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## Blended Learning During Pandemic Through Knowledge Management: An Analytical Study

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**Abstract.** Blended Learning (BL) essentially fuses high-tech digital learning with traditional ones to involve students in “network learning”, which helps in transcending physical boundaries. Especially during the ongoing COVID-19 pandemic, BL has been embraced as a realistic possibility to ensure seamless knowledge distribution regardless of time and space. Knowledge Management (KM)-based approaches are typically used to collect, coordinate, and control processes that may be utilised efficiently to both recognise and address customer needs. This study aims to explain how to apply KM techniques within the BL environment to increase educational excellence and quality. We used a quantitative approach, specifically by adopting an online questionnaire circulated to about 272 undergraduate students, primarily from the Department of Information Science and Library Management (ISLM) of the University of Dhaka, Bangladesh. We received completed answers from 74 students; the data gathered were analysed using Statistical Package for the Social Sciences (SPSS) version 20. The findings reveal that KM can be used with BL, especially during crisis times like the one we have today, as it includes integrated tasks and online and e-learning. Finally, the study also proposed an intuitive model for applying BL through KM. Importantly, this study seems to be among the first to examine the students’ perceptions about BL and

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KM integration during a pandemic. Therefore, this research would possibly prompt further research on different aspects of the combined learning process at different universities, especially within Bangladesh.

*Keywords:* KM; BL; knowledge sharing; higher education; pandemic situations; COVID-19; Bangladesh.

## 1. Introduction

Technology usage in education improves the processed and distributed knowledge system (Luaran *et al.*, 2016). Blended Learning (BL) effectively amalgamates technology in education with traditional learning methods and has thereby been recognised today as the avenue for “future learning”. BL practices provide the learner autonomy by allowing students to learn at individual pace and space, ensuring that the student effectively learns and gains knowledge. Therefore, having an institutional approach to BL would ensure collective learning for the intended cohort (Mukherjee and Hasan, 2020). On the other hand, Knowledge Management (KM) strategies may be used to track, coordinate, and distribute information and can be used to define management systems (Sammour *et al.*, 2004). Traditionally, BL in KM has often been described as a “knowledge resource repository”, where KM approaches are primarily used to facilitate the successful distribution of information (Ponce, 2003; Sammour *et al.*, 2004; cited in Qwaider, 2011a; Ravet, 2002).

Furthermore, KM deals with learning and mainly focusses on basic types of informal learning as part of information exchange processes (i.e. community-based learning) or accesses to learning resources and experts, i.e. knowledge foundations (Efimova and Swaak, 2002). KM is, therefore, also commonly referred to as “21st-century” information management processes, which could help managers identify and appreciate what is expected in KM work (Anongkhanatrakul, 2004). This paper responded with great faith and interest in BL systems while introducing KM ideas. In this endeavour, we look to analyse KM, as we believe it would be helpful for educational establishments with BL in case of another pandemic.

The rest of this study is structured as follows. The theoretical concept of KM and BL is analysed in Sec. 2. The literature review is done in Sec. 3. Section 4 presents and analyses the blended knowledge transformation. In Secs. 5–7, we conduct our data analysis, followed by a proposed intuitive model and its theoretical implications, followed by discussion, conclusions, and future research scope.

### 1.1. *Problem statement*

The sudden outbreak of COVID-19 has affected all of us, and students have not been an exception. The pandemic has thrown the students’ lives entirely out of gear, impacting their studies and personal lives (Bender, 2020). Possibly, most undergraduate students are staring at an uncertain future today, regardless of their country/city. Specifically, in the context of Bangladesh, the Ministry of Education issued a circular note for schools and other educational institutions, including higher education institutions (HEIs) to stop conventional teaching temporarily (Daily Prothom-Alo, 2020). Thus, from 18th March 2020, all educational institutions in

Bangladesh have been declared “closed” to avert the spread of the COVID-19 virus (Anwar *et al.*, 2020). In these situations, it is challenging to study at home for students who are low motivated. Such homes also lack the facilities and infrastructure that wealthier families find to be obvious, which makes the issue even more intriguing (Yan, 2020). Based on this premise, we were motivated to conduct this study.

### **1.2. Aim and objectives of the study**

Due to the COVID-19 pandemic, the government and management of educational institutions had to ponder how to maintain learning continuity while facing the real possibility of a prolonged closure (Ali, 2020). Therefore, within this backdrop, our primary aim is to explain how to apply KM techniques in the BL environment to increase educational excellence and quality during pandemic situations. In this endeavour, we focus on a multi-focal triad of online learning and KM, and lessons learned by the ISLM’s Department connected with the COVID-19 pandemic. Also, the students’ expectations during the pandemic, elaborating upon KM techniques that have been implemented in the university. The key objectives of this research can be described as follows:

- (a) To identify the students’ perceptions of using BL during the pandemic through KM.
- (b) To identify the relationship among students’ gender, the concepts of BL and KM, academic skills, and students’ confidence.
- (c) To present an intuitive model for applying BL through KM.

## **2. Theoretical Conceptions of KM and BL**

### **2.1. KM in higher education**

KM is regarded as an essential component of any organisation, especially educational institutions such as universities. KM implementation is concerned with knowledge acquisition, transfer, and application, which are the basic components of KM systems (Gold *et al.*, 2001). Identify the capacity of an enterprise to learn, transform, and apply specific knowledge as a possible part of an innovation and success strategy (Mostofa *et al.*, 2020; Liao and Wu, 2009). Debates on the preparation of universities for standardised KM have already been two decades old, in the case of higher education (López-Nicolás and Meroño-Cerdán, 2011; Ngah *et al.*, 2016). However, a university should be a powerful example of KM techniques and procedures, such that the best examples can be found in organisations for future KM translations (Ngah *et al.*, 2016). The translation of KM from theory to higher education practice covers four dimensions: leadership, cultural, technological, and measuring. Leadership means integrating high-quality and appropriate data for decision-making, whilst culture means team building and information sharing within the university (Lee and Roth, 2009). In terms of technology, Lee and Roth (2009) recommended that leaders

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focus on identifying and designing adequate processes for the development, sharing, and transition of information. KM helps design and improves assessment processes and measures the performance and efficacy of educational institutions (Rowley, 2000).

## **2.2. *KM practices in e-learning systems***

The connections between KM and e-learning systems can be understood in two ways: KM thinking helps in developing robust e-learning systems (ideally, efficient, and sustainable) and learning systems can provide an adequate foundation for KM growth. According to Alharthi *et al.* (2019), an e-learning system is “an educational way to provide information, to encourage learning and to improve results, to use and to manage appropriate technological processes and resources”. Sustainable e-learning systems have three quality models: quality of the product (including functionality, performance, compatibility, accessibility, reliability, protection, maintenance, portability, and greening); quality and quality of use of data (Alharthi *et al.*, 2019). The use of e-learning offers several new ways to expand the education system and develop techniques for managing wisdom to accomplish better educational goals and objectives (Petrides and Nodine, 2003). Specifically, e-learning in KM improves the transfer of knowledge between students and the institute (Tessier and Dalkir, 2016). Herein, it may be mentioned that immersive online technologies have highly stimulated that is hugely dependent on information. E-learning goes beyond expected topics and acknowledges the importance of self-management for students. Weichhart *et al.* (2018) stated that e-learning allows personalised learning; however, this strategy would only be successful if teachers restructure their classes. Journell (2007) claimed that better results could be seen by initiating personal socialisation and using technology consistent with previous findings. However, the most important practices are KM, and online learning of COVID-19 is as follows:

- Several virtual solutions were introduced worldwide with teleconferences, videos during COVID-19, but there have been limitations, such as “hands-on learning through operating experience” (Chick *et al.*, 2020).
- Researchers and experts have launched new information-sharing channels, contributing to the transition to digital communication (Neumeyer *et al.*, 2020).
- Dissemination of information and checked information is essential; however, false news is not filtered, thereby misunderstanding and low levels of knowledge are created (Malhotra *et al.*, 2020).
- Massive Open Online Courses (MOOCs) have opened up the possibility of “sharing information with peers” with people from various countries with different resources and sufficient storage capacity to store the materials (Arpaci *et al.*, 2020).
- Mobile learning helps with the process by “allowing students to use mobile technology to access learning material anytime” (Al-Emran *et al.*, 2020).

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In this instance, creativity is the main factor in the learning process and combines skills and experience.

### **2.3. BL and its relationship to KM**

KM is not necessarily restricted to where it is applied; it is also relevant for individuals from learning, small businesses to large multinationals, for turning information into permanent knowledge (Tseng *et al.*, 2012; cited in the Gao *et al.*, 2018). To provide reliable, real-time information to curb more infections under the current global pandemic, KM has indefinitely increased its position in technology. The assurance of the right people, who mainly handle correct information, is effectively and efficiently managed by digital KM, as its ability limits the exponential spread of the infection and removes its prevalence. In effect, KM depends on some primary capabilities, including the need to store, share, and build knowledge (Alavi and Leidner, 2001). Recently, multiple IT companies and educational institutions have started incorporating an integrated KM model into their human resource preparation and learning programs (Alony *et al.*, 2007; Choi and Lee, 2003; Ferguson *et al.*, 2005). It may be noted herein that some KM models prioritise information exchange (Alavi and Leidner, 2001; Bartol and Abhishek, 2002; Earl, 2001; Gagné, 2009). Similarly, some emphasise the value development of knowledge and some stress upon the significance of internalisation (Imani, 2007; Nonaka and Kenney, 1991; Nonaka and Takeuchi, 1995). Internalisation is a critical cognitive learning process (Vygotsky, 1986); it relates to the mechanism by which prior knowledge is transformed into tacit knowledge (Nonaka and Takeuchi, 1995). However, the integrated KM and BL approach incorporate classes better than essential electronic learning (Osguthorpe and Graham, 2003).

This study aims to analyse a blended KM preparation for students to develop their creativity. Further, this study's intuitive model also emphasises communication, internalisation, and knowledge growth while integrating e-learning in classroom teaching. Hult (2003) identified KM as a systematically organised process to produce and spread explicit and tacit market knowledge. Hasanali (2002) stated that the key to successful KM implementation might be split into five major categories; they include (i) management; (ii) refinement; (iii) roles, responsibilities, and infrastructure; (iv) infrastructure of IT; and (v) dimension. These elements, in turn, enable KM to interact with each other successfully.

Incorporating KM within the BL system is an essential factor and highly relevant in higher education (Gurteen, 1998; Schmidt, 2005). KM involves sharing, creation, monitoring, presentation of knowledge applications, and distribution (Bhatt, 2001; Holm, 2001). To date, only limited KM studies have based themselves on pre-service creative education; several studies have explored that KM may be incorporated into the production of curricula (Kidwell *et al.*, 2000; Rees and Lu, 2009; Yeh *et al.*, 2011); or for that matter, how KM affects professional and self-economic growth (Endres *et al.*, 2007; Fung, 2005; Sammour *et al.*, 2008). A teacher's professional

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knowledge is discovered by teacher behaviour and the effectiveness of personal teaching (Borko and Putnam, 1995; Aguirre and Speer, 2000; Albion, 2001). Therefore, teachers should foster this awareness and belief in the sense of innovative learning to improve the imagination of learners.

Similarly, BL optimises the advantages of face-to-face and interactive approaches, incorporating lessons and e-learning (Osguthorpe and Graham, 2003). The following elements have been described in Dziuban *et al.* (2004) study as “blended education”; they include (i) a change from sage-on-the-stage rote teaching mechanism to the student-based learning involving and engaging students; (ii) enhanced ties between teachers, educators, and external resources; and (iii) integrated teacher and student preparation and summative appraisal processes. These features, in turn, make learning in combination very useful. Combined learning would enhance the teachers’ critical thinking ability, thereby highlighting the quality of individual education while effectively raising awareness of critical thinking within teachers (Yeh, 2008). Schmidt (2005) noticed that KM and e-learning have two paradigms in business learning. The critical difference between KM and e-learning is that KM believes that it creates or translates information and looks for guidance to enhance learning. From one point of view, these two methods (i.e. KM and e-learning) may appear conflicting, but they may be complementary when mixing is used. A guide to practise can be incorporated into the KM method to increase know-how output and transition between face-to-face and online learning modes. Presenting the literature on BL and KM, Graham *et al.* (2005) found the following three definitions: (i) BL combines a range of teaching modes (informative method); (ii) BL combines teaching methods; (iii) online BL combines face to face teaching and traditional teaching.

Additionally, three types of BL have been defined by Whitelock and Jelfs in 2003 (cited in Rossiou and Sifaleras, 2007); (i) BL integrates traditional learning techniques (web-based online approaches) and network learning methods; (ii) BL is a combination of media network learning and tools; (iii) BL is a combination of methods of teaching (pedagogical approaches) and the use of learning systems. Bonk and Graham (2012) believed that a teaching field network that does not include multiple educational designs, teaching methods, content teaching, and more is difficult to discover. Therefore, BL may be described as “integrating conventional face-to-face learning and network methods” (Ho *et al.*, 2016).

#### **2.4. Methodology**

We used a quantitative approach by using an online questionnaire circulated to undergraduate students of the Department of ISLM of the University of Dhaka, Bangladesh. It may be noted herein that the University of Dhaka is the country’s largest and oldest university, which opened its doors for students on 1st July 1921; thus, this university continues to show a strong character in fulfilling the higher education needs of a large portion of the population in Bangladesh (University of

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Dhaka, 2020). The data gathering procedure was done through Google forms, which were sent to the Facebook group (link of the Google form) with the help of class leaders, by using an online survey questionnaire. The first part of the questionnaire asked about the demographic details, while the second part focussed on questions specific to BL and KM. We sent the forms to about 272 undergraduate students, among whom 74 students replied. Notably, students from the ISLM Department were deliberately chosen because Baghdadabad (2008) believed that LIS students at times have a higher understanding of KM than others. Despite this presumption culled from Baghdadabad (2008) study, we repeatedly checked with the students if they needed any clarification on KM questions. The gathered data were analysed using SPSS version 20; then, we conducted a chi-square test to measure the relationship among students' demographic details vis-a-vis their conceptual understanding of BL and KM, their academic skills and credentials, and their overall confidence level. We got Cronbach's alpha score to check for the reliability of the questionnaire items. The resulting alpha score was 0.939, indicating that the questionnaire had a reliable alpha score (Table 1).

As the objective of this study was to analyse the role of BL in improving KM performance, we preferred to evaluate the efficiency of such an application as part of an empirical method. Thus, our research methodology is primarily analytical, wherein BL through KM has been explored. Further, this study has been divided into two phases; phase 1 looks into extant literature by perusing research papers under BL and KM in pandemic situations. Phase 2 explores the transformation witnessed through blended knowledge, which is followed by a discussion and conclusion. Based on the literature covered so far, it may be worth noting that we tested the following null hypotheses:

- H01.** *There is no significant relationship between gender and students' concepts.*
- H02.** *There is no significant relationship between gender and the academic skills of the students.*
- H03.** *There is no significant relationship between gender and students' confidence.*

***Reliability Statistics***

We tested the reliability of the questionnaire by using the Statistical Package for Social Sciences (SPSS) program. Table 1 shows the reliability coefficient of the questionnaire. Cronbach's alpha test shows that the alpha is 0.939, which can be called reliable as the alpha value is greater than 0.05.

Table 1. Reliability statistics.

Cronbach's alpha	No. of items
0.939	15

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### **3. Literature Review**

In this section, the most important theories related to both BL and KM are presented in brief. Educators have claimed that learning is about passing information to students and is thereby broader and more holistic because it is a mechanism whose primary emphasis and foundation lie in addressing learners' personal and social needs (Bakalar, 2018). Most homes have new technological devices, which has resulted in them being used for entertainment rather than for their actual intended purpose (König *et al.*, 2020). BL was essentially created to fulfil this 'intended purpose', as it combines conventional learning and e-learning, which benefits both the learner and the instructor (Halverson and Graham, 2019). Graham *et al.* (2005) and Diabat (2013) confirmed that blended education is characterised by providing a broad range of learning areas, where there is a wide range of possibilities in teaching. Blended education contributes to strengthening study materials, where communication and diversity in activities are achieved, where work is delivered quickly, and where tasks are received flexibly. In pandemic situations, KM seems to have a higher strategic goal than in other crises, to save lives actively.

On the other hand, although other catastrophes are bound to spread, pandemics may spread worldwide, and their losses spread across countries and over time. Despite the relevance of KM in the face of pandemics, it is not a unified and consistent topic within the KM science landscape. The research seems to be fragmented and articulated in the following ways:

#### **3.1. *KM in pandemic***

Through effective knowledge exchange from the World Health Organization (WHO), COVID-19 has enhanced public awareness about the symptoms, treatment of unprecedented outbreaks, and preventative measures to stop them from spreading (Ali, 2020). Likely, digital access to the COVID-19 information portal has been fully mechanised with advanced knowledge-sharing capabilities for ordinary citizens, medical professionals, and parent organisations. With its high knowledge-sharing effectiveness in the fight against COVID-19, China has built tremendous information-sharing mechanisms and custody skills to aid countries worldwide (Wanga, 2020).

#### **3.2. *BL in pandemic***

Upon completion of the pandemic, institutional education is indefinitely needed to be reflected by applying different techniques, in addition to conventional face-to-face training. BL has proliferated and is now used most often in medical education, defined as a combination of traditional personal and asynchronous or synchronous e-learning (Sánchez *et al.*, 2013; Liu *et al.*, 2016; Vodovar *et al.*, 2020; Moszkowicz *et al.*, 2020). Consequently, in the field of academic medical education, the reversed teaching approach was used. In these classrooms, students are initially taught online



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content. The next face-to-face course can then be used to promote active learning through student-centred activities (Ramnanan and Pound, 2017).

**3.3. Gap analysis**

Table 2 shows the gap analysis of the study.

The literature review and the gap analysis indicate that there is indeed a gap in understanding the practice of both KM and BL, especially in the context of developing countries like Bangladesh. Furthermore, we also did not find any study dealing with the students' perceptions of integrated KM and BL during pandemic situations. Thus, a study on combined BL through KM relating to Bangladesh students' perceptions is required to fill the gap. Consequently, reviewing the literature and providing feedback from the students would assist the higher authorities in their

Table 2. Gap analysis.

Author/s and Years	Topic/Title	Findings and gap
Hargitai <i>et al.</i> (2021)	Integrating Business Students' E-Learning Preferences into Knowledge Management of Universities after the COVID-19 Pandemic.	BL can be helpful in the transition to an integrated framework of KM strategies. However, we need to conduct both theoretical and practical implications.
Ali (2020)	Online and remote learning in higher education institutes: A necessity in light of COVID-19 pandemic.	The essence of learning continuity in KM plays an essential function in ICT integrated learning. However, due to COVID-19 needs to provide a robust platform for online learning.
Vasantan (2021)	BL Strategies as Knowledge Management in Underdeveloped Area.	BL strategies are influenced by local wisdom, learning style, and learning methods. First, however, need to know the kinesthetic effects of students' perception and their knowledge.
Ibrahim and Padilla-Valdez (2021)	Knowledge Management and BL: Towards a Compatibility and Complementarily Model.	The complementary process of BL and KM is integrated correctly. Therefore, an integrated approach to provide a balanced strategy can be applied in tertiary education.
Tovstiga and Tovstiga (2020)	COVID-19: knowledge and learning perspective.	The ultimate global impact of the Knowledge-based action on the pandemic around the world is enabling purposefulness. We need to make sense of the pandemic from a knowledge perspective along the evolving knowledge trajectory.

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decision-making process to identify which areas of learning to prioritise to enhance combined learning.

#### 4. The Blended Knowledge Transformation

##### 4.1. Knowledge transformation model

A joint analysis of BL and KM (Fig. 1) shows that the primary purpose of BL through KM is to facilitate corporate learning. Scientists have attempted to determine the similarity of targets, evaluation methods, and specific knowledge-sharing processes in integrated BL and KM systems. A BL framework within KM is typically studied as a repository of information tools, using KM methods, improving the effectiveness in disseminating knowledge (Sammour *et al.*, 2004; Ponce, 2003; cited in Qwaider, 2011b). Further, in KM, BL is traditionally regarded as a knowledge repository that improves the efficiency of distribution methods. Notably, KM and BL are integrated in the following ways (Qwaider, 2011a):

- The integration of BL and KM capacities provides numerous learning resources and activities in the knowledge.
- The KM process of an institution can be exchanged to ensure success and prosperity.
- Improving KM learning efficiency and feedback.
- The use of KM activities can take less time to make the teacher's teaching materials.

Although KM and BL integration produce enhanced results, there are several challenges in creating, sharing, and using e-learning systems. Herein, it may be noted that learning units are defined as a means of creating and exchanging information (Yordanova, 2007; cited in Qwaider, 2011a). KM has discussed the effect on the advancement of new digital learning methods. Similarly, the effects of e-learning in a KM process of the business or organisation encourage organisational change and development. In summary, both e-learning and KM have basic features for implementing them in future studies for their integration (Yordanova, 2007; cited in Qwaider, 2011a).



Fig. 1. Knowledge transformation model (Qwaider, 2011a).

#### 4.2. *BL and KM model*

The following model (Fig. 2) would explain the epistemology and dynamism of knowledge and a structure for handling the relevant information management from an ontological point of view (Hafeez and Alghatas, 2007; cited in Qwaider, 2011b). This model would also explore how information is shared, created, and learned in virtual practice design communities. This process is regarded as the transfer of information, and this relationship has been established through four modes of transfer, developed by Nonaka and Takeuchi (1995). The model is explained as follows:

- Socialisation-Tacit knowledge for a tacit understanding: It is the information sharing process that generates tacit awareness. The findings are observed, imitations, and practices (Qwaider, 2011a).
- Externalisation-Implicit information to explicit knowledge: It is a process in which silent information (concepts and hypotheses or models) is expressly understood (Gill, 2009).
- Combination-Explicit knowledge to explicit knowledge: Explicit combinations of information bodies (Qwaider, 2014).
- Internalisation-Explicit knowledge to tacit knowledge: This is an explicit method of transformation into implicit knowledge contrasting “learning by” and “learning by doing” (Qwaider, 2011b).

#### 4.3. *Blended e-learning model*

BL provides a wide range of events from face-to-face learning, e-learning, and self-study (Perveen, 2016). BL consists of conventional training, synchronous online training, asynchronous self-study, and fundamental task-focussed training for teachers and mentors (Hasan *et al.*, 2021). BL is dedicated to provide the best

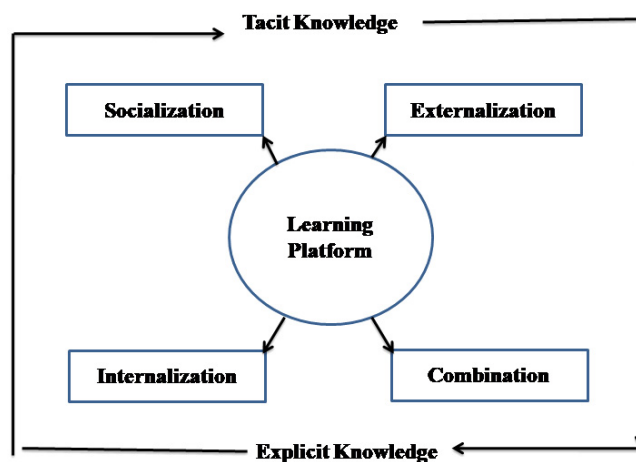


Fig. 2. BL and KM model (Nonaka and Takeuchi, 1995).

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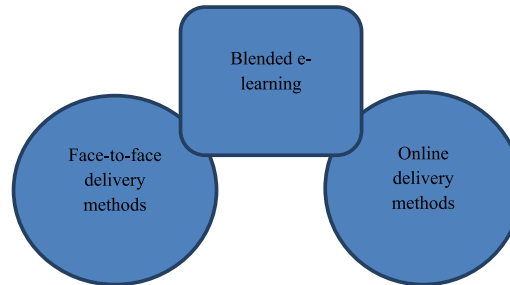


Fig. 3. Blended e-learning model (Qwaider, 2011b).

face-to-face learning experiences in the most remote classroom environments (Osguthorpe and Graham, 2003). In general, BL refers to the convergence of e-learning strategies with conventional teaching methods (Aytaç, 2009; Bañados, 2006; cited in Qwaider, 2011b). Notably, the time spent online vis-a-vis the amount of technology used by the BL model is the two key factors here (Fig. 3).

## 5. Data Analysis of the Study

### *Demographic profile of the respondents*

Out of the 74 responses (Table 3), we note that 42(56.8%) were male, while 32 (43.2%) were female, implying thereby that there is no gender discrimination. Most of the respondents, 43(58.1%), belonged to the 18–20 age category. In total, 12 (16.2%) were in the age group of 21–23 years, while the rest, 19(25.7%), were above 24 years.

### *Mean and Standard Deviation (SD) of students' perceptions on KM and BL*

Participants were asked about their perceptions on KM and BL vis-a-vis its impact on the ongoing pandemic; they were given options and were asked to rate on a 5-point Likert scale. The mean and SD of the responses received were calculated

Table 3. Demographic profile of the respondents.

Gender	Frequency	Percentage
Male	42	56.8
Female	32	43.2
Total	74	100%
Age group	Frequency	Percentage
18–20 years	43	58.1
21–23 years	12	16.2
Above 24 years	19	25.7
Total	74	100.0

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Table 4. Students' perceptions on KM and BL.

KM Perceptions	Mean	SD
The idea on KM and BL.	3.47	0.996
Online learning through KM is an innovative concept.	3.45	1.062
Like the idea of online learning through KM in the pandemic.	3.34	1.114
Online learning through KM helps to improve your learning skill.	3.41	1.146
Technical skills to attend online learning.	3.12	1.072
Trained on how to use selected online platforms.	2.76	1.108
Able to prepare and use instructional materials to attend online learning.	2.96	1.152
Can use a digital camera and computer to produce video presentations.	2.73	1.114
Online learning enables participants to improve their academic skills.	3.12	1.204
Able to access the internet easily.	3.12	1.238
The use of ICT increases students' confidence in online learning.	3.47	1.137
Online learning does not help understand the course content.	3.16	1.314
BL may be a great source of inspiration during a pandemic.	3.27	1.285
Online learning meets my learning needs.	3.01	1.066
Prefer to carry online learning integrated with KM for forthcoming academic sessions.	2.95	1.121

according to the following scores; where 1.00–not necessary, 2.00–less important, 3.00–important, 4.00–more critical, and 5.00–most important. The respondents affirmed with the highest mean score of 3.47 (Table 4) that they have a fair idea of both KM and BL and that ICT does enhance the students' confidence in online learning. The second highest mean score 3.45 (Table 4) revealed that KM and BL integration is an innovative concept. The third mean score 3.41 reflected that e-learning through KM helps in improving the students' learning skills. The fourth mean score of 3.34 revealed that the students liked the idea of e-learning through KM within the ongoing pandemic. The fifth mean score of 3.27 exposed that the combined BL and KM process may be a great source of inspiration for e-learning, especially during a pandemic. This is followed by e-learning, which does not help understand the course content (3.16), e-learning enables participants to improve their academic skills (3.12), students are able to access the internet easily (3.12), the online learning meets my learning needs (3.01), etc. The lowest mean score of 2.73 exposed that students can use digital cameras and computers to produce video presentations.

### 5.1. Hypothesis testing of the study

#### *Chi-square tests between gender and students' concept of BL and KM*

A chi-square test was conducted to assess the relationship between gender and students' concepts on BL and KM (Table 5). The results show that there is no significant relationship between gender and students' concept that BL and KM are an innovative idea. ( $X^2 = 5.628^a$ ,  $N = 74$ ,  $Df = 4$ ,  $p = 0.229$ ). Moreover, the effect size was minimal (Cramer's  $V = 0.276$ ), and thus, we can retain the null hypothesis.

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Table 5. Students' concept of BL and KM.

Chi-Square Tests	Value	Df	Asymp.Sig. (2sided)
Pearson Chi-Square	5.628 <sup>a</sup>	4	0.229
Likelihood Ratio	7.462	4	0.113
N of Valid Cases	74	1	0.410
Symmetric Measures	Value	Approx. Sig.	
Nominal by Nominal Phi	0.276		
Cremer's V	0.276	0.229	
N of Valid Cases	74	0.229	

### ***Chi-Square Test between gender and academic skills***

A chi-square test was conducted to assess the relationship between students' gender and academic skills (Table 6). The results show no significant relationship between gender and academic skills ( $X^2 = 7.054^a$ ,  $N = 74$ ,  $Df = 4$ ,  $p = 0.133$ ). Moreover, the

Table 6. BL enables students to improve their academic skills.

Chi-Square Tests	Value	Df	Asymp.Sig. (2sided)
Pearson Chi-Square	7.054 <sup>a</sup>	4	0.133
Likelihood Ratio	7.901	4	0.095
Linear-by-Linear Association	0.641	1	0.424
N of Valid Cases	74		
Symmetric Measures	Value	Approx. Sig.	
Nominal by Nominal Phi	0.309	0.133	
Cremer's V	0.309	0.133	
N of Valid Cases	74		

Table 7. Use of ICT increases students' confidence in BL

Chi-Square Tests	Value	Df	Asymp.Sig. (2sided)
Pearson Chi-Square	5.395 <sup>a</sup>	4	0.249
Likelihood Ratio	5.879	4	0.208
Linear-by-Linear Association	3.344	1	0.067
N of Valid Cases	74		
Symmetric Measures	Value	Approx. Sig.	
Nominal by Nominal Phi	0.270	0.249	
Cremer's V	0.270	0.249	
N of Valid Cases	74		

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effect size was minimal (Cramer's  $V = 0.309$ ), and we can again accept the null hypothesis.

***Chi-square test of gender and students' confidence***

A chi-square test was conducted using ICT to assess the relationship between gender and students' confidence in BL (Table 7). The results show that there is no significant relationship between gender and students' confidence. ( $X^2 = 5.395^a$ ,  $N = 74$ ,  $Df = 4$ ,  $p = 0.249$ ). Moreover, the effect size was minimal (Cramer's  $V = 0.270$ ), thereby accepting the null hypothesis.

## 6. Integrated BL and KM Model

### 6.1. Components of the proposed model

The proposed intuitive model has three primary and three sub-components; the major components include BL, KM, and BL through KM, while the sub-elements include knowledge sharing, along with both synchronous and asynchronous learning. These components have also been used to describe how they would assist KM and BL during pandemics. Further, these components are explained as follows (Figure 4):

- BL:** The first principal component of the model is BL, which blends the conventional approach to e-learning with face-to-face instruction (Ologbo and Nor, 2015).
- KM:** KM is the second key element of the intuitive model, a technology-based skill that should be established to accelerate the educational process creatively (Yeh *et al.*, 2012).
- BL and KM Integration:** The third major component is the combination of BL and KM. The incorporated BL and KM model can provide various knowledge resources and take part in the knowledge procedure of the educational institutions to attain sure success in the organisation (Efimova and Swaak, 2002).

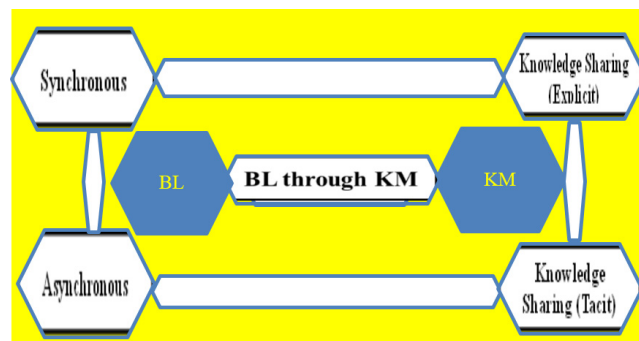


Fig. 4. Integrated BL and KM model (Source: Authors).

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- (d) **Knowledge sharing:** It is KM's sub-section. The information may be directly and tacitly communicated. Explicit knowledge refers to organised and formalised information, in which tacit knowledge is difficult to transmit, and contact between people is the easiest way to communicate this knowledge (Nonaka, 1991; Nonaka and Takeuchi, 1995; cited in Attar, 2020).
- (e) **Synchronous learning:** It is BL's sub-component. It is a real-time engagement that can be interactive, integrating online activities (Salmon, 2013), and teacher lecture facilities with question answer sessions.
- (f) **Asynchronous learning:** The last part of this model is asynchronous learning, which is also the sub-element of BL. It is a collaboration of a student–teacher presence in a virtual classroom in real-time. It appears like the conventional classroom, except that all participants have remote internet access (Perveen, 2016).

This proposed model of this study is not yet formally tested. It needs more research for testing it in the educational institutions in Bangladesh. Then the model would be more operative and helpful.

## 7. Theoretical Implications

This study was conducted during the ongoing COVID-19 pandemic, and thus it offered ISLM students' accurate insights into their mixed applications to learn. The consequences of this study are mainly for the scientific community that must start contextualisation, test, and revolutionary lines of the KM hypotheses in pandemics. Then, policymakers and other relevant stakeholders would gain analytical insights and have the required experience to look with a systematic and integrated view of the issues and challenges they face in practice. The study findings have some educational advantages in BL. This study supports the previous studies that BL is as successful as face-to-face learning. Teaching specific courses in a mixed way could be even more efficient than the conventional way. BL method can reflect lessons, collaborative learning, and writing classes more effectively. If BL is adopted, the faculty and designers will mix and match the courses. However, innovative ideas are suggested in the results of this analysis, especially the introduction of new technology to pandemic training systems.

Additionally, the theoretical implications of this study could be realised by understanding the role of KM and BL as a mediator in pandemic situations, which could impact the educational system at large (Supermane, 2019). Thus, the respective authorities of educational institutions could look to include BL more vigorously while building effective strategies for both teachers and students to extract optimal benefits. Importantly, higher authorities within institutions and the government also need to ensure adequate technical infrastructure for a seamless exchange of information through educational web portals. The methods outlined in this paper show clear trends towards improved cooperation between BL and KM fields, and there are ways to reduce the distance among related areas (Ras *et al.*, 2005).



### **7.1. Discussion and conclusion**

This paper demonstrates how the e-learning program and e-learning framework could be used (Springer, 2008). The existing situation is worsened by the limitations of the procedure necessary to prevent and monitor the online learning spread of the virus (Rapanta *et al.*, 2020). On the other hand, this pandemic confrontation could be alarming enough to prevent unprecedented attacks on bioterrorism (Chyba and Greninger, 2004). However, scientists, researchers, and physicians work very hard in this regard, as the initiative to alleviate the pandemic promises to raise a ray of hope (Nguyen *et al.*, 2020). Dennen and Wieland (2007) research showed that students who participate in BL lack social interaction and promotion. Previous work highlighted BL's preferences to individual students (Owston *et al.*, 2013).

However, the objectives of this research were to identify the students' perceptions of using BL during the pandemic through KM and identify the relationship between students' gender and their perceptions. The study found that students of the ISLM Department have the idea of KM and BL. This finding supports Baghdadabad (2008) that LIS students have the same understanding of KM as other students. This study also revealed that the use of ICT increased students' confidence in online learning. This research also identified that KM and BL integration are an innovative concept and online learning through KM helps to improve students' learning skills. Students like the idea of online learning through KM, and the combined BL and KM processes may be a great source of inspiration for online learning during a pandemic. The hypothesis test of the study showed that there was no significant relationship between gender and students' concept that BL and KM is an innovative idea. This study also revealed that there was no significant relationship between the students' gender, academic skills, and students' confidence. However, e-learning has evolved from a radical concept for what is popular in KM. This idea enables students to quickly detect and share know-how by writing a message, making a YouTube video, connecting with the internet, and building a social network (Qwaider, 2014). Various educational institutions are looking for creative instructional approaches to satisfy specific student needs. So, e-learning in pandemic circumstances may play a significant role in delivering relevant knowledge to the right students at the right time (Alqahtani and Rajkhan, 2020). There is an urgent need for institutional learning interventions to support learning continuity, resulting in higher learning gains (Othman *et al.*, 2021). According to the findings of the study, schools, parents, and students should encourage BL by offering a course that combines classroom and online learning components.

### **7.2. Limitations and future scope of research**

The sample sizes in this study were students from the Department of ISLM at the University of Dhaka. Other public and private universities were not included in this study. However, researchers failed to compare the research results of this study with

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the results of other studies due to the lack of studies in this field, especially in the context of developing countries.

In today's context, one of the critical challenges to the successful adoption of digital content in the teaching–learning process is the sparse availability of communication medium to the student community (Mukherjee and Hasan, 2020). The findings of this study point to the following issues, which would in turn have consequences for future research, i.e., new approaches would focus on existing well-developed KM models to e-learning requirements and standards. It would promote the transformation of knowledge systems into frameworks for learning activities and learning material. KM and BL integration can only be effective if researchers from several different disciplines collaborate.

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## Appendix A. Demographic Profile of the Respondents

(1) Gender: a. Male b. Female

(2) Age:

Kindly tick (✓) to indicate your level of agreement/disagreement in the following statement using these options: SD=Strongly disagree, D=Disagree, N=Neither agree nor disagree, A=Agree and SA=Strongly agree.

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		SD	D	N	A	SA
Q1	Do you have any idea on KM and online learning?					
Q2	Do you think online learning through KM in an innovative concept?					
Q3	Do you like the idea of online learning through KM in pandemic?					
Q4	Online learning through KM helps to improve your learning skill					
Q5	I have technical skills to attend online learning.					
Q6	I am trained on how to use selected online platform.					
Q7	I am able to prepare and use instructional materials to attend online learning.					
Q8	I can use a digital camera and computer to produce video presentations.					
Q9	I feel online learning enables participants to improve their academic skills.					
Q10	I am able to access the internet easily.					
Q11	I think the use of ICT increases students' confidence in online learning.					
Q12	Online learning does not help understand better the course content.					
Q13	Online learning may be a great source of inspiration during the pandemic.					
Q14	Online learning meets my learning needs.					
Q15	I prefer to carry on online learning in integration with KM for forthcoming academic sessions.					

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