universiti Sains Malaysia, Gelugor, Malaysia

<sup>3</sup> BRAC University, Dhaka, Bangladesh

<sup>4</sup> Universiti Malaysia Perlis (UniMAP), Perlis, Malaysia  
afsana.swe@diu.edu.bd

**Abstract**—Because of lockdown for Covid-19 pandemic online teacher's training has taken on paramount importance in the academia. Consequently, a key focus of training and education related research has been discovering ways to motivate individuals to engage in more active behavior. This research identifies the factors influencing teachers' intention to participate in online training. Specifically, we investigated the impact of theory of planned behavior (TPB), ability, opportunity and motivation. Data were collected from 142 respondents using a structured questionnaire from four different universities of Bangladesh. The result suggests high level of impact on teacher's intention by perceived behavior control, motivation and ability. Our developed research model empirically advances the TPB model with ability, opportunity and motivation.

**Keywords**—online training, theory of planned behavior, ability, opportunity, motivation, Bangladesh

## 1 Introduction

### 1.1 Introduction

This paper aims to understand the need for tertiary-level teachers' training as a result of the digital transformation of education caused by the staggering impact of the COVID-19 pandemic around the world and its aftermath in tertiary education. The demand for online education has increased phenomenally. However, the ability of teachers to teach online is not up to the mark. Holistically, it is not just about teachers' ability; there are other factors like availability of opportunities and resources, peer pressure, and perceptions or fixed mindsets and attitudes. All these will determine the future reality.

The urgent imperative to ‘move online’ created by the recent COVID-19 pandemic (World Health Organization) has added to the stresses and workloads experienced by university faculty members and staffers, who were already struggling to balance teaching, research, and service obligations, not to mention ensure their work-life balance [1] [2] (Houston, Meyer and Paewai 2006; Houlden and Veletsianos 2020).

Following the COVID-19 outbreak and the post-pandemic situation, industry will have new skills expectations from its employees. Hence, upskilling is the only way to survive with dignity. The education industry—especially the institutions of higher education—will no doubt make it compulsory for teachers to teach online. The skills and abilities of teachers exclusively geared toward online teaching would have to be enhanced by continuous training and development programs.

Though various researchers have attempted to find out the predictors which might influence the intentions of teachers to participate in online training programs, very few have endeavored to consider ability, opportunity, and motivation as strong predictors, more specifically by combining them with the Theory of Planned Behavior, which is mostly used around the world to measure the intentions behind any act.

As of June 1, 2020, 1.2 billion learners globally (or 68.0 percent of the world’s total enrolled learners) were affected by the closure of educational institutions in 144 countries, according to UNESCO data. Bangladesh’s case was no different. Since March 17, all the educational institutions in the country have remained closed. Undeniably, the direct and most immediate impact of the COVID-19 pandemic on the education sector is the loss in learning opportunities. More than 36.0 million students (including 17.0 million in the primary section) are now out of school. Finance Minister AHM Mustafa Kamal, in his budget speech in the National Parliament on Thursday, also said that COVID-19 has essentially caused discontinuation of the regular academic curriculum of around 40.0 million students across the country.

As a result of this economic crisis, there is a good chance that the country might see higher rates of child labor, child marriages, or even transactional sex among children and adolescents, all of which are phenomena that cause higher dropout rates. As a result, of the 16.0 million students from poor families, many might never go to school ever again. It is noteworthy that the dropout rate in Bangladesh is still quite high for secondary (37.60 per cent) and post-secondary education (19.60 per cent), according to BANBEIS.

As the pandemic gets prolonged, such a contraction in the expenditure on education goes against what this sector requires. The fallout of low spending on this sector to mitigate the impacts of the COVID-19 pandemic will last for a long time. With so little to spare, the country might face more chronic “long-term consequences” in this sector as an aftermath of the pandemic than comparable countries. If the challenges are not properly addressed, the demographic dividend for Bangladesh might turn into a demographic burden in future.

Severe short-term disruptions have been felt by many families around the world: home schooling has come as a massive shock not only to parents’ productivity, but also to children’s social life and learning. Teaching is moving online, and on an untested and unprecedented scale. Student assessments are also moving online, with a lot of trial and error and uncertainty for everyone. Many assessments have simply

been canceled. More importantly, these interruptions will not just be a short-term issue, but can have long-term consequences for the affected cohorts, and are likely to increase inequality.

The careers of this year's university graduates may be severely affected by the COVID-19 pandemic. They have experienced major teaching interruptions in the final part of their studies; they are experiencing major interruptions in their assessments; and, finally, they are likely to graduate at the beginning of a major global recession. Evidence suggests that poor market conditions at the time of labor market entry cause workers to accept lower paid jobs, and that this has permanent effects on the careers of some. [3] (Oreopoulos et al, 2012) show that graduates from programs with high predicted earnings can compensate for their poor starting point through both within- and across-firm earnings gains, but graduates from other programs have been found to experience permanent losses in earnings from graduating in a recession.

Hence, our research questions are:

- RQ1. Does the Theory of Planned Behavior explain teachers' intentions to participate in online teaching?
- RQ2. Does the ability of teachers influence teachers' intentions to participate in teaching development?
- RQ3. Does the motivation of teachers influence teachers' intentions to participate in teaching development?
- RQ4. Do the opportunities for teachers influence teachers' intentions to participate in teaching development?

To answer these research questions, we have listed several objectives, as follows:

- RO1. To test the relationship between the constructs of TPB (attitudes, subjective norms, and perceived behavior control) with the teacher's intention to participate in online teaching;
- RO2. To examine the relationship between the ability of teachers with the teacher's intentions to participate in teaching development;
- RO3. To inspect the relationship between the motivation of teachers with the teacher's intentions to participate in teaching development;
- RO4. To test the relationship between the opportunities of teachers with the teacher's intentions to participate in teaching development.

The current study aims to empirically answer these four questions. To accomplish the aims of this work, the subsequent sections are organized as follows. First, the context and the rationale of this study are presented in brief. Next, we provide the relevant literature by discussing the Theory of Planned Behavior, ability, and opportunity, and by elaborating on motivation. Third, the theoretical framework and hypothesis development are presented. Fourth, the study details the research method by including sampling technique and size using G\* power calculator, development of items, and the techniques of analysis of the collected data. From there onward, we proceed to validate the research framework developed by executing the measurement and structural model evaluation. Fifth, the results of the data analysis and discussion

are presented. Finally, we explain the theoretical and practical contributions, limitations, and future research.

## 2 Literature review

### 2.1 Literature review

Previous works on the Theory of Planned Behavior (Attitudes, Subjective Norms, PBC, Intentions): To explore the relevant applications of TPB in academic settings, we conducted a thorough literature review. In the health sector, Van Den Branden et al. (2012) [4] conducted research on the parents of pre-school children. In that paper, researchers tested TPB on oral health-related behavior. In the same field, (Mahnz et al. 2012) explored the influence of TPB on physical activity in high school students. Later, [5] experimented with TPB on school girls with reference to Type-2 diabetes nutrition.

In the context of the environment, [6] identified the crucial impact of TPB on consumers’ intentions to visit green hotels. In the same context, [7] explored the key beliefs underlying pro-environmental behavior in high school students that relied on TPB.

In terms of the use of technology, there was a vast implementation of TPB with student samples. [8] found a significant impact of TPB on mobile learning readiness. In addition, they integrated attitudinal, normative, and control beliefs with TPB. [9] investigated Young People’s Use of Social Networking Web Sites and found a significant influence. They also integrated self-identity and belongingness with TPB. TPB—as integrated with human computer interaction, social interaction, flow, and enjoyment—can also influence game-playing behavior in tertiary-level students, as found by [10]. Moreover TPB was used for innovation and entrepreneurship Education by [11]. Again TPB was used for the developed and developing countries in using blended learning system [12]. Additionally, Students behavior for LGC is measured using TPB [13]. See Table 1 for the summary.

**Table 1.** Previous works

	Author	Year	Area	Method	Independent variable	Dependent variable	Country	Participants
1	Alzahrani et al.	2017	Games	Quantitative Survey	Flow Enjoyment Human computer interaction, Social interaction	Actual use	Malaysia	Students
2	Gerend, M. A., & Shepherd, J. E.	2012	Papillomavirus Vaccine Uptake	Quantitative Survey	Self-efficacy, norms, attitude	HPV Vaccine Uptake	USA	Young Adult Women (N=729)

3	Masser, B. M et al	2012	retention of first-time donors	Quantitative Survey	Attitude, SN, PBC, Self-Identity	Behavior	Queensland, Australia	Participants were 256 (53 male, 201 female, two undisclosed)
4	SOLHI MAHNA Z et al	2012	Educational Program to promote physical activity	Quantitative Survey	Intention, SN, PBC	Physical Activity	Tehran, Iran	High School Students (n=150)
5	Kautonen, T et al	2015	Business start up	Quantitative Survey	Attitude, SN, PBC	Behavior	Austria and Finland	Adult population (20-60 years of age) (n=969)
6	Chen, M.-F., & Tung, P.-J.	2014	consumers' intention to visit green hotels	Quantitative Survey	PBC, Attitude, SN	Intention	Taiwan	People of Taiwan (n=559)
7	De Leeuw, A. et al	2015	Environment	Quantitative Survey	PBC, Attitude, SN, Behavior	Intention	Luxembourg	High School Students (13-16 Years of age) n=602
8	Pelling, E. L., & White, K. M.	2009	Social Networking Websites	Quantitative Survey	Self-Identity, Belongingness, PBC, Attitude, SN	Intention	Australia	Undergrad Students (17-24) n=233
9	Jongpil Cheon et al	2012	Mobile Learning readiness	Quantitative Survey	Attitude, SN, PBC	Intention	USA	Undergrad Students (n=189)
10	Farzaneh Maleki et al	2016	Nutritional Behavior	Cluster Sampling-Quantitative Survey	Intention, SN, PBC, attitude	Effectiveness	Tehran, Iran	200 adolescents School Girls
11	S.Van Den Branden et al	2012	Oral Health	Quantitative Survey	Attitude, SN, PBC	Behavior	Flanders, Belgium	Mothers of the students of preschool (age 3-5 years) n=1057

From the above discussion, several research gaps were identified, which are addressed in this study in Table 2.

**Table 2.** Research Gaps

Gaps		
1	Theoretical	Previous researchers integrated several independent variables with TPB but they ignored the idea of ability, opportunity and motivation
2	Situational	Limited research on teacher and training more specifically during covid-19 period
3	Contextual	No research found in research databases on online teachers training in Bangladesh

## 2.2 Model and hypothesis development

**Theory of planned behavior.** The concept was first introduced by Icek Ajzen [14]. The theory has been applied in different sectors like education, health, advertising, public relations, behavioral intentions, and so on. The theory mainly enhanced the predictive power of another theory called the theory of reasoned action. The Theory of Planned Behavior argues that subjective norms, attitudes, and perceived behavioral control (PBC) shape one's intentions. It has the power to measure people's violent behavior.

**Attitude.** These generally refer to the favorable or unfavorable judgment of a behavior of a person's interest. These also reflect the outcome of a specific action. A high interest triggers likely attitudes and thereby resonates with the outcome [14].

**Subjective norm.** Generally, it refers to the empirical and individual belief of what most people approve or disapprove of in a behavior. It influences a person as regards his/her engaging in any behavior in the context of what others think of this behavior [14].

**Perceived behaviour control.** PBC refers to self-efficacy and perceived ease of the use of the system. PBC is assumed to reflect experience with the performance of the behavior and anticipated obstacles that could inhibit behavior. It seems that the concept of PBC is not defined in a way that is acceptable to every researcher [14].

**Intention.** The Motivation-Opportunities-Ability (MOA) (in some cases shortened as AMO) hypothesizes that worker performance can be affected by an organization's capacity to use these three concepts in a win-win capacity [14]. By win-win, this means that both the worker and the organization benefit from efforts to apply the MOA model within the working environment. Before investigating this further, let us ensure that we clearly understand these three terms.

**Motivation.** In this study, the motivation implies, the requirements and needs of a person may influence them to act in a certain way. Motivation is the driving force for behavior. An elephant is trained to sit, since it is commended for it, or treated for it, and it wants these as results. Compensation impels dogs to act in accordance with their craving.

**Opportunity.** Pertinent limitations that empower behavior could be a great way to depict opportunity. Cases of important constraints that can empower behavior incorporate accessibility to time and assets. Typically, we look for openings to complete a task that will result in an advantage to ourselves or to others.

**Ability.** Abilities—which are the level of cognitive, passionate, monetary, physical, or social assets—of an individual are those that it can apply to perform a particular behavior.

**Relationship between the constructs of TPB.** The theory of planned behavior is the original theory of our research model. [15] suggests that an individual's attitude, subjective norm and perceived behavior control outline any individual's intention. We agree the same in our case. Higher level of attitude, influence of others and the resources of teachers will lead to higher level of intention to participate in online training.

H1: Attitudes have a positive impact on teachers' intentions to participate in online teachers' training;

H2: Subjective norms have a positive impact on teachers' intentions to participate in online teachers' training;

H3: Perceived behavior control has a positive impact on teachers' intentions to participate in online teachers' training;

H4: Motivation has a positive impact on teachers' intention to participate in online teachers' training.

According to [16], ability and opportunity are strong predictors of continuance intention of flipped teaching. Similarly, in our research, we conceptualized ability and opportunity as strong drivers that increase teachers' intentions to participate in online learning and teaching. We can, therefore, propose that:

H5: Ability has a positive impact on teachers' intentions to participate in online teachers' training;

H6: Opportunity has a positive impact on teachers' intentions to participate in online teachers' training.

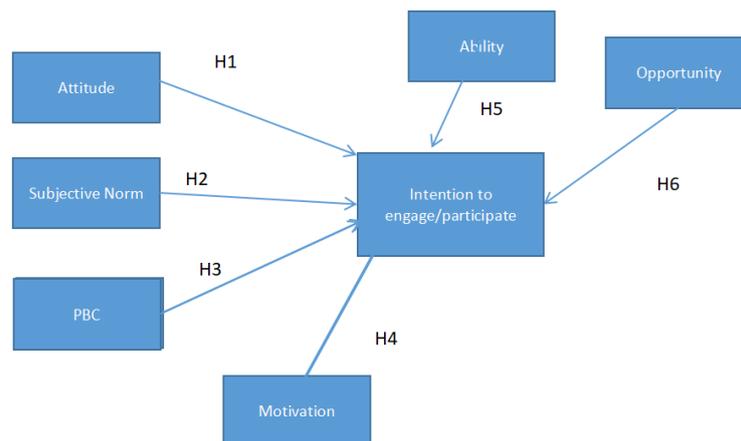


Fig. 1. Proposed research model

### 3 Research methodology

#### 3.1 Study design and participants

For the purpose of this study, we collected data from 142 teachers of different universities in Bangladesh. According to G\* power calculator [17][18][19], our minimum sample size is supposed to be 146 with actual power 95. We distributed 300 survey questionnaires via email but received 142, with a response rate of 47.3%.

### 3.2 Measures

Our survey questionnaire had two parts: 1. Demographic 2: measurement questionnaire. Measurement questionnaires were adapted from literature of TPB, ability, opportunity and motivation constructs. All the measurement questionnaires were anchored with seven-point Likert scale 1- Strongly disagree to 7- Strongly Disagree except Attitude. The sources of measurement questionnaire are given below in Table 3.

**Table 3.** Survey questionnaire items

<b>Intention</b>	<b>Source</b>
IN 1: I intend to embed professional learning from teaching training workshops in my regular teaching practice.	Lai et al. (2018)
IN 2: When I make up my mind to do something, I do it.	
IN 3: I intend to use teaching training workshops for my professional learning.	
<b>Ability</b>	<b>Source</b>
AB 1: In this section, we will ask a few questions about your ability on teaching training.	Lai et al. (2018)
AB 2: I could complete the online teaching task if I could call someone for help if I got stuck.	
AB 3: I could complete the online teaching task if I had a lot of time to execute flipped teaching.	
AB 4: I have sufficient ability to prepare teaching materials for the flipped teaching tasks in advance.	
<b>Opportunity</b>	<b>Source</b>
OP 1: In this section, we will ask a few questions about the opportunity you got/can get from teaching training.	Lai et al. (2018)
OP 2: The university provides technology and software resources for flipped teaching.	
OP 3: The university provides facilities and resources to help me improve students’ flipped learning.	
OP 4: The university provides the opportunity to acquire decision making skills.	
<b>Motivation</b>	<b>Source</b>
ME 1: I am confident I can be successful applying the development training.	Lai et al. (2018)
ME 2: I know that I can be effectively put into practice the things presented in this training.	
MV 1: Participating in teaching training helps me in my job.	
MV 2: It is important to me to apply what I have learned from professional development.	
MC 1: I have to give up not too much to put this training into practice.	
MC 2: Applying for professional development will not require too much effort.	
MC 3: Applying the training will not be stressful.	
<b>Subjective Norm</b>	<b>Source</b>
SN 1: Most of my colleagues think the change to the new way of training is a good idea	Lai et al. (2018)
SN 2: My peers are supportive of the change to the new way of training	
SN 3: Most people whom I deal with in my job encourage my change to the new way of training	
<b>Perceived Behavioral Control</b>	<b>Source</b>
PBC 1: I have knowledge necessary to participate in online teachers' training workshops.	Lai et al. (2018)
PBC 2: I feel able to use these workshops for professional development	
PBC 3: I have the resources and time necessary to participate in online teachers' training program	

Attitude	Source
Att 1: Online Teachers' Training Program is (Bad/Good)	Lai et al. (2018)
Att 2: Online Teachers' Training Program is (Inconvenient/Convenient)	
Att 3: Online Teachers' Training Program is (Harmful/Beneficial)	
Att 4: Online Teacher's Training Program is (Useless/Useful)	

## 4 Data analysis and result

### 4.1 Data analysis

Our data and proposed research model were analyzed in two ways. For the demographic data analysis, we used SPSS version 21. In the second part, we used partial least squares regression testing using SMARTPLS 3.0 [20][21]. In smartPLS 3.0 we followed two types of results following the research of [22]. First part, we calculated the measurement model which shows the result of convergent and discriminant validity. In the second part, we showed the relationship between the variables and the hypothesis testing [23].

### 4.2 Measurement model

At first, we ran PLS algorithm and received the result of AVE, CR and Discriminant validity. According to [24], our AVE and CR matched the threshold values which are AVE is more than 0.5 and CR is more than 0.7. See the result in Table 4.

Table 4. CR and AVE

	Composite Reliability	Average Variance Extracted (AVE)
Ability	0.799	0.500
Attitude	0.947	0.817
Intention	0.878	0.706
Motivation	0.919	0.740
Opportunity	0.944	0.808
Perceived Behavior Control	0.892	0.733
Subjective Norm	0.915	0.782

In Table 5, we are presenting the discriminant validity, according to our result, all the diagonal as values are higher than inside value. That means, our discriminant validity is established.

Table 5. Discriminant validity

	AB	ATT	INT	MOV	Oppo	PBC	SN
Ability	0.707						
Attitude	0.128	0.904					

Intention	0.615	0.211	0.840				
Motivation	0.631	0.317	0.749	0.860			
Opportunity	0.446	0.456	0.471	0.613	0.899		
Perceived Behavior Control	0.568	0.367	0.689	0.783	0.539	0.856	
Subjective Norm	0.421	0.293	0.364	0.562	0.543	0.540	0.884

### 4.3 Structural model

The t-values were evaluated using the bootstrap routine with 5,000 samples to analyze the path coefficients of the research model. Among the six hypotheses, three of our hypotheses are found to be significant. Regarding H3, we can confirm a significant relationship between PBC and intention (H3 supported,  $b = 0.270$ ,  $p < 0.05$ ). Furthermore, results also reveal that a significant relationship is observed between motivation and intention (H4 is supported,  $b = 0.160$ ,  $p < 0.05$ ). In terms of the ability and intention, there is a strong relationship (H5 is supported,  $b = 0.211$ ,  $p < 0.05$ ). However, no significant relationship was found for attitude, subjective norm and opportunity with Intention to participate in online teacher's training.

**Table 6.** Hypothesis test result

		beta	T value	P Value	Remark
H1	Attitude -> Intention	-0.04	0.516	0.606	Not Supported
H2	Subjective Norm -> Intention	-0.147	1.891	0.059	Not Supported
H3	Perceived Behavior Control -> Intention	0.27	2.563	0.011	Supported
H4	Motivation -> Intention	0.476	3.668	0	Supported
H5	Ability -> Intention	0.211	3.144	0.002	Supported
H6	Opportunity -> Intention	0.038	0.447	0.655	Not Supported

### 4.4 Limitation and future research

These results have several limitations. The study was carried out only in the context of tertiary-level teachers from different universities located in the capital city of Bangladesh. In future, we will conduct a longitudinal study. The constructs of this research are based on the teachers' current perceptions of online training and development. These might change over time, and some constructs might gain or lose influence over online training intentions. In terms of theory, there could be a possibility that a mediation could happen between TPB and technostress. In this study, we did not investigate the mediation effect. In future research, how far the results fit this theory can be examined. We have also plan to implement machine learning algorithm to predict the important variables.

## 5 Conclusion

The study examines the relative behavioral issues of teachers' intentions to participate in online training. It investigated the factors that play an important role in formulating a teachers' intentions. Building on extant literature, this study succeeds in validating a theoretical framework that merges theory of Planned Behavior with motivation, ability, and opportunity. Based on the results, it can be seen that perceived behavior control, motivation, and ability of teachers have a positive relationship. Non-significant relationships like attitude, subjective norms, and opportunity suggest that necessary resources, enough motivation, and sufficient abilities will boost teachers' intentions to participate in online training. This study could serve as the catalyst for further research into online teachers' training and development in the COVID-19 period.

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## 7 Authors

**Ejaj-Ur Rahaman:** Ejaj-Ur-Rahaman is working as Assistant Professor of Accounting and Art of Living in the Daffodil International University, Bangladesh. In addition he is embarking as Deputy Director of Human Resource Development Institute (HRDI) where he designs, organizes, coordinates and trains teachers on bringing excellence in teaching & learning with compelling edtech tools. He is an active volunteer of East Side Institute and participated (virtually) as co-presenter of “Economics of Body Language” at the conference “Performing the World” held in New York. He visited Lyceum of the Philippines University in Laguna, Philippines as visiting professor to coach in the College of Business & Accountancy and in the Graduate School there. Mr. Ejaj was also a full time fellow for Teach for Bangladesh for 2019 moving with a vision to end educational inequity by engaging as a classroom teacher of grade-3. In connection with that vision Ejaj has completed his PGD in Education leadership from Brac University. He is also a freelance teachers' trainer and regularly trains faculty members of Technical Teachers Training College and Bangladesh University of Professionals.

**Md. Ar Rafi Himel:** Md. Ar Rafi Himel is currently working as a national consultant at JICA. After graduating from Shahjalal University, He started his career as a teaching fellow at Teach For Bangladesh and later worked in the same organization as permanent staff. He has done his masters in Educational Leadership from BRAC University. Since the beginning of his career, he has been heavily involved in teaching, teacher training, curriculum development, talent development and project designing. At JICA, he is currently engaged in developing and training government gazetted officers in project planning and appraisal.

**Imran Mahmud:** Dr. Imran Mahmud is currently working as Head and Associate Professor at Department of Software Engineering in Daffodil International University, Bangladesh. He is also working as visiting professor at Graduate School of Business

in Universiti Sains Malaysia. Previously, Dr. Imran worked as a senior lecturer at Graduate School of Business in Universiti Sains Malaysia. Dr. Imran was also a visiting lecturer at Institute Technology, Bandung (Indonesia) and Hong Kong Management Association (Hong Kong). He completed his PhD in Technology Management from Universiti Sains Malaysia and Masters in Software Engineering from University of Hertfordshire, UK. Dr. Imran achieved several awards including “Hall of Fame” and “Presitigious Publication Award” from Universiti Sains Malaysia, “Young Researcher” from Kasetsart University, Thailand and “Young Scientist in Technology Management” from Venus International Foundation, India. At the moment, Dr. Imran is working with Technostress, games addiction and online learning continuance intention.

**Afsana Begum:** Ms. Afsana Begum is currently working as assistant professor at Department of Software Engineering, Daffodil International University. She is also working as Program Director of MSc in Software Engineering program. Ms. Afsana is also adjunct faculty at Brac business school and working as consultant in various government institutions. She is also pursuing PhD in Data Science at Universiti Malaysia Perlis.

**Nusrat Jahan:** Ms. Nusrat Jahan is currently assistant professor and head of the Department of Information Technology & Management. She is also pursuing PhD in Data Science at the Department of Computer Engineering in Universiti Malaysia Perlis. She has several research papers and won several research awards. Ms. Nusrat is a judge of several national and international competitions.

Article submitted 2022-02-27. Resubmitted 2022-04-01. Final acceptance 2022-04-01. Final version published as submitted by the authors.