

E-Learning Challenges Created by Digital Divide during COVID-19 Pandemic: A case Study of Pakistani University System

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Abstract:

This research paper determines the factors leading to digital divide in the Pakistani higher education institutions. The visibility of digital divide in the learning communities was even more prominent during the COVID-19 Pandemic than one could imagine. Researchers have investigated what impact ICT Adoption, Connectivity and Learning Management Systems play in the digital divide in the country.

This study only looked at the E-Learning Challenges because of digital divide during COVID-19 Pandemic in the Lahore region. If study is broadened to other provinces and rural areas are invited to participate, we may get different results because of much bigger data and much diverse population.

We invited 450 Undergraduate seniors, Graduate and Doctorate students to participate in this study from public and private sector universities of Lahore region.

Results of our study show that participants have shared their keen interest in the ICT / E-learning adoption whereas Learning Management Systems is accepted but requires serious

improvements. However, Connectivity / Internet Access is a cause of concern as the respondents have shown serious concerns about this.

Literature Review:

The term Digital Divide was first used by Professor Lloyd of Yale University while he was serving as President of Merkel Foundation. The digital split or the digital divide as written by experts, is an unequal access to broadband – due to financial reasons / affordability in certain geographical regions. The topic has been the focus of discussion in all community gatherings yet there isn't any policy on fair access to Internet. The famous book "Virtual Inequality" written by Moosberger, Tolbert and Stansbury described the digital divide as "The forms of unequal access to information technology based on income, race, ethnicity, gender, age and geography" (Moosberger, Tolbert & Stansbury, 2003).

Digital division is a complex and multidimensional issue in the community and has a profound impact on society and all social planning (Chang, Wong, & Park, 2014). This is simply because of the ability to pay for the ability to exist between different segments of the population with easy access to ICT as well as those with little or no access to digital devices. With the advent of the World Wide Web and many computers, the issue of digital success has gained worldwide support (Dijk, 2005). The vision of digital division can emerge at some and all levels, from small to small, between rich and poor, rural and urban. (Hameed, 2007). This digital divide is strong among developed and developing countries and extends to all countries and developing countries in terms of digital rights and standards of use (Soomro, 2015).

Digital Divide & ICT: The main idea is that learners of all ages has the right to access education via available online resources in the society to gain skills, knowledge and competencies for further advancement in career or academics. Continuous innovation in ICT played a significant role to allow access to information, data and knowledge in the communities. Though, there is a need to advance educational methodologies and models for digital learning across the range of cultural, social and educational backgrounds (Benlamri, Klett & Wang, 2016).

ICT has helped global communities to be close to each other regardless of geographical boundaries. Learning and sharing that used to be impossible decades ago, now is simply a matter of few clicks. Because of Internet, students have access to much wider

range of resources that won't have been possible otherwise at least in the developing countries where library culture was never promoted. Because of global connectivity it's now totally possible to share unique ideas and projects with global community and in fact collaborative work is now within reach with someone sitting in Europe, US or any other parts of planet. The triple T framework of talent, technology and tolerance presented by Chun & Evans, in 2009, increases the value of ICT as universities pursue to capitalize on their talent.

When digital conflicts are about education and learning, they can make money and students have no money in technology and broadband access. Others may not be able to participate in technology learning or may use technological interests to differentiate between men and women (Sims and Vidgen, 2008). In the digital economy, ICT works in a sustainable and evolving way, primarily through technology advancement and change, and has a strong ability to explore how technology research is integrated in many ways. , 2012).

E-Learning and Pandemic: Recently, the world is expecting a COVID-19-related infectious disease that affects all sectors of the economy. The education sector is suffering severely as schools, colleges and universities close academic and external e-learning. According to the Washington Post, “changes in the e-commerce environment through school closures have shown that the resources we now need to learn at home and in technology face long-term barriers to education” (Voisin, 2020). In the current context, many schools have embarked on online learning to stop the spread of COVID-19, and the disease prompted a public school system in New York to relocate 1,800 online schools. However, the city expects 114,000 children to live in housing and flexible housing, which is challenging to provide online education. (Daniels, 2020).

Digital separation has been effectively demonstrated in existing COVID-19 patients. People are looking for ICT to prevent another failure process because all activities in the organization are disrupted. Suddenly, different companies were forced to take possession of various video chat productions and devices. All teaching and learning institutions are closed by state law. There are people and restrictions to prevent people from being isolated and those who need ICT to connect with family and friends. While they use existing technologies, many technology professionals provide the latest technology to educational institutions. I am a citizen without access to ICT who has more problems. They are only available to those who can access a very important ICT platform during COVID-19, which makes a big difference in learning from digital content (June 2020).

Challenges and Gaps in ICT Resources: There are serious problems with digital sharing, because some students who do not have reliable access to online struggles engage in digital learning in virtual classes. This discrepancy is seen between the two countries and between local revenue. Norway, Austria and Switzerland have 95% of computers and only 34% of Indonesia has digital education. In the case of the United States, the gap in the digital division is reflected in the accessible and hassle-free environment: 25% of students do not have access to digital media and local authorities provide their digital resources to students. . ese online. In Australia, experts and policy makers are concerned that this disease will further expand the digital divide (Li and Lalani, 2020).

Pakistan & COVID - 19 Pandemic: As COVID-19 spreads worldwide; The Pakistani government has paid close attention to the country to reduce the spread of the virus. In the midst of the turmoil, the Pakistani government closed schools, colleges and universities and all operations changed to online learning as long as resources were available. In some cases, the university is not ready for an online conference or remote class that is undermining the growing educational value of the community, and students are calling for better digital and improved internet service, especially in remote areas. remote of the country. Due to the lack of broadband services in regions such as Baluchistan, Khyber Pakhtunkhwa, southern Punjab and Gilgit-Baltistan, large numbers of students avoid attending meetings and testing online. However, the country has seen a catastrophic situation in ICT, where the telecommunications industry is using the system to its full potential. According to the Pakistan Telecommunications Regulatory Authority, broadband service is expanding at 36%, up from 22% in 2019. This shows that the Internet is not very good in the country, which shows the new trend. digital division (Mahnoor, 2020).

Large cities have good Internet access, while small progressive towns have little connectivity. Hundreds of students from Azad Jammu Kashmir (AJK) and Gilgit Baltistan, as well as the Khyber Pakhtunkhwa ethnic group, are unable to access online classes and travel several miles every day to have better connections. Students in these areas do not have access to 3G and 4G Internet connections and are asking the government for better. (Saavedra, 2020).

However, there are intensifying fears that students from less privileged families have left in arrears as the digital divide in Asia, particularly in the subcontinent, has become more superficial. Students are substantially isolated from campuses and thus from other

possessions such as computer labs, libraries and common spaces with shared online resources. Lifelong learning is a compulsion and no one should be left behind in this 21st century is the theme and slogan of all world bodies, yet this digital divide is creating serious gaps in learning and sharing (Block, 2010). Educational institutions and governments must try their best to orchestrate their efforts to discourse the existing concerns in order to endorse and support e-learning initiatives (Qureshi, Ilyas, Yasmin & Whitty, 2012).

Research Model: Based upon the above literature, the proposed model is designed as follow:

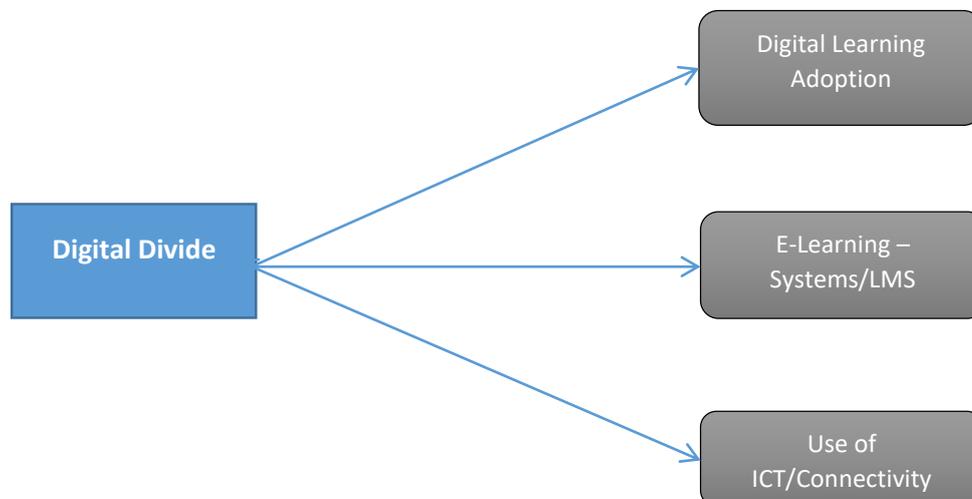


Figure 1.

Research Methodology:

Instruments:

Digital Divide: The Digital Divide Questionnaire is made up of three items i.e. Digital Learning Adoption, E-learning System/LMS and Use of ICT/Connectivity. It is used in this study, where participants rate their agreement with the statements on a Likert-type scale from 1 to 5. The research used in this study includes three parts, and the first includes simple demographic data. The second part discusses issues related to the Online/Digital Learning Adoption, LMS and use of ICT and Connectivity. Researchers evaluated the data collected through responses of participants.

The instrument authentication (pilot study) procedure is grounded on analysis in which 50 students from public and private universities were requested to contribute to authenticate the tools.

The Sampling Procedure:

The aim of this study was to invite 450 participants from public/private Sector Universities in all regions of Lahore. The human representation of the model is shown in Table 1 below.

Table 1: Sampling Procedure and Demographics:

Gender	Count	%	Residence	Count	%
Male	170	67.46%	In City	162	64.28%
Female	80	31.74 %	In Village (rural areas)	87	34.52%
Not reported	2	0.79%	Not reported	3	1.19%
Total	252	100%	Total	252	100%

Age	Count	%	Education	Count	%
18 - 25 years	165	65.47 %	High School or less	56	22.22 %
>= 26 years	84	33.33%	Bachelor	138	54.76 %
Not reported	3	1.19%	Master/PhD	52	20.63 %
Total	252	100%	Not reported	6	2.38 %
			Total	252	100%

As mentioned above, the research included issues related to the use of ICT / Connectivity, Digital divide adoption and LMS. Table 2 describes these questions as well as the corresponding frequency in each question. Regarding the use and availability of ICT resources (Q: 1, 2, 3, 6, 11 and 14,15 in Table 2), respondents indicated a higher level of computing (96.8%), a higher availability of mobile phones (92.76%).), high availability of computers and homes (93.5%), a high percentage emphasized the need for high Internet access (91.3%) and Internet use / access from home or work (91.0%).

These results indicate greater potential for Digital divide adoption and use of ICT/Connectivity. Mobile phone content does not indicate the ability of the mobile phone to search the Internet, which may be the end of the article or the need to add other content to the search.

The study also addressed issues related to e-learning services and Use of ICT in Table 2). Respondents said they had heard of e-learning (68.6%) but did not want it at the same level (34.1%, a small percentage who use mobile phones through the e-learning door).

Table: 2. The Digital Divide and E-Learning

Descriptive Statistics						
	N	Minimum	Maximum	Sum	Mean	Std. Deviation
The skills required to use computers is available.	250	1	5	958	3.83	1.204
Smart phone/computer available at your home.	250	1	5	981	3.92	1.286
Access to the Internet in Work/home/School is available.	250	1	5	589	2.36	1.352
Heard about the e-Learning / m-Learning terms.	250	1	5	961	3.84	1.275
Browsed the e-Learning platforms of university.	249	1	5	965	3.88	1.303
Mobile phone can use latest applications for E-Learning.	250	1	5	965	3.86	1.329
Used E-Learning for MOOCS.	250	1	5	988	3.95	1.334
Heard the term Digital Divide and its impact on communities.	250	1	5	1034	4.14	1.260
Moving from Class room to E-Learning is totally fun and easy.	250	1	5	941	3.76	1.334
Available resources to go online are sufficient.	250	1	5	621	2.48	1.380
Access to Internet without disruption is available to attend online classes.	250	1	5	697	2.79	1.467
LMS/Online Systems are user friendly.	250	1	5	927	3.71	1.362
There was plenty of usage of ICT in classes before VOVID-19.	250	1	5	918	3.67	1.304

Broadband during COVID-19 was available at subsidized rates.	250	1	5	690	2.76	1.433
Online Tech support from University was available to when needed.	250	1	5	663	2.65	1.424
Valid N (listwise)	249					

The section elaborates the descriptive frequencies and percentage scale of variables.

Table 1 shows that 76% students agreed that using technology (ICT) for learning is really a fun. However, 24% of students don't agree to this statement. In overall descriptive summaries it has been noticed that digital learning and student engagement are positively related variables towards e-learning challenges but internet connectivity is a big issue for the students in south, southwest and Midwest of the Punjab, Pakistan. This directly affects the students' e-learning behaviors.

Reliability Analysis:

Table 2: Overall Reliability Statistics

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.815	.815	15

Above Table 2 is statistical measure for reliability of the test tool. In the line inferential statistics before causal or other analysis the reliability test is very much essential as it justifies the test tool and allows the researcher to move ahead with further analysis. The table-2 shows the overall reliability test of the test tool and on the basis of existing literature if this measurement value is .7 or above .7 then it is a justified tool and can be used for further working. The test statistics in table 2 is 0.815 that indicates reliability of the test tool. Overall Reliability Statistics depicts that reliability of data is significant because value of Cronbach's alpha is 0.815 that is greater than 0.7. In general range of Cronbach's alpha is between 0 to 1. We can use this data for further analysis, prediction and forecasting.

Table 3: Constructs Reliability Statistics

Constructs	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Digital Learning Adoption	.926	.926	5
Students Engagement/LMS	.759	.759	5
Internet Connectivity/Accessibility	.412	.412	5

The above table shows that the reliability Statistics for Digital Learning is very close to 1 which is highly significant as the Value of Cronbach's alpha for Digital Learning is .926. The reliability statistics for Students' engagement is .759 which is also greater than .7 however the cronbach's alpha value for internet connectivity/accessibility is less than .7 which is .412. so we can say that internet connectivity is a very serious issue in Pakistan.

Results

Table 04: Results

Variables and Descriptions	Path Coefficient	CR	AVE	R2
---		---	---	0.58
Digital Learning		0.79	0.52	
Student Engagement		0.85	0.69	
Internet Connectivity/Accessibility		0.89	0.84	
Digital Learning>Online Learning	0.39*			
Internet Connectivity>Online Learning	0.29 ^{NS}			
Student Engagement>Online Learning	0.58*			

* represent the 95% level of confidence;

NS represents not significant

Above mentioned table shows that after achieving all the assumptions such as composite reliability and Average Variance Extracted two hypotheses are significant at the 95% level of confidence except Internet Connectivity/Accessibility toward online learning. This model explains the Online learning challenges about 58% (R2). Student engagement is the strongest predictor towards Online Learning environment. The table-1 is the summary of the overall inferential statistics of the research model. The table shows that all the coefficients are positive indicating the incremental impact on the e-learning specially Internet connectivity/Accessibility. Out of three coefficients only one variable impact is insignificant

“Internet Connectivity/Accessibility” as indicated by the sign of NS in the table. On the other hands between the two significant variables Student engagement has much stronger impact on the online learning environment as its coefficient is 0.39 which is 0.10 times greater than the Digital learning variable.

Conclusions:

This study concludes that students have shown keen interest in the online learning. Almost all participants shared their opinion that learning through digital devices in their own environment is fun.

However, students have shown reservations towards LMS/Online Systems. Although it's not at disappointing level but still there is need to develop more user friendly learning management systems. Availability of instructors online and sharing of resources/study material at the same platform would help students to make the most of online learning.

The most serious area that requires immediate attention is the Connectivity. Most of the participants have stated that internet connectivity has been a serious cause of inconvenience. There is weak connectivity, expensive broadband subscription, and most of the time accessibility is an issue. While in the city internet connection is reliable, remote areas and villages have serious connectivity issues.

Recommendations:

Future researchers are suggested to increase the sample size from Lahore to other big cities of Pakistan. While only villages around Lahore city are included in this study adding other provinces and regions of Pakistan would provide results on the national level, helpful for the researchers and policy makers.

References:

Benlamri, R., Klett, F., & Wang, M. (2016). Editorial: Models, technologies and approaches toward widening the open access to learning and education. *Knowledge Management & E-Learning*, 8(1), 1–9.

Block, J., (2010). Distance Education and the Digital Divide: An Academic Perspective, *Online Journal of Distance Learning Administration*, 13(1) Spring 2010 University of West Georgia, Distance Education Center.

Chang, Y., Wong, S. F., & Park, M. C. (2014). A three-tier ICT access model for intention to participate online a comparison of developed and developing countries. *Information Development*. <https://doi.org/10.1177/0266666914529294>

Chun, E. & Evans, A. (2009). *Bridging the diversity divide: Globalization and reciprocal empowerment in higher education*. Hoboken, New Jersey: Wiley.

Daniels. N. (2020). The Digital Divide: Researching the Challenges of Online Learning for Many Students. *The Learning Events*, The New York Times. <https://www.nytimes.com/2020/03/27/learning/the-digital-divide-researching-the-challenges-of-online-learning-for-many-students.html>

Hameed, T. (2007, August). ICT as an enabler of socio-economic development. Paper presented at the Digital Opportunity Forum, Seoul, Republic of Korea.

Junio, R.D., (2020). Digital Divide in the Time of COVID-19. *United Nations University*. <https://cs.unu.edu/news/news/digital-divide-covid-19.html>

Khan, S.K., Bhatti, R. & Ahmad. K. A, (2011). Use of ICT by Students: A Survey of Faculty of Education at IUB. *Library Philosophy and Practice (E-journal)*. Paper 677. <http://digitalcommons.unl.edu/libphilprac/677>

Lau, J. (2020). Will online education widen Asia's digital divide? The world university rankings. <https://www.timeshighereducation.com/news/will-online-education-widen-asias-digital-divide>

Li, C.& Lalani. F., (2020). Media, Entertainment and Information Industries, *World Economic Forum* <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/>

Mahnoor, N. (2020). Poor Internet is Making Studying Impossible for Students in Remote Areas. *ProPakistani*, <https://propakistani.pk/2020/04/16/poor-internet-is-making-studying-impossible-for-students-in-remote-areas/>

Moosberger, K., Tolbert, C. & Stansbury, M. (2003). *Virtual inequality: Beyond the digital divide*. Washington, D. C.: Georgetown University Press.

Qureshi. A. I., Ilyas. K, Yasmin. R, & Whitty. M., (2012). Challenges of implementing e-learning in a Pakistani university. *Knowledge Management & E-Learning: An International Journal*, .4(3).2012.

Saavedra, Jaime. *Educational challenges and opportunities of the Coronavirus (COVID-19 pandemic* |MARCH 30, 2020. Worldbank.org

Shanab, A. E., (2012). The Digital Divide and its Influence on Public Education Diffusion. *International Journal of Technology Diffusion*, 3(4), 36-47, October-December 2012.

Sims, J., & Vidgen, R. (2008). E-Learning and the digital divide: Perpetuating cultural and socio-economic elitism in higher education. *Communications of the Association for Information Systems*, 22(23), 429–442.

Soomro, A.K., (2015). Digital Divide among Pakistani Faculty regarding their Information and Communication Technology (ICT) Access. *Graduate Theses, Dissertations, and Problem Reports*. 6692. <https://researchrepository.wvu.edu/etd/6692>

Dijk, J. (2005). The deepening divide: Inequality in the information society. *Thousand Oaks: Sage Publications*.

Voisin, L. S., (2020). End the digital divide. Our children are being left behind. The washington post. https://www.washingtonpost.com/opinions/local-opinions/end-the-digital-divide-our-children-are-being-left-behind/2020/04/23/f722803c-83fa-11ea-a3eb-e9fc93160703_story.html

Wang, M.& Chang. C. C., (2012). Editorial: Technology in higher education and human performance. *Knowledge Management & E-Learning: An International Journal*, 4(3) 2012.