

RESEARCH ARTICLE

DIGITAL LEARNING PERCEPTION DURING COVID-19 PANDEMIC SITUATION To CREATE DISTANCE LEARNING OPPORTUNITY IN BANGLADESH**Md. Shahnur Azad Chowdhury^{1*}, Md. Iftekhhar Arif², Md. Shahidul Islam³**¹*Department of Business Administration, Int'l Islamic University Chittagong, Bangladesh.*²*Institute of Education and Research, University of Chittagong, Bangladesh.*³*Service Engineering Division, Bangladesh Forest Research Institute, Chittagong, Bangladesh.****Corresponding Author: Md. Shahnur Azad Chowdhury**

Abstract: Digital learning system grows very rapidly during Covid-19 pandemic situation for safe and secure environment in Bangladesh. Now the present study is conducted to measure the digital learning perception and digital distance learning opportunity, the effect of demographic factor on digital learning perception and the opportunity of digital distance learning system for education from the digital learning perception developed in the Covid-19 pandemic situation. In the study, 400 respondent data was collected by survey questionnaire method in the month of June-July, 2022 in a five-point Likert scale. Among the valid respondents, 108 are university teachers and 292 are university students, of which 168 from public university and 232 from private university. 272 respondents are male and 128 are female, of which 236 from urban area and 164 from rural area. 68 respondents communicate class with mobile with mobile network, 184 mobile with broadband-Wifi connections and 148 computer with broadband-Wifi connections. It is observed that both teacher – student profession and male – female gender have same positive digital learning perception. But both public university respondents higher than private university respondents and urban residence respondents higher than rural residence respondents positive digital learning perception. The study also shows that both mobile with broadband-Wifi and computer with broadband-Wifi respondents have higher digital learning perception value from mobile with mobile network respondents. But no significant difference in the digital learning perception value of mobile with broadband-Wifi and computer with broadband-Wifi respondents. So, mobile network facility should be improved to utilize mobile in the digital distance education learning system. Finally the study shows that with the increase of digital learning perception, the digital distance learning system for education may increase significantly. So, a digital distance learning system for education may be developed utilizing the developed positive digital learning perception during covid-19 pandemic situation in Bangladesh.

Keywords: *Digital learning, Covid-19, Opportunity, Perception.*

Article Received: 20 July 2022

Revised: 6 August 2022

Accepted: 22 August 2022

INTRODUCTION

Because to the Covid 19 dilemma, about 150 million students all around the world have been forced to alter the way in which they learn. These students are all very close to finishing their degrees and beginning the process of seeking for work. The education of each and every one of these kids has been abruptly terminated, which has a negative impact on their mental, financial, social, psychological, and physical health. In addition to this, the country's whole

educational system has become dysfunctional, which poses the greatest risk to the country's future. Making the transition to an educational model that is conducted online is both the simplest and most widely used solution to this issue [1]. There have been an adequate number of positive contributions made in this field by the leaders of our nation and the Ministry of Education. In the midst of this crisis, the online education system has become a viable

alternative for students to obtain an education.

This has provided students with optimism. In spite of the fact that a lot of people have questioned its quality and compared it to the actual structure, it has provided us with the opportunity to think about the topic in a more in-depth manner. But the students of today, no matter where they are in the world, are seeking for a flexible approach to study that they can engage in whenever they want and from wherever they are. The availability of online learning possibilities is in great demand, particularly among a cohort of students who struggle with particular challenges; as a result, education providers are actively working to meet this need. Every nation and school is different when it comes to the quality and popularity of online education.

It's crucial to have different learning and teaching styles, as well as personal support and the right infrastructure, if you want your online teaching experience to go well. The success of online teaching has been demonstrated by a number of educational institutions, including colleges and universities [2]. Online teaching and learning offers a solution to a problem that will continue to exist, despite the fact that there are certain issues with the system. Following the outbreak of the coronavirus, educational institutions of all levels and in all regions of the world were required to halt the customary face-to-face distribution techniques that were used on campus. There are educational institutions, such as colleges and universities that do not provide online research programs.

Problems arise for a great number of internet researchers who conduct their work online. Especially in less developed nations, where access to information technology is not as widespread and the internet is not always simple to reach from a variety of locations. Online classes might provide challenges for both students and instructors, making it difficult for either group to continue with the program. The fact that more and more individuals embrace and utilize the internet on a daily basis is excellent news for the expansion of online educational opportunities [3]. In light of this, it is essential to be aware of the challenges that students experience

and to conduct an analysis of them before formulating a strategy for effective and efficient online teaching and learning.

LITERATURE REVIEW

According to Meyer and Jones [4], the frequency with which natural catastrophes strike highlights the need of utilizing technology that assist individuals in adapting to change, particularly communication technologies such as e-learning tools [5]. The economic system, health care system, and educational system were most negatively impacted by the corona virus illness (COVID-19), which was a catastrophe for people all over the world. In the following study of the relevant literature, we will discuss the manner in which things are changing, the tools for digital education systems, the challenges these systems confront, and some potential solutions to improve online education.

It was determined that the Staying Home and Strong Lockdown tactics would be the most effective in preventing the spread of COVID-19 [6] and on August 1, 2020, these measures were implemented nationwide [7]. Nearly all of the world's governments share a set of priorities, including the implementation of stringent lockdowns, restrictions on immigration, increased social and physical distance, and the elimination of face-to-face learning on campus [8]. In addition, globalization, privatization, and liberalization of education have all contributed to a significant deterioration of the situation, as a result of which academic pursuits are restricted and individuals are less able to travel freely across nations [9]. During this lockdown, teachers have been instructed to teach their lessons via online learning tools [10].

When traditional classrooms were phased out in favor of online learning environments, educators were forced to adapt their pedagogical practices in order to stay current with emerging trends and developments in the business world. In this tough time, the ability of institutions to implement online education on a broad scale has become a problem that has surpassed the quality of education as the primary focus of concern [11]. Because of the enormous demand, the faculty members reorganized their classes

hastily and with just a minimal amount of formal education. On the other side, students have been impacted in a variety of ways, such as having difficulty mastering new technologies, losing out on internship opportunities, being placed in less desirable locations, and so on [12]. In addition, the educational system has to be updated because of the rise of artificial intelligence, machine learning, and automation. This indicates that improvements in information technology are necessary [13]. The term "online learning" refers to the process of acquiring knowledge in a variety of environments via the use of electronic devices such as mobile phones and laptops to establish a connection with a teacher over the internet from any location in the globe [14].

Numerous additional names have been given to the concept of online learning, including open learning, web-based learning, m-learning, and blended learning. It is a way of instructing and being instructed that makes use of computers and the internet to establish a connection between a teacher and a student located anywhere in the globe [15]. Before the epidemic, the majority of educational institutions relied on in-person instruction on campus. However, the COVID-19 explosion transitioned our education system from the conventional to the digital, with online lectures, online examinations, teleconferencing, digital open books, and practically all interactions taking place in virtual spaces [16, 17]. Additionally, for the very first time, online platforms such as Zoom, Google Classroom, and other virtual learning platforms, as well as social media such as Messenger, Whatsapp, we-chat, Telegram, and so on, were utilized in an educational setting. This was a first of its kind event [18].

According to Means et al. [19], traditional methods of learning may not be as successful as learning through online platforms. Once more, students from a great distance may readily connect with one another while expending very little effort and financial resources. Online education, on the other hand, might be challenging for those with lower earnings because not everyone in society has the same social and economic circumstances [18]. The majority of students have Android phones, but many struggle with remote access due to poor internet,

despair, anxiety, and a lack of a supportive learning environment [20]. Learners who have difficulty hearing also have a difficult time with e-learning [21]. Students coming from third-world nations also have a difficult time adapting to rapidly changing educational systems. They are forced to contend with a lack of academic capabilities, a lack of technical infrastructure, and inadequate finances. In the event of a pandemic, it is critical to make effective and economical use of available resources in order to continue normal educational operations.

According to Dhawan [22], institutions must to concentrate on enhancing their digital literacy, internet speed, access to the internet, security features, and labs, as well as reducing the expenses of maintenance and purchase of technology that may be utilized more effectively. Some educational models, such as the model for educational emergencies treatment (MEET) for managing and restoring educational operations [23], and holistic teacher education systems [24], are being pushed for better support in current and future teaching during natural disasters like the COVID-19 pandemic. For example, the model for educational emergencies treatment (MEET) was developed to manage and restore educational operations.

As a result, Bangladesh is coping with the COVID-19 epidemic while also adjusting its educational system. It requires study on the new education system, which is backed by the above evaluation of the literature, so that it can administer and distribute education in an equal fashion both now and in the future. This will allow it to ensure that all students receive an equal education.

OBJECTIVE OF THE STUDY

The objective the of the study (i) to measure the digital learning perception and digital distance learning opportunity during covid-19 pandemic situation (ii) the effect of demographic factor (Profession, University, Gender, Residence and Device-Network used) on digital learning perception during covid-19 pandemic situation and (iii) to measure the opportunity of digital distance learning from the digital learning perception during covid-19 pandemic situation. A positive digital learning perception and digital distance learning opportunity was developed during covid-19 pandemic situation.

It is observed that profession (both teacher and student) and gender (both male and female) have same positive digital learning perception. But public university respondents have higher than public university and urban residence respondents have higher than rural residence positive digital learning perception. There is no significant difference of digital learning perception value for mobile with broadband-Wifi and computer with broadband-Wifi. But these two device network used have higher digital learning perception value than mobile with mobile network respondents. So, mobile network facility should be improved to utilized mobile device in the digital distance learning system for education.

HYPOTHESIS

Hypothesis 1 (H₀): There is not a significantly positive digital learning perception and digital distance learning opportunity during covid-19 pandemic situation.

Hypothesis 1 (H₁): There is a significantly positive digital learning perception and digital distance learning opportunity during covid-19 pandemic situation.

Hypothesis 2 (H₀): There is no effect of demographic variables (Profession, University, Gender, Residence and Device-Network used) on digital learning perception during covid-19 pandemic situation.

Hypothesis 2 (H₁): There is an effect of demographic variables (Profession, University, Gender, Residence and Device-Network used) on digital learning perception during covid-19 pandemic situation.

Hypothesis 3 (H₀): Digital learning perception during covid-19 pandemic situation does not create opportunity of digital distance learning opportunity.

Hypothesis 3 (H₁): Digital learning perception during covid-19 pandemic situation creates opportunity of digital distance learning opportunity.

METHODS

To study the digital learning perception during covid-19 pandemic situation a survey questionnaire is prepared from the literature and experience of authors. The developed survey questionnaire was pre-tested with 16 respondents and then necessary corrections

and modifications were made according to the suggestion. The corrected and finalized questionnaire was distributed among the 480 public and private university teachers and students selected by purposefully sampling in randomized block design via E-mail, Whats App and hand-to-hand in Chattogram.

As some respondents answered all the questions are the same rank and did not answer many questions, 400 response data are selected for final analysis and then coded (five point Likert scale ranging from 1 = Strongly disagree with the opinion to 5 = Strongly agree with the opinion) in IBM SPSS Statistics 26 and IBM SPSS AMOS 22 software. Among the valid respondents, 108 (27%) are university teachers (with masters or PhD educational qualification) and 292 (73%) are university students (under graduate and graduate level). Among them 168 (42%) in public university and 232 (58%) in private university with 272 (68%) are male and 128 (32%) are female, of which 236 (59%) respondents from urban area and 164 (41%) rural area in the data set. Also, 68 (17%) respondents communicate class with mobile with mobile network, 184 (46%) communicate class mobile with broadband-Wifi connections and 148 (37%) communicate class with computer with broadband-Wifi connections. The descriptive analysis values of each response variable in the survey response data are calculated. Factor analysis with Cronbach's Alpha value of each factor and Kaiser-Meyer-Olkin measure for sampling adequacy are conducted with all the response variables to classify them into digital learning perception and digital education opportunity factors.

Then one-sample t-Test is conducted to determine the significant positive attitude of digital learning perception and digital distance learning opportunity factors. Then Structure Equation Model (SEM) is developed to identify factors that influence the digital learning perception. Also, Kolmogorov-Smirnov test, Shapiro-Wilk test, Mann-Whitney Test and Kruskal-Wallis Test are conducted to determine the normality and significant difference in the digital learning perception with demographic variables. Finally, Structure Equation Model with Spearman rho correlationis used to determine the opportunity of digital distance learning from digital learning perception during covid-19 pandemic situation.

RESULT AND DISCUSSION

Descriptive Statistics of Respondents

The descriptive statistics (N, Min, Max, Sum, Mean, Standard Deviation) of the survey

responses digital learning perception and digital distance learning opportunity during covid-19 pandemic situation are shown in Table 1.

Table 1: Descriptive analysis result of digital learning perception digital distance learning opportunity variables

S. No.	Questionnaire	Variable name	N	Min	Max	Sum	Mean	Std. Dev.
1.	Digital learning perception	Average Perception	400	2.29	4.71	1521	3.803	0.764
a.	No difficulties challenged in digital class environment	Per1	400	2	5	1522	3.80	1.039
b.	No difficulties communicating with teacher and students to questions or concerns during digital classes	Per2	400	2	5	1528	3.82	0.916
c.	No difficulties to notice with teacher and students to digital classes	Per3	400	2	5	1508	3.77	0.877
d.	Contents of the lecture are clearly understood in the digital classes	Per4	400	2	5	1532	3.83	0.868
e.	Take digital materials and class notes like in traditional classes	Per5	400	2	5	1508	3.77	0.927
f.	Learn in digital class as like traditional classes	Per6	400	2	5	1538	3.84	0.873
g.	Do not face any trouble in digital classes	Per7	400	2	5	1512	3.78	0.940
2.	Digital distance learning opportunity	Average Opportunity	400	2.29	4.71	1505	3.762	0.649
a.	Digital assignments helped to understand the course contents	Opp1	400	2	5	1518	3.80	0.880
b.	More flexibility in digital classes than in traditional classes	Opp2	400	2	5	1488	3.72	0.874
c.	Opportunity of participating in digital classes in pandemic	Opp3	400	2	5	1510	3.78	0.745
d.	Teaching can be conducted using different channels	Opp4	400	2	5	1526	3.82	0.868
e.	Expand knowledge on digital technology	Opp5	400	2	5	1510	3.77	0.864
f.	Participate in all digital classes	Opp6	400	2	5	1484	3.71	0.811
g.	Recommend friends to participate in digital classes	Opp7	400	2	5	1498	3.74	0.890

From the above descriptive table, the mean and standard deviation for digital learning perception is 3.77 to 3.84 and 0.868 to 1.039 and for digital distance learning opportunity mean and standard deviation variation are 3.71 to 3.82 and 0.745 to 0.880 respectively.

The mean with standard deviation of average digital learning perception and average digital education opportunity are 3.803 ± 0.764 and 3.762 ± 0.649 respectively.

In the above result, the mean and standard deviation values overlap each other. So factor analysis may be conducted to test the questionnaire and to classify them into different factor, which is demonstrated in Table 2.

Factor Analysis

In the factor analysis, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy value is 0.860 (significance level 0.000). So, we can

apply the factor analysis method to divide the response questionnaire into two different factors. In the factor analysis table, the survey response values are classified into two factors such as digital learning perception (factor leading 0.772 to 0.939) and digital distance learning opportunity (factor leading 0.629 to 0.940) respectively.

The factor loading result shows all factor loadings are greater than 0.400, which indicates all measurements for each factor have good reliability.

The Cronbach's Alpha value of each factor as the digital learning perception is 0.924 and digital distance learning opportunity is 0.881 respectively (all the Cronbach's Alpha values are >0.7). It indicates that the survey response with factors is most reliable, valid and consistent.

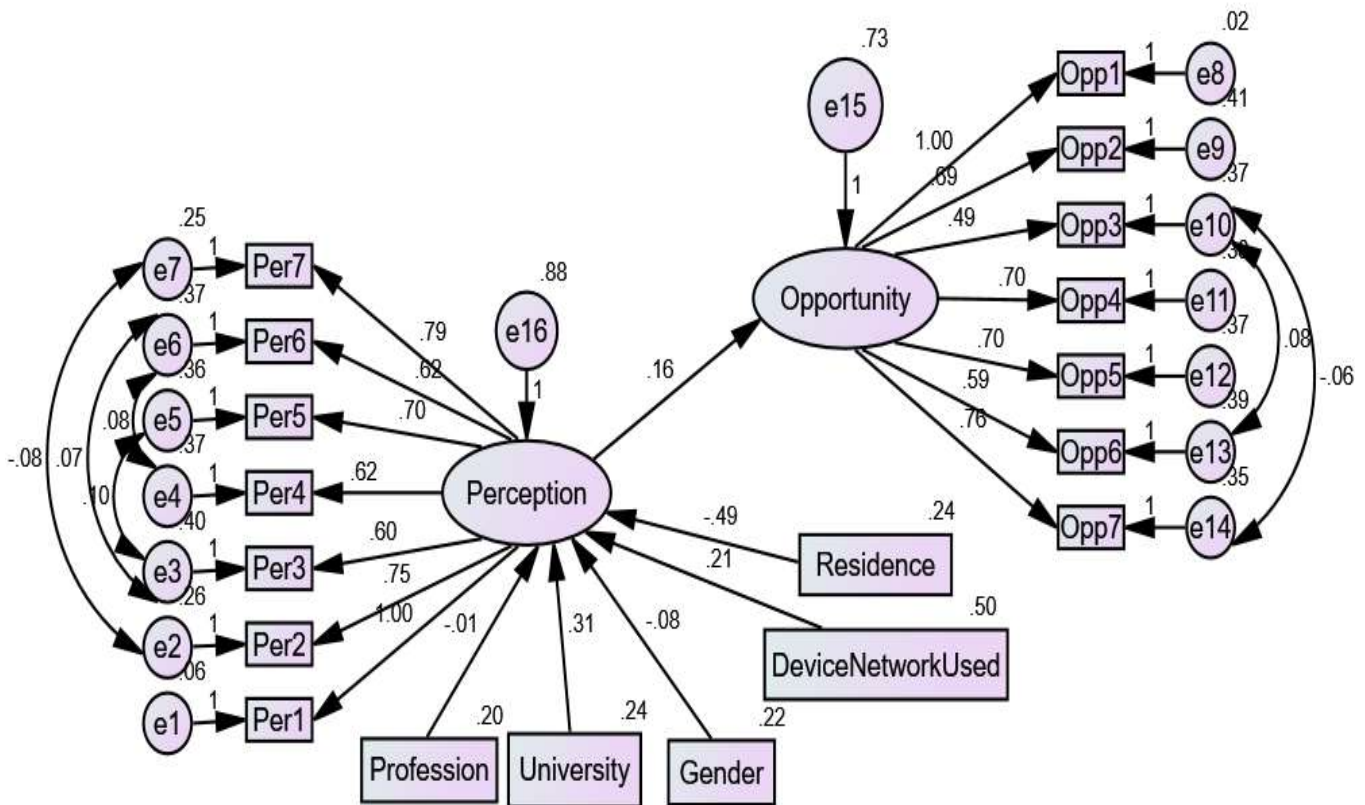
Based on the above factor analysis result, a structural equation model of digital distance learning opportunity from digital learning perception with demographic variables is developed (Fig. 1).

Table 2: Factor analysis with Cronbach's Alpha and test statistic values of response variables

Rotated Component Matrix ^a				Cronbach's	One-Sample t-Test (Test Value 3) (Sig.)	Kolmogorov-Smirnov Average (Sig.)	Shapiro-Wilk Average (Sig.)
Factor	Variable	Component					
Name	Name	1	2	Alpha			
Digital learning perception	Per1	.939		0.924	21.019	0.204	0.844
	Per7	.849			(0.000)	(0.000)	(0.000)
	Per2	.823					
	Per5	.814					
	Per6	.787					
	Per3	.786					
	Per4	.772					
Digital distance learning opportunity	Opp1		.940	0.881	23.501	0.129	0.928
	Opp7		.789		(0.000)	(0.000)	(0.000)
	Opp4		.766				
	Opp5		.750				
	Opp2		.738				
	Opp6		.701				
	Opp3		.629				
Extraction Method: Principal Component Analysis.							
Rotation Method: Varimax with Kaiser Normalization.							
a. Rotation converged in 3 iterations.							

Now in the above factor analysis, the digital learning perception is identified as (i) No difficulties challenged in digital class environment, (ii) No difficulties communicating with teacher and students to questions or concerns during digital classes, (iii) No difficulties to notice with teacher and students to digital classes, (iv) Contents of the lecture are clearly understood in the digital classes, (v) Take digital materials and class notes like in traditional classes, (vi) Learn in digital class as like traditional

classes and (vii) Do not face any trouble in digital classes. Also, the digital distance learning opportunity is identified as (i) Digital assignments helped to understand the course contents, (ii) More flexibility in digital classes than in traditional classes, (iii) Opportunity of participating in digital classes in pandemic, (iv) Teaching can be conducted using different channels, (v) Expand knowledge on digital technology, (vi) Participate in all digital classes and (vi) Recommend friends to participate in digital classes.



From the above structure equation model, the factor loadings for digital learning perception is 0.60 – 1.00 and for digital distance learning opportunity is 0.49 – 1.00 respectively. Here all the factor loadings are very high and significant ($p < 0.05$). The error variance for digital learning perception measured variables are 0.06 to 0.40, which all are very high and significant ($p < 0.05$) But, the error variance for digital distance learning opportunity measured variables are 0.02 to 0.41.

The error variance for digital learning perception (0.88) and digital distance learning opportunity (0.73) are also high and significant ($p < 0.05$). The covariance values are – 0.06 to 1.00, which are also significant ($p < 0.05$). In the model, χ^2 / df is 2.986 (which is < 3), goodness of fit index (GFI) is 0.903 (which is > 0.9), comparative fit index (CFI) value is 0.926 (which is > 0.9), incremental fit index (IFI) is 0.926 (which is > 0.9), Tucker Lewis index (TLI) is 0.913 (which is > 0.9), Root Mean Square Error of Approximation is 0.071 (which is < 0.08). Here, the model index values meet all the standards of the survey and hence the model is well-fitted.

Hypothesis Testing

The calculated mean with standard deviation

of average digital learning perception and average digital distance learning opportunity are 3.803 ± 0.764 and 3.762 ± 0.649 respectively (Table 1), which is higher than the middle perception value 3. The one-sample t-Test statistic values of (Test value = 3) for average digital learning perception and average digital education opportunity are 21.019 (Sig. 0.000) and 23.501 (Sig. 0.000). So, the null hypothesis 1 is rejected (as the significance values are < 0.05) and there is a significantly positive digital learning perception and digital distance learning opportunity during covid-19 pandemic situation.

The Kolmogorov–Smirnov test and Shapiro–Wilk test statistic of digital learning perception are 0.204 (0.000) and 0.844 (0.000) respectively. Also the Kolmogorov–Smirnov test and Shapiro–Wilk test statistic of digital distance learning opportunity are 0.129 (0.000) and 0.928 (0.000) respectively. So, non-parametric Kolmogorov–Smirnov test and Shapiro–Wilk test (Table 3) with least significance difference (LSD) test (Table 4) is conducted to determine the significant difference of digital learning perception for different demographic variables (Profession, University, Gender, Residence and Device-Network used).

Finally non-parametric test Spearman rho correlation is used to

determine the significant correlation between digital learning perception and digital distance learning opportunity.

Table 3: Performance of digital learning perception with demographic variables

Variable Name	Measured variable	Number of observation	Mean value	Standard deviation	One sample t-Test (Test value =3) (Sig.)	Test	Test statistic (Sig.)
Profession	Teacher	108	3.775	0.787	10.231 (0.000)	Mann-	0.179
	Student	292	3.813	0.756	18.374 (0.000)	Whitney	(0.858)
University	Public	168	3.561	0.813	8.952 (0.000)	Mann-	4.874
	Private	232	3.978	0.764	22.020 (0.000)	Whitney	(0.000)
Gender	Male	272	3.830	0.783	17.478 (0.000)	Mann-	1.509
	Female	128	3.745	0.721	11.693 (0.000)	Whitney	(0.131)
Residence	Urban	236	3.976	0.650	23.071 (0.000)	Mann-	4.768
	Rural	164	3.554	0.845	8.394 (0.000)	Whitney	(0.000)
Device Network used	Mobile with mobile network	68	3.235	0.870	2.231 (0.029)	Kruskal-Wallis	31.235 (0.000)
	Mobile with Broadband-Wifi	184	3.961	0.653	19.954 (0.000)		
	Computer with Broadband-Wifi	148	3.867	0.723	14.577 (0.000)		

The mean with standard deviation value of average digital learning perception of 108 teachers is 3.775 ± 0.787 and 292 students is 3.813 ± 0.756 . The one sample t-Test statistics (Test value = 3) of teacher and student are 10.231 (0.000) and 18.374 (0.000) respectively. So, both teacher and student have positive digital learning perception (as $p < 0.05$). The Mann-Whitney Test (z) statistic value of average digital learning perception is 0.179 ($p = 0.858$). So, Profession (Teacher and Student) has no significant difference on digital learning perception (as $p > 0.05$).

Also, the path coefficient of Profession (Teacher and Student) to digital learning perception in the structure equation model is 0.01 ($p = 0.890$). As the p-value is greater than 0.05, there is not enough evidence to reject the null hypothesis 2 for profession (Teacher and Student). So, both teacher and student profession have same positive digital learning perception.

The mean with standard deviation value of average digital learning perception of 168 public university respondents is 3.561 ± 0.813 and 232 private university respondents is 3.978

± 0.764 . The one sample t-Test statistics (Test value = 3) of public university respondents and private university respondents are 8.952 (0.000) and 22.020 (0.000) respectively. So, both public university respondents and private university respondents have positive digital learning perception (as $p < 0.05$). The Mann-Whitney Test (z) statistic value of average digital learning perception is 4.874 ($p = 0.000$). So, private university respondents have significant higher digital learning perception than public university respondents (as $p < 0.05$).

Also, the path coefficient of university (Public and Private) to digital learning perception in the structure equation model is 0.31 ($p = 0.002$). So, the null hypothesis 2 is rejected (as the significance values are < 0.05) and public university respondents have significantly higher positive digital learning perception than public university respondents.

The mean with standard deviation value of average digital learning perception of 272 male is 3.830 ± 0.783 and 128 female is 3.745 ± 0.721 . The one sample t-Test statistics (Test value = 3) of male and female are 17.478 (0.000) and

11.693 (0.000) respectively. So, both male and female respondents have positive digital learning perception (as $p < 0.05$). The Mann-Whitney Test (z) statistic value of average digital learning perception is 1.509 ($p = 0.131$). So, gender (male and female) has no significant effect difference on digital learning perception (as $p > 0.05$). Also, the path coefficient of gender (male and female) to digital learning perception in the structure equation model is 0.08 ($p = 0.453$). As the p-value is greater than 0.05, there is not enough evidence to reject the null hypothesis 2 for gender (male and female). So, both gender (male and female) have same positive digital learning perception.

The mean with standard deviation value of average digital learning perception of 236 urban residence respondents is 3.976 ± 0.650 and 164 rural residence respondents is 3.554 ± 0.845 . The one sample t-Test statistics (Test value = 3) of urban residence respondents and rural residence respondents are 23.071 (0.000) and 8.394 (0.000) respectively. So, both urban residence respondents and rural residence respondents have positive digital learning perception (as $p < 0.05$).

The Mann-Whitney Test (z) statistic value of average digital learning perception is 4.768 ($p = 0.000$). So, urban residence respondents have significant higher digital learning perception than rural residence respondents (as $p < 0.05$). Also, the path coefficient of residence (urban and rural) to digital learning perception in the structure equation model is 0.49 ($p = 0.000$). So, the null hypothesis 2 is rejected (as the significance values are < 0.05) and urban residence respondents have significantly higher

positive digital learning perception than rural residence respondents.

The mean with standard deviation value of average digital learning perception of 68 mobile with mobile network respondents is 3.235 ± 0.870 , 184 mobile with broadband-Wifi respondents is 3.961 ± 0.653 and 148 computer with broadband-Wifi respondents is 3.867 ± 0.723 . The one sample t-Test statistics (Test value = 3) of mobile with mobile network respondents, mobile with broadband-Wifi and computer with broadband-Wifi respondents are 2.231 (0.029), 19.954 (0.000) and 14.577 (0.000) respectively. So, all mobile with mobile network respondents, mobile with broadband-Wifi and computer with broadband-Wifi respondents have positive digital learning perception (as $p < 0.05$).

The Kruskal-Wallis Test (Chi-Square) statistic value of average digital learning perception is 31.235 ($p = 0.000$). So, device network used respondents (mobile with mobile network respondents, mobile with broadband-Wifi and computer with broadband-Wifi respondents) have significant difference of digital learning perception (as $p < 0.05$). Also, the path coefficient of device network used respondents (mobile with mobile network respondents, mobile with broadband-Wifi and computer with broadband-Wifi respondents) to digital learning perception in the structure equation model is 0.21 ($p = 0.002$). So, the null hypothesis 2 is rejected (as the significance values are < 0.05). To determine the significant difference between digital learning perception at different device network used respondents Least Significant Difference (LSD) is calculated.

Table 4: LSD of digital learning perception at different device network used

LSD Dependent Variable: Average Perception				
(I) Device Network Used	(J) Device Network Used	Mean Difference (I-J)	Std. Error	Sig.
Mobile with Mobile Network	Mobile with Broadband-Wifi	-.72589*	.10216	.000
	Computer with Broadband-Wifi	-.63150*	.10546	.000
Mobile with Broadband-Wifi	Mobile with Mobile Network	.72589*	.10216	.000
	Computer with Broadband-Wifi	.09438	.07949	.236
Computer with Broadband-Wifi	Mobile with Mobile Network	.63150*	.10546	.000
	Mobile with Broadband-Wifi	-.09438	.07949	.236

From the above LSD table, the difference between the digital learning perception value

for mobile with mobile network and mobile with broadband-Wifi is 0.726 ($p = 0.000$) and

for mobile with mobile network and computer with broadband-Wifi is 0.631 ($p = 0.000$). As the p values are less than 0.05, there is a significant difference in the digital learning perception value of mobile with mobile network from both mobile with broadband-Wifi and computer with broadband-Wifi respondents. But the difference between the digital learning perception value of the mobile with broadband-Wifi and computer with broadband-Wifi is 0.094 ($p = 0.236$). As the p values are greater than 0.05, there is no significant difference in the digital learning perception value of mobile with broadband-Wifi and computer with broadband-Wifi respondents.

The path coefficient of digital learning perception value to digital distance learning opportunity in the structure equation model is 0.16 ($p < 0.000$). As the p -value is less than 0.05, Hypothesis (Null) 3 is rejected. So, digital learning perception has a significant effect on digital digital learning opportunity effect. Also the Spearman rho correlation between average digital learning perception and average opportunity of digital education is 0.156 ($p < 0.002$). So, digital learning perception value has a strong positive correlation with opportunity of digital education. It may be concluded that with the increase of digital learning perception, digital distance learning opportunity may be increases significantly.

CONCLUSION

The result shows that during covid-19 pandemic situation, a significantly positive digital learning perception and digital distance learning opportunity in Bangladesh. It is observed that both teacher and student profession have same positive digital learning perception. But public university respondents have significantly higher positive digital learning perception than public university respondents. Also, both male and female gender has same positive digital learning perception.

But urban residence respondents have significantly higher positive digital learning perception than rural residence respondents. The study shows that there is a significant difference in the digital learning perception value of mobile with mobile network from both mobile with broadband-Wifi and computer with broadband-Wifi respondents.

But there is no significant difference in the digital learning perception value of mobile with broadband-Wifi and computer with broadband-Wifi respondents. So, mobile network facility should be improved to utilized mobile in the digital distance education learning system. Finally, it observed that with the increase of digital learning perception, opportunity of digital education may be increases significantly.

RECOMMENDATION

- As the positive digital learning perception and digital distance learning opportunity was developed during covid-19 pandemic situation, the digital distance learning system may be developed for education in Bangladesh.
- Both teacher and student profession respondents have positive digital learning perception, which may be utilized in developing in the digital distance learning system for education in Bangladesh.
- Both public university respondents and public university respondents have positive digital learning perception, which may be utilized in developing in the digital distance learning system for education in Bangladesh with higher effort to public universities (as public university respondents have significantly higher positive digital learning perception than public university respondents).
- Also both male and female gender respondents have positive digital learning perception, which may be utilized in developing in the digital distance learning system for education in Bangladesh.
- Also both urban residence respondents and rural residence respondents have positive digital learning perception, which may be utilized in developing in the digital distance learning system for education in Bangladesh with higher effort to rural residence respondents (as urban residence respondents have significantly higher positive digital learning perception than rural residence respondents).
- Moreover, both mobile with broadband-Wifi and computer with broadband-Wifi device network may be utilized in developing in the digital distance learning system for education in Bangladesh. But mobile

network facility should be improved to utilized mobile device in the digital distance learning system for education.

- Finally the study shows that with the increase of digital learning perception, the digital distance learning system for education may increase significantly.

REFERENCES

- Schrum L, Hong S (2002) Dimensions and strategies for online success: Voices from experienced educators. *Journal of Asynchronous Learning Networks*, 6(1):57-67.
- Fredericksen E, Pickett A, Shea P, Pelz W, Swan K (2000) Factors influencing faculty satisfaction with asynchronous teaching and learning in the SUNY learning network.
- Muilenburg LY, Berge ZL (2005) Student barriers to online learning: A factor analytic study. *Distance Education*, 26(1):29-48.
- Meyer K, Jones S (2011) Information Found and Not Found: What University Websites Tell Students. *Online Journal of Distance Learning Administration*, 14(3).
- Tull S. NAK (2017) Social media and e-learning in response to seismic events: resilient practices. *DEANZ the Journal of Open, Flexible, and Distance Learning*, 21(1):63-76.
- Sintema EJ (2020). Effect of COVID-19 on the performance of grade 12 students: Implications for STEM education. *EURASIA Journal of Mathematics, Science and Technology Education*, 16(7). <https://doi.org/10.29333/ejmste/7893>
- Palden T (2020) Women test COVID-19 positive after five tests locking down entire country. *Kuensel*, pp. 1–2.
- Gonzalez T, De la Rubia MA, Hincz KP, Comas-Lopez M, Subirats L, Fort S, Sacha GM (2020) Influence of COVID-19 confinement on students' performance in higher education. *PLoS ONE*, 15(10 October):1-23. <https://doi.org/10.1371/journal.pone.0239490>
- Mishra L, Gupta T, Shree A (2020) Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. *International Journal of Educational Research Open*, 1, 100012. <https://doi.org/10.1016/j.ijedro.2020.100012>
- Abidah A, Hidaayatullaah HN, Simamora RM, Fehabutar D, Mutakinati L (2020) The Impact of Covid-19 to Indonesian Education and Its Relation to the Philosophy of "Merdeka Belajar." *Studies in Philosophy of Science and Education*, 1(1):38-49. <https://doi.org/10.46627/sipose.v1i1.9>
- Carey K (2020) Everybody ready for the big migration to online college? Actually, No. *The New York Times*, 13.
- Govindarajan V, Srivastava A (2020) What the shift to virtual learning could mean for the future of higher ed. *Harvard Business Review*, March 31, <https://hbr.org/2020/03/what-the-shift-to-virtual-learning-could-mean-for-the-future-of-higher-ed>, Accessed on April 29, 2020.
- Krishnamurthy S (2020) The future of business education: A commentary in the shadow of the Covid-19 pandemic. *Journal of Business Research*, 117:1-5. <https://doi.org/10.1016/j.jbusres.2020.05.034>
- Singh V, Thurman A (2019) How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018) *American Journal of Distance Education*, 33(4):289-306.
- Cojocariu VM, Lazar I, Nedeff V, Lazar G (2014) SWOT analysis of e-learning educational services from the perspective of their beneficiaries. *Procedia-Social and Behavioral Sciences*, 116, 1999-2003.
- Strielkowski W (2020) COVID-19 pandemic and the digital revolution in academia and higher education. *Preprints 2020,2020040290*.doi:10.20944/preprints202004.0290.v1.
- Kumar DNS (2020) Impact of Covid-19 on Higher Education. *Higher Education*

Digest.<https://www.highereducationdigest.com/impact-of-covid-19-on-higher-education/>

18. Pokhrel S, Chhetri R (2021) A Literature Review on Impact of COVID-19 Pandemic on Teaching and Learning. *Higher Education for the Future*, 8(1),133-141. <https://doi.org/10.1177/2347631120983481>
19. Means B, Toyama Y, Murphy R, Baki M (2013) The effectiveness of online and blended learning: A meta-analysis of the empirical literature. *Teachers College Record*, 115(3).
20. Kapasia N, Paul P, Roy A, Saha J, Zaveri A, Mallick R, Chouhan P (2020) Impact of lockdown on learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India. *Children and Youth Services Review*, 116:105194. <https://doi.org/10.1016/j.chilyouth.2020.105194>
21. Manzoor A. (2020) Online Teaching and Challenges of COVID-19 for Inclusion of Persons with Disabilities in Higher Education. <https://dailymtimes.com.pk/595888/online-teaching-and-challenges-of-covid-19-for-inclusion-of-pwds-in-higher-education/> Bangert AW (2006) Identifying factors underlying the quality of online teaching effectiveness: An exploratory study. *Journal of Computing in Higher Education*, 17(2):79-99.
22. Dhawan S (2020) Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems*, 49(1):5-22. <https://doi.org/10.1177/0047239520934018>
23. Karalis T (2020) Planning and evaluation during educational disruption: Lessons learned from Covid-19 pandemic for treatment of emergencies in education. *European Journal of Education Studies*, 7(4):125-142. <https://doi.org/10.5281/zenodo.3789022>
24. Zhu X, Liu J (2020) *Zhu-Liu2020_Article_EducationInAndAfterCovid-19Imm.pdf*. 695-699.
25. Basilaia G, Kvavadze D (2020) Transition to online education in schools during a SARS-CoV-2 coronavirus (COVID-19) pandemic in Georgia. *Pedagogical Research*, 5(4):1-9.
26. Bennett CF, Monds KE (2008) Online courses the real challenge is motivation. *College Teaching Methods & Styles Journal (CTMS)*:4(6):1-6.
27. Eom SB, Wen HJ, Ashill N (2006) The determinants of students' perceived learning outcomes and satisfaction in university online education: An empirical investigation. *Decision Sciences Journal of Innovative Education*, 4(2):215-235.
28. Gorsky P, Blau I (2009) Online teaching effectiveness: A tale of two instructors. *The International Review of Research in Open and Distributed Learning*, 10(3).
29. Goto ST, Martin C (2009) Psychology of success: Overcoming barriers to pursuing further education. *The Journal of Continuing Higher Education*, 57(1):10-21.
30. Jasim MM (2020) Private university students taking online classes. Retrieved from <https://tbsnews.net/coronavirus-chronicle/covid-19-bangladesh/private-university-students-taking-online-classes-64867>
31. Kop R, Fournier H, Mak JSF (2011) A pedagogy of abundance or a pedagogy to support human beings? Participant support on massive open online courses. *International Review of Research in Open and Distributed Learning*, 12(7):74-93.
32. Stallman HM (2008) Prevalence of psychological distress in university students: Implications for service delivery. *Australian Journal of General Practice*, 37(8):673.
33. Sujan S (2020) 63 universities taking online classes, 70% students, Bonik Barta. Retrieved from https://bonikbarta.net/home/news_description/228213
34. Vijayraghavan K, Mascarenhas R (2020) Asian paints raises staff salaries to boost morale. Retrieved June 7, 2020, from <https://economictimes.indiatimes.com/new>

s/company/corporate-trends/asian-paints-raises-staff-salaries-to-boost-morale/articleshow/75746239.cms

determine what our students actually learn online. Chronicle of Higher education, <https://www.chronicle.com/article/Coronavirusthe-Great/248216>, Accessed on April 29, 2020.

35. Zimmerman J (2020) Coronavirus and the great online-learning experiment: Let's

APPENDICES

Questionnaire on: “**Digital learning perception during covid-19 pandemic situation to create distance learning opportunity in Bangladesh**”

Name							
Profession		Teacher			Student		
University		Public			Private		
Gender		Male			Female		
Residence		Urban			Rural		
Device and Network used		Mobile with Mobile Network		Mobile with Broadband-Wifi		Computer with Broadband-Wifi	
Serial No.	Questionnaire	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	
Per1	No difficulties challenged in digital class environment						
Per2	There is no difficulties in communicating with teacher and students to ask questions or concerns during digital classes						
Per3	No difficulties to notice with teacher and students to digital classes						
Per4	Contents of the lecture are clearly understood in the digital classes						
Per5	Could be taken digital materials and class notes like traditional classes						
Per6	Learning in digital classes are as like as traditional classes.						
Per7	Facing no any trouble in digital classes						
Opp1	Digital assignments helped to understand the course contents						
Opp2	More flexibility in digital classes than traditional classes						
Opp3	Opportunity of participating in digital classes in pandemic						
Opp4	Teaching can be conducted using different channels						
Opp5	Expanded knowledge on digital technology						
Opp6	Participated in all digital classes						
Opp7	Recommended friends to participate in digital classes						