

EXAMINING STUDENTS' ADOPTION AND USAGE BEHAVIOR IN LINE WITH UTAUT CONSTRUCTS: EVIDENCE FROM THE TERTIARY LEVEL EDUCATION IN BANGLADESH.

Md. Khaled Amin¹, Mahmud H. Zaman², Afrina Amin³

⁴Corresponding Author:

ABSTRACT

The study aims to apply the Unified Theory of Acceptance and Use of Technology (UTAUT) model to understand both adoption and usage behavior of various Information and Communication Technologies (ICTs) enabled products and services among the students of Higher Education Institutions (HEIs) in Bangladesh. The study was carried out at the tertiary level education institute, consisting of 210 respondents drawn from three departments (i.e., science, business and engineering) of a leading private university in Bangladesh. The model confirmed a good fit with the data, and explained 47% of the variance for Behavioral Intention (BI) and 35% for Usage Behavior (UB). Results of the study confirmed the significant direct effect of the variables, i.e., Performance Expectancy (PE), Effort Expectancy (EE) and Social Influence (SI) on Behavioral Intention (BI) to use ICTs at the tertiary level education. The study's findings may contribute to both academia and policy makers to devise program to understand and enhance various Information and Communication Technologies (ICTs) based platforms in higher educational institutions (HEIs) of Bangladesh.

Keywords: Behavioral Intention, Information and communication technology (ICT), E-learning

1. INTRODUCTION

The definition of ICT becomes challenging when it is drawn from a wide spectrum of disciplines such as digital literacy, economics, and information technology and based on the diverse applications (Zuppo, 2012). According to a report published by Educational Testing Service (ETS), ICT is commonly being used by several entities such as global industry, international media and academics in bridging the gaps between computer and communication technologies (Panel,

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1. Assistant Professor, Department of Marketing, American International University -Bangladesh (AIUB).
 2. Senior Lecturer, Department of Marketing and International Business, School of Business & Economics, North South University (NSU), Bangladesh.
 3. Department of Civil Engineering, Rajshahi University of Engineering & Technology (RUET), Bangladesh
 4. Mahmud H. Zaman, Senior Lecturer, Department of Marketing and International Business, School of Business & Economics, North South University (NSU), Bangladesh.

2002). The implementation and effectiveness of ICTs in the classroom environment has been extensively discussed which includes the utilization of PCs, laptops, handheld devices and other type of wireless and cable connected equipment (Jamieson-Proctor, Watson, Finger, Grimbeck, & Burnett, 2007). However, the increased adoption of ICTs in higher education institutions (HEIs) has drastically changed the learning patterns of students; making it more interactive and dynamic. Learning patterns of young learners, attributed behavioral changes towards performing homework, taking quizzes, discussing in group. Due to functional benefits, a large portion of their academic works/tasks are being performed with the help of ICTs and its associated products and services that are available in Bangladesh (Md.khaled Amin, 2018). To meet this unprecedented demand, various ICTs enabled education platforms have been deployed and expanded South East Asia where ICTs is playing significant roles in teaching and learning at the tertiary level (Oliver, 2002; Sarkar, 2012; Stensaker et al., 2007). However, in many countries, the use of ICTs in academia is still regarded as expensive and lacks quality. Introducing ICTs requires huge investment and planning. As such, facilities to which it is adhered, need to be highly prioritized and used by majority of the community. In fact , higher return from ICT investment basically, depends on innovation, teamwork and collaborative working environment (Laudon & Laudon, 2010). Bangladesh is also experiencing a major move up in this sector. Due to a number of initiatives undertaken by the government of Bangladesh (In favor of opening up various ICTs driven ventures) (Islam & Selim, 2006), the country is now meeting the need of introducing both static and dynamic ICTs driven products and services such as Interactive Digital Board, Moodle, Google Class Room, Smart Printing Technology, Virtual Desktop based Lab, Education Enterprise Resource Planning (ERP) and Virtual University Expert System (VUES) in all levels of education. These intervention HEIs provide an alternative learning environment to promote productive and informative resources (Sevillano-Garc, xed, Esteban, xe, & zquez, 2015); including managing issues of equity, management, quality and pedagogy (Buttar, 2016). Although, the adoption level of ICTs in higher education is widespread, ICTs have failed to bring radical changes in learning and teaching (Kirkup & Kirkwood, 2005). This is due to lack of adoption of digital technologies by the students and instructors as an instructional tool (Agbatogun, 2013); which must be accepted positively and concurrently used by the stakeholders of an organization to foster changes (Hu, Chau, Sheng, & Tam, 1999). Moreover, literature suggests the ignorance of the educational needs (Sarkar, 2012) which also serves as a challenge for adopting new technologies. In order to play more effective role in teaching and learning, some issues (such as pedagogy, organizational and human development) Should be linked up with ICTs (Stensaker et al., 2007). Though ehavioral intention to adopt ICTs in HEIs is adequate, many academicians and learners are reluctant to incorporate ICTs (Amin et al., 2016; Dewi, 2017). Therefore, the principle motivation of the paper is understand the under-utilization of ICTs provided by the HEIs (for its students) so as to perform academic and research activities; (Attuquayefio & Addo, 2014). Therefore, the extent to which various factors explains adoption of various e-learning platforms is addressed in this study.

2. LITERATURE REVIEW

2.1 ICT in Higher Education

The importance and appropriation of ICTs in higher education has been mentioned in several studies, highlighting various benefits of ICTs in higher education; as well as exploring roadmap for the adoption (Oliver, 2002). The incorporation of ICTs with the teaching modules of teachers have been observed by researchers (Kirkup & Kirkwood, 2005), studies indicated that the majority of the teaching staff considers the injection of ICTs in academia as a tool to facilitate and improve the daily activities (Kirkup & Kirkwood, 2005). On the other hand, Chelladurai & Pitchammal, (2016) addressed the future opportunities and challenges poised by the integration of ICTs in higher education. Introducing web based learning environments has always been quite effective as ICTs can lead to a rich learning experience fostering positive learning outcomes (Lockyer, Patterson, & Harper, 2001). On the other hand, challenges to implementing technology-based learning environments is attributed to pedagogies, finance and technology infrastructure, cultural change, organization and management resistance (scarcity) (Usluel, Aşkar, & Baş, 2008). To foster the process of internationalization, ICTs are now being used as a supporting tool to coordinate activities (Thune & Welle-Strand, 2005). Through the appropriation of ICTs in HEIs, teachers and students will be encouraged to share resources (Tsongjunag, 2009); while interactive learning environments can ensure to foster positive changes (Sofia Balula, Jos, xe, & Alves, 2014).

2.2 UTAUT model in ICTs with respect to higher education

The roles of infrastructure in promoting ICTs aided teaching (at the school level) is pivotal (Chun et al., 2015). In this regard, the usefulness of various blogs and wikis have been measured through the application of constructs raised in TAM were found to have a significant positive relationships on the behavioral intention (Ummuhan & Petek, 2012). In order to achieve precise result, UTAUT model has been extend by several scholars via adding more constructs (i.e; as subjective task) and proven to be useful in measuring learners intention to use web based learning (Chiu & Wang, 2008). Authors Raman et. al., (2014) also used the UTAUT scales to examine the acceptance level of the Learning Management System (LMS) at a tertiary level educational institution by surveying a group of students in a simulated environment. The study confirmed the usefulness of LMS in terms of learning and teaching. In the context of Bangladesh, authors Amin et al., (2016) applied the Technology Acceptance Model (TAM) to explore the adoption level of various e-learning platforms confirming the usefulness as a major determinant in adopting e-learning platform. Moreover the UTAUT model had been applied to know the usage behavior of EdTech and confirmed the significant positive effect of Effort Expectancy, Facilitating Condition, and Perceived Behavioral Control on the adoption and usage behavior of EdTech (Md.khaled Amin, 2018).

3. TECHNOLOGY ADOPTION THEORIES AND APPLICATIONS IN A DIVERSE MANNER.

A series of models, each with different types of variables or constructs depending on the situation, have been yielded for the past two decades to elucidate the adoption behavior; since a single theory may not be capable enough to describe diverse phenomena. Therefore, academic models coupled with empirically validity, are often proposed to describe the adoption behavior of various technology aided products and services (Luo et al., 2010). The theory of planned behavior (TPB), is still considered as the core theory and has been extended and converted in to theory of reasoned action (TRA) by adding a single construct; i.e. Perceived Behavioral Control (PBC) to justify situation (Ajzen, 1985). TRA itself was proven to be parsimonious in describing and predicting a diverse range of adoption behaviors (Fishbein, 1979). Many authors have added new constructs to the TRA and extended to technology acceptance model (TAM) and create several versions (i.e, TAM 2 and TAM 3) (Venkatesh & Davis, 2000). The TRA, TPB, TAM theories therefore have widely been adopted to explore adoption behavior among various technology-based product and services. For example, previous studies have confirmed that student's behavioral intention to use course content management systems (CCMS) is influenced by perceived usefulness and perceived ease of use of a system (Zaman & Amin, 2016). Meanwhile, the motivational model (MM) served as tool for academics, but was not able to sustain for a long period of time to clarify the adoption behavior of new technologies (Venkatesh & Davis, 2000). Scholarly approach often evoke to extend existing model, as a result Model of PC Utilization (MPCU) had been hatched with six relative constructs. At the same time TPB and TAM were combined into C-TAM-TPB in 1995 (Venkatesh & Davis, 2000). Based on the above discussion, it can be stated that the models (along with various unique constructs) have always been robust and useful in describing various adoption behaviors UTAUT model; on the other hand consists of four core factors and measures users' intention and usage behavior. Introduced by the authors Viswanath Venkatesh et al., (2003), commonly known as UTAUT has shared up to 70% in Behavioral Intention; which is relatively higher making the model a robust tool for academicians and managers to assess the likelihood to understand behavioral intention and respond proactively (Venkatesh et al., 2003).

4. METHODOLOGY

This study was conclusive in nature and used a multi-stage sampling design while collecting the data. Samples were drawn randomly from the three clusters (i.e. department of science, business and engineering) from both undergraduate and graduate students of a renowned private university in Bangladesh. Students of Bangladesh were chosen in this study as the universities of Bangladesh are striving to equip students with the various ICTs in order to transfer skills needed for today's digital workforce. The study was undertaken between March 2017 and April 2017 and consisted of two hundred ten (n = 210) respondents. At the initial stage, data

collection procedure was centered in the campus premises in which respondents were briefed in the classrooms and kept them informed about the usefulness of various ICTs such as course content management systems (CCMS), radio frequency identification (RFID) enabled multipurpose card, Virtual Desktop based Lab and other factors that facilitate academic activities. After the briefing a self-administrated questionnaires were distributed among the respondents. The instrument comprised of two parts; part one consisted of few demographics items while part two of the questionnaire were comprised of several categorical questions were pertinent to ICTs adoption. The responses were encoded by using a seven-point likert scale and were recorded via the strengths of the items to corresponding respondents; i.e. Strongly Disagree (SD) to Strongly Agree (SA). The items were adopted from prior studies pertinent to technology adoption and usage. Finally, collected data encoded into SPSS and analyzed using a standard SEM simulator, namely SMART PLS 2.0.

5. RESEARCH DESIGN

The UTAUT model which combines a number of theories and is highly regarded as stable and reliable tool for measuring IT use behavior (Venkatesh et al., 2003, Wang & Shih, 2009) and educational technology acceptance (ETA). The model explains 70% variance for Educational technology Acceptance compared to others models in this field, which only explains 40% variance (Nistor et al., 2013). The UTAUT model also explains the moderating effect of the variables such as gender, age, experience, and usage between dependent and independent variables (Ummuhan & Petek, 2012). The research model (i.e. figure 1) of the study is based on constructs UTAUT model. However it excludes all moderators, making the model simple to identify adoption and usage behavior (Attuquayefio & Addo, 2014; Birch & Irvine, 2009).

5.1 Research Model:

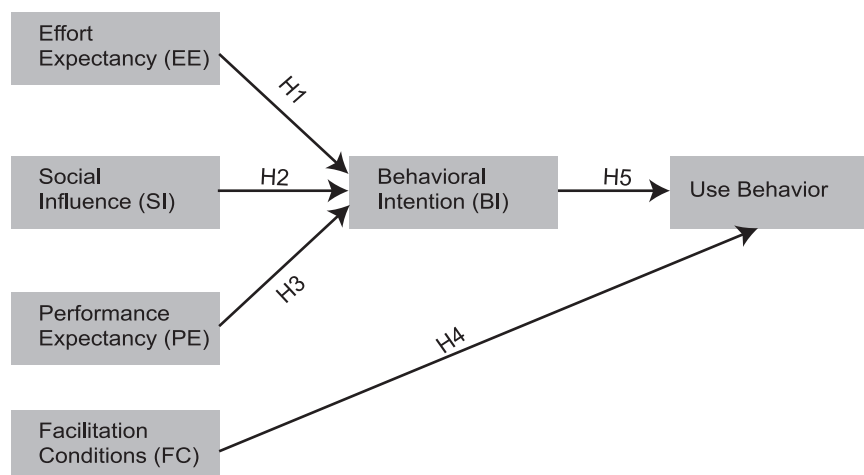


Figure: 1 Research Model
Source: Venkatesh et al. (2003)

The study measures students' adoption and usage behavior of ICTs at the tertiary level in Bangladesh via the UTAUT model as a base theory. The UTAUT consist of six uniquely identified constructs along with several constructs that moderates the relationships and establishes causal relationships.

5.2 Development of Hypotheses

Performance expectancy (PE) can be defined as “the degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh et al., 2003, p. 447). More elaborately, it is the degree to which an individual believes that using a specific system will help him or her to be more productive that leads to the attainment of the goal. Literature suggests both perceived usefulness and self-efficacy explained almost 71% of variance in Usage behavior (in the context of educational research) (Ummuhan & Petek, 2012). Effort Expectancy (EE) is defined as “the degree of ease associated with the use of the system” (Venkatesh et al., 2003, p. 450); i.e. the degree to which people believe that technology (and its associated products) will be free from any sort of complexity (Sun et al., 2013) . Consequently authors Birch & Irvine (2009) studied teachers' acceptance towards adaption of ICTs using UTAUT model. The results of the study indicated EE to be a significant predictor of Behavioral Intention (BI). Social influence (SI) is defined as “the degree to which an individual perceives that important others believe he or she should use the new system” (Venkatesh et al., 2003, p. 451); in other words, social influence is the degree to which he or she prioritizes others beliefs before using the new system. Authors Attuquayefio & Addo (2014) analyzed the UTAUT model to examine the adoption behavior of students; however their results indicated insignificant relationship between SI and BI. Therefore, the authors' postulates EE, SI, PE will have significant positive impact on Behavioral Intention to adopt ICT among students.

The following hypotheses were therefore proposed for the BI construct:

- H1: There will be a significant positive impact of EE on BI*
- H2: There will be a significant positive impact of SI on BI.*
- H3: There will be a significant positive impact of PE on BI.*

Adittionally, facilitating conditions are defined as “the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system” (Venkatesh et al., 2003, p. 453). Authors Attuquayefio & Addo (2014) applied the UTAUT model to understand factors affecting English e-learning website, and confirmed the positive effect of facilitating condition on usage behavior of students in adopting.

Hence, the following hypotheses were derived for UB:

H4: There will be a significant positive impact of FC on UB.

H5: There will be a significant positive impact of BI on UB.

5.3 Structural Equations

The following (PLS) equations have been formulated which are based on the research model (i.e. figure 1).

$$1. BI = \gamma_{21}EE + \gamma_{22}SI + \gamma_{23}PE + \epsilon_1$$

$$2. UB = \beta_{12}BI + \gamma_{14}FC + \epsilon_2$$

6. CFA RESULT

6.1 Demographics of the respondents

This study incorporated representative samples where all respondents were sampled from tertiary level (both undergraduate and graduate), were chosen systematically and drawn from three departments; i.e. Business Studies (47.1%), Engineering (32.9%) and Science (20 %). In the dataset, 80% of the respondents are male students and the rest of them are female students. Dataset also reveals that over 96% of the respondents were aged between 20 to 29 years old who possess high computer and internet literacy and willing to use ICTs provided by the institution.

6.2 Reliability and Validity Analysis

Table 1: Reliability and validity

	AVE	Composite Reliability	R Square	Cronbach's Alpha	Communality	Redundancy	No. of Items
BI	0.6448	0.8788	0.4773	0.8158	0.6448	0.2228	4
EE	0.5359	0.8204		0.7077	0.5359	0.0000	4
FC	0.5406	0.7783		0.5913	0.5406	0.0000	3
PE	0.5940	0.8525		0.7663	0.5940	0.0000	3
SI	0.6131	0.8257		0.7083	0.6131	0.0000	4
UB	0.6230	0.8315	0.3539	0.6987	0.6230	0.1424	3

Source: Estimated result

As suggested by Gliem & Gliem (2003), we conducted reliability analysis for the scales by following the three standard criterias; i.e. Cronbach's Alpha range , AVE and CR value.

As shown in table 1, it can be stated that the all of the six constructs retained adequate Cronbach’s Alpha level, indicating good internal consistency. However the Cronbach’s Alpha values of the construct, FC, was found to have lower than the suggested level; but it does not indicate that the scales were unidimensional (Dobele & Lindgreen, 2011). In addition, all Average Variance Extracted (AVE) and Composite Reliability (CR) values are adequate as they exceeded the standard thresholds (Henseler, Ringle, & Sinkovics, 2009).

6.3 Discriminant Validity:

Table 2: Fornell-Larcker Criterion analysis:

	BI	EE	FC	PE	SI	UB
BI	0.8029					
EE	0.6295	0.7320				
FC	0.4295	0.4736	0.7352			
PE	0.5778	0.6227	0.3335	0.7707		
SI	0.4250	0.3691	0.4618	0.3971	0.7830	
UB	0.5045	0.4373	0.5014	0.4472	0.4328	0.7893

Source: Estimated Result

According to authors Fornell & Larcker (1981) all square root values of AVEs should be higher than the correlations of the constructs in the structural model. Due to issues relating to the version of the simulation, we manually calculated to attain the values and placed diagonally (see table 2). Based on the values calculated, we can conclude that the discriminant validity is well established.

6.4 Analysis of the Structural Models

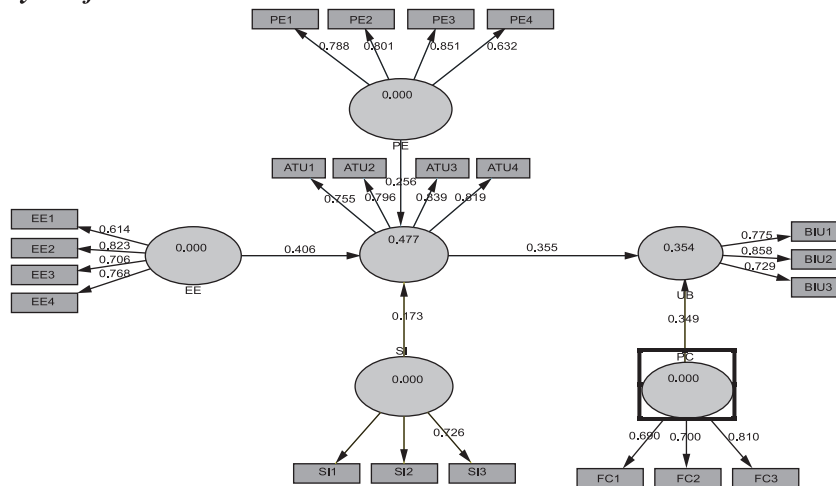


Figure: 2 Structural Model
Source: Simulation Output

The structural model (figure 2) comprises of two endogenous and four exogenous variables. All outer loadings were adequate, since all loadings exceeded the standard cut-off point. The results indicate 47% of the variance was predicted on BI from PE, EE and SI, with an additional, 35% of the variance on UB was explained by BI, FC.

6.5 Correlations Analysis

To know the status and strengths of the relationships among latent constructs, we calculated correlations analysis (i.e. table 2). Data appears to have significant positive relationships among all latent constructs. Data support the significant positive relationships between EE and BI (0.6295), PE and BI (0.5778), FC and UB (0.5045), BI and UB (0.5045). However, the strengths of all relationships, except between SI and BI (0.4250), appear to be strongly correlated since all values are above (or near) 0.50 (Attuquayefio & Addo, 2014). To know the size of the beta coefficient, we, therefore, calculated the t-statistics and path coefficients (i.e. β).

6.6 Testing Research Hypotheses

Table 3 Path coefficients

Hypothesized Paths	Path Coefficients (β)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (O/STERR)	Result
H1 EE -> BI	0.4060	0.1019	0.1019	3.9860	Supported
H2 SI -> BI	0.1735	0.0608	0.0608	2.8551	Supported
H3 PE -> BI	0.2561	0.0958	0.0958	2.6720	Supported
H4 FC -> UB	0.3491	0.0639	0.0639	5.4628	Supported
H5 BI -> UB	0.3546	0.0814	0.0814	4.3576	Supported

Source: Estimated Result

All test results of hypotheses stated in the earlier part of this study are shown in table 3. A total of five hypothesized paths were analyzed by using SEM simulator. Results reveal that the hypothesized paths between BI and UB ($\beta=0.3546$, $t= 4.35$, $p< 0.05$), EE and BI ($\beta = 0.4060$, $t=3.98$, $p < 0.05$), FC and UB ($\beta = 0.3491$, $t = 5.46$, $p < 0.05$), PE and BI ($\beta = 0.2561$, $t = 2.60$, $p < 0.05$), SI and BI ($\beta = 0.1735$, $t = 2.85$, $p < 0.05$) are statistically significant.

7. CONCLUSION, MANAGERIAL IMPLICATION AND FUTURE RESEARCH DIRECTIONS

This study applied the UTAUT model to understand both adoption and usage behavior of various ICT enabled products (and services) among students of HEIs. The sample size consisted of 210 respondents from three departments (i.e. science, business and engineering). The results explained a 47% variance for Behavioral Intention (BI) and a 35% for Usage Behavior (UB). Results of the study also confirmed significant direct effect of the variables including PE, EE

and SI on Behavioral Intention (BI) to use ICT at tertiary level education. The finding also indicated that adaption of ICT by students in HEIs are significant, providing evidences in favor of emphasizing on the factors tested in the earlier part of the paper.

The results of the study indicates that the higher amount of ICTs adoption and usage are highly associated with the increased number of identified factors such as EE, PE, SI and FC. Therefore, HEIs should focus on developing infrastructure to facilitate ICTs adoption, disclosing the usefulness of the platform, and making the learners' able to understand the relative advantages of ICTs over traditional medium of instruction by organizing inhouse workshops and seminars. In addition, HEIs should also provide sufficient training facilities to the students in order to ease the process of use and to be familiar with system to share the message that the extent of technologies on which learners are associated free from hassle. It is also imperative that faculty members encourage the students to be acquainted with the platforms by the respective HEIs in Bangladesh.

These finding may help policy makers to devise program to adopt ICT enabled products and service in tertiary level education systems (Nassuora, 2012). As understanding potential consumers' characteristics usually contributes to adoption of various mediums, attention should be drawn to it (Varma et al., 2000)

The major limitation of this study was the sample size; it was derived from one university. Moreover, the study did not incorporate the moderating variables of the original UTAUT model. Future studies may be undertaken with greater number of respondents (sample size) for more reliable results. Studies can also be undertaken to include additional variables to improve the variance explained by the predictors; i.e. the mediating role Perceived Behavioral Control (PBC), in adoption behavior of ICTs among students of Bangladesh. Studies can also be undertaken to compare ICT adoption among private and public universities of Bangladesh.

REFERENCE

- Agbatogun, A. O. (2013). Interactive digital technologies' use in Southwest Nigerian universities. *Educational Technology Research and Development*, 61(2), 333-357.
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior Action control (pp. 11-39): Springer.
- Amin, M., Azhar, A., & Akter, A. (2016). Factors Affecting Private University Students' Intention To Adopt E-Learning System in Bangladesh.
- Attuquayefio, S. N., & Addo, H. (2014). Using the UTAUT model to analyze students' ICT adoption. *International Journal of Education and Development using Information and Communication Technology*, 10(3), 75.

- Birch, A., & Irvine, V. (2009). Preservice teachers' acceptance of ICT integration in the classroom: applying the UTAUT model. *Educational Media International*, 46(4), 295-315. doi: 10.1080/09523980903387506
- Buttar, S. S. (2016). ICT in Higher Education. PEOPLE: *International Journal of Social Sciences*, 2(1).
- Chelladurai, M., & Pitchmmal, S. (2016). ICT in Higher Education. Copyright@ 2016 by HINDCO Publications, Tirunelveli-627010, 80.
- Chiu, C.-M., & Wang, E. T. (2008). Understanding Web-based learning continuance intention: The role of subjective task value. *Information & Management*, 45(3), 194-201.
- Chun, L., Chin-Chung, T., & Di, W. (2015). The Role of ICT Infrastructure in Its Application to Classrooms: A Large Scale Survey for Middle and Primary Schools in China. *Journal of Educational Technology & Society*, 18(2), 249-261.
- Dewi, C. (2017). THE USE OF E-LEARNING AS LEARNING MEDIUM AT SECONDARY VOCATIONAL SCHOOL. *Journal of Innovation and Applied Technology*, 3(1), 402-407.
- Dobele, A., & Lindgreen, A. (2011). Exploring the nature of value in the word-of-mouth referral equation for health care. *Journal of Marketing Management*, 27(3-4), 269-290.
- Fishbein, M. (1979). A theory of reasoned action: some applications and implications.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, 39-50.
- Gliem, J. A., & Gliem, R. R. (2003). *Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales*.
- Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing *New challenges to international marketing* (pp. 277-319): Emerald Group Publishing Limited.
- Hu, P. J., Chau, P. Y., Sheng, O. R. L., & Tam, K. Y. (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. *Journal of management information systems*, 16(2), 91-112.
- Islam, M. T., & Selim, A. S. M. (2006). Current status and prospects for e-learning in the promotion of distance education in Bangladesh. *Turkish Online Journal of Distance Education*, 7(1).
- Jamieson-Proctor, R., Watson, G., Finger, G., Grimbeek, P., & Burnett, P. C. (2007). Measuring the use of information and communication technologies (ICTs) in the classroom. *Computers in the Schools*, 24(1-2), 167-184.
- Kirkup, G., & Kirkwood, A. (2005). Information and communications technologies (ICT) in higher education teaching—a tale of gradualism rather than revolution. *Learning, Media and Technology*, 30(2), 185-199.
- Laudon, K. C., & Laudon, J. P. (2010). *Management Information Systems: Managing the Digital Firm*. 2011: Prentice Hall.

- Lockyer, L., Patterson, J., & Harper, B. (2001). ICT in higher education: Evaluating outcomes for health education. *Journal of Computer Assisted Learning*, 17(3), 275-283.
- Md.khaled Amin, M. A. R., Tahsina Khan and Mubasshir Tahmidul Karim. (2018). Investigating Students' Adoption and Usage behavior of Educational Technology at Tertiary Level (PLS-SEM Approach). *AIUB Journal of Science and Engineering (AJSE)*, 17(1), 25-30.
- Nistor, N., xf, x11f, xfc, x15f, Ayta, . . . Lerche, T. (2013). Educational technology acceptance across national and professional cultures: a European study. *Educational Technology Research and Development*, 61(4), 733-749.
- Oliver, R. (2002). The role of ICT in higher education for the 21st century: ICT as a change agent for education. Retrieved April, 14, 2007.
- Panel, I. L. (2002). Digital transformation: A framework for ICT literacy. *Educational Testing Service*.
- Raman, A., Don, Y., Khalid, R., & Rizuan, M. (2014). Usage of learning management system (Moodle) among postgraduate students: UTAUT model. *Asian Social Science*, 10(14), 186.
- Sarkar, S. (2012). The role of information and communication technology (ICT) in higher education for the 21st century. *Science*, 1(1), 30-41.
- Sevillano-Garc, M. a. L., xed, Esteban, V., xe, & zquez, C. (2015). The Impact of Digital Mobile Devices in Higher Education. *Journal of Educational Technology & Society*, 18(1), 106-118.
- Sofia Balula, D., Jos, xe, & Alves, D. (2014). Towards an Enhanced Learning Management System for Blended Learning in Higher Education Incorporating Distinct Learners' Profiles. *Journal of Educational Technology & Society*, 17(1), 307-319.
- Stensaker, B., xf, rn, Maassen, P., Borgan, M., Oftebro, M., & Karseth, B. (2007). Use, Updating and Integration of ICT in Higher Education: Linking Purpose, People and Pedagogy. *Higher Education*, 54(3), 417-433.
- Sun, Y., Wang, N., Guo, X., & Peng, Z. (2013). Understanding the acceptance of mobile health services: a comparison and integration of alternative models. *Journal of Electronic Commerce Research*, 14(2), 183.
- Thune, T., & Welle-Strand, A. (2005). ICT for and in internationalization processes: A business school case study. *Higher Education*, 50(4), 593-611.
- Tsungjunag, W. (2009). The Transformational Promise of Information and Communications Technologies (ICTs) for the Professional Education of Architects. *Journal of Educational Technology & Society*, 12(3), 206-213.
- Ummuhan, A., & Petek, A. (2012). The Comparison of the Opinions of the University Students on the Usage of Blog and Wiki for Their Courses. *Journal of Educational Technology & Society*, 15(2), 194-205.
- Usluel, Y. K., Aşkar, P., & Baş, T. (2008). A structural equation model for ICT usage in higher education. *Journal of Educational Technology & Society*, 11(2).
- Varma Citrin, A., Sprott, D. E., Silverman, S. N., & Stem Jr, D. E. (2000). Adoption of Internet shopping: the role of consumer innovativeness. *Industrial Management & Data Systems*, 100(7), 294-300.

- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management science*, 46(2), 186-204.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS quarterly*, 425-478.
- Wang, Y. S., & Shih, Y. W. (2009). Why do people use information kiosks? A validation of the Unified Theory of Acceptance and Use of Technology. *Government Information Quarterly*, 26(1), 158-165.
- Zaman, M. H., Amin, K. M. (2016). Examining Students' Attitude towards using course content management system (CCMS). *International Journal of Business & Management Toronto*, 3(1), 1-14.
- Zuppo, C. M. (2012). Defining ICT in a boundaryless world: The development of a working hierarchy. *International journal of managing information technology*, 4(3), 13.

AUTHOR'S BIOGRAPHY

Md. Khaled Amin is an Assistant Professor of Marketing in the Faculty of Business Administration at American International University-Bangladesh (AIUB). Before joining AIUB, Mr. Amin worked as a Senior Lecturer for Daffodil International University (DIU) and as a Lecturer for Northern University Bangladesh (NUB). Besides, Mr. Amin also worked as a part-time faculty member for universities such as Zhejiang Gongshang University (ZJSU), Zhejiang Shuren University, Uttara University(UU). He holds a Master Degree and a Bachelor Degree in Business Administration with concentration in Marketing from AIUB, and completed his Doctorate Degree in Management Science with concentration in Marketing and Innovation Management at Zhejiang Gongshang University(ZJSU), China. His academic research interest encompasses a broad spectrum of areas such as Consumer Psychology, E-commerce and Digital Marketing, E-learning, Technology and Innovation. He is particularly concerned with the acceptance and the adoption of various ICTs driven products and services by the rural consumers in Bangladesh. He has published several research papers both in local and foreign journals and conferences. Aside from being a faculty member of AIUB, he has been serving as an active reviewer and editorial member for several journals and conferences, and actively participating in various conferences, workshops, and symposiums both in home and abroad.

Mahmud Habib Zaman is a Lecturer at department of Marketing and International Business (MIB), School of Business & Economics (SBE) at North South University, Bangladesh. His research interest centers on consumer behavior (i.e. purchase decisions and patronage behavior), international business process (i.e. Mergers & Acquisitions, Strategic Alliances) and social marketing (i.e. Inclusive growth at the Bottom of the pyramid markets).

Afrina Amin is currently working as a Lab Officer in the Department of Civil Engineering at Pundra University of Science & Technology (PUST), Bogura. She holds a BSc degree in Civil Engineering from Rajshahi University of Engineering & Technology (RUET), Bangladesh.