

Key Barriers Hindering Adoption of E-learning Among Media Students: An ISM and MICMAC Analysis

¹Anwasha Sen Majumdar, ²Sushil Kumar Rai, ³Shalini Singh

¹*K Research Scholar, School of Media and Communication Design, IMS Unison University, Dehradun, Uttarakhand*

²*Associate Professor, School of Media and Communication Design, IMS Unison University, Dehradun, Uttarakhand*

³*Assistant Professor, School of Management, IMS Unison University, Dehradun, Uttarakhand*

Abstract

There has been a huge and transformational change in the E-learning sector after the growth in internet in India and Covid 19 pandemic. The number of E-learning websites and platforms for the media students have increased manifold. Although India is one of the leading countries which is concentrating on developing its online education system, yet in some parts of India imparting education through e-learning still seems to be an insurmountable task. This study aims to identify the key barriers hindering adoption of e-learning among media students in India to analyze the inter-contextual relationships among them. For this, initially an extensive review of literature has been done followed by in-depth interviews of 30 media academicians, e-learning experts and media professionals to identify the key barriers. Finally, Interpretive Structural Modeling (ISM) has been applied to represent the key barriers in a hierarchical paradigm showing contextual interrelationships among them. Results represent 12 major barriers evolved from the literature review and the interviews for which a hierarchical paradigm was developed showing contextual interrelationships among key barriers at different five levels. The results solicit value to researchers, academicians and practitioners by revealing valuable insights related to key barriers hindering the adoption of e-learning among Media students in India.

Keywords: Barriers, E-learning, Interpretive Structural Modeling, MICMAC, India, Media Student.

I. INTRODUCTION

Education has always been important for students throughout the globe. Pupils have acquired their knowledge from ‘teachers’, ‘educators’ and ‘gurus’. As India pushes itself into the next millennium, it bears the burden of a large burgeoning population (approx. 1.3 billion), which also includes a fast-growing young population.

The last Indian census data also threw more light on the above. India now has a gigantic student population of more than 315 million. This comprises not just the largest student body

amongst all countries, but Indian students alone can make for the fourth biggest country in the world, almost near the population of the United States of around 318 million. In slight contrast, China's student number is around 252 million according to UNESCO.

In recent years, private educational institutions, home tutors and extra coaching classes have sprung up in virtually every part of India. There has also quite evidently been a silent transformation in India when it comes to internet education. With reduction in internet usage rates and growth in the overall consumption of smartphones, more students are

looking at websites and apps for assistance. Also, more and more people are creating content for online usage, including those with entrepreneurial interests in this area.

With India's internet user base set to cross 900 million by 2023, the usage of e-learning or otherwise, is only projected to increase. As of November 2019, 433 million active Internet users in India belong to the 12+ age group, while 71 million falls between the age bracket of 5-11 years, who primarily access the Internet using devices owned by family members. With an overall 62% internet penetration rate in India, e-learning entrepreneurs and education experts forecast that the next big change is going to take place in India. It was estimated that more than 3 million students are fully taking online learning for their higher education and the number is expected to rise.

However, despite the stupendous growth, there have been some barriers hindering the adoption of e-learning especially for students who are pursuing a course in media studies. These barriers which were already present for sometime became more pronounced when students and faculties were required to adopt E-learning platforms during the sudden onset of lockdowns and pandemic in the year 2020. Countries all over the world suddenly shutdown schools and colleges leaving students hanging. Students, teachers and their families even have suffered due to closure of schools by governments all over the world; even economies were affected with societal consequences (Agormedah et al., 2020; Damianakis et al., 2020; Jamerson & Mitchell, 2020; Owusu-Fordjour et al., 2020; Suneeth et al., 2021).

Lack of ICT infrastructure is still a huge barrier impeding the process, especially in rural and semi urban areas (Alshehri and Drew, 2010; Belaid, L., 2021). Schefter in 2000 also advocated that the lack of qualified and skilled trainers and users also obstruct the use of internet technology in the education industry. Problems like high cost, unfamiliarity with internet technology and lack of infrastructure and so on are still persistent despite the exponential growth in usage of mobiles and

internet (Ebersole and Vorndam, 2003; Gulbahar, 2007; Berner, 2003). A research study by Al-Araibi et al. (2019) puts technological aspects as the main determiners in the success of an e-learning system, while showing that 45% of e-learning endeavours in third world countries have resulted in failures, 40% are partial failures, while only 15% considered successful by researchers. Globally, however, due to the COVID-19 pandemic, universities were forced to close during lockdown, while most teachers and students were left with no choice but to adapt by moving coursework online. Many families were found to have impulsively bought educational coursework online sometimes even when they have barely spoken to the telemarketer (Verma, H., & Singh, S. (2019). Some struggled while others adapted to tools and techniques for online teaching.

A pivotal factor that needs to be improved is the essential support in terms of the infrastructure in schools. As per recent data, only about 9% of rural India can access the Internet. Sometimes it may be tough for parents, especially in rural and marginalized groups to assimilate concepts without proper access. Although 78%(approx.) of India's 1.3 billion population possesses cellphones, tele density in rural places is only about 57%, as per data from the Telecom Regulatory Authority of India (TRAI). A study by Pramod Kumar, 2020 says that these statistics are not enough to make virtual classrooms a reality for the majority students.

Further deliberation into this reality has depicted those doubts have arisen about the

readiness, designing and efficacy of e-learning especially for a developing country such as India, where technical limitations like suitability of devices and bandwidth availability pose a strong challenge. (T. Muthuprasad et al, 2021).

This paper tries to detect and identify the main hindrances in the adoption of e-learning of students pursuing Media courses (both graduates and undergraduates) in India and to establish the contextual relationship among the

identified barriers in order to better understand current e-learning challenges.

2. Literature Review

After liberalization reforms in the 1990's, internet and computer companies entered the Indian market in a big way. It has become pertinent for researchers to investigate whether the growth of education is in line with the kind of growth and opportunities offered by technology. these days

2.1 E-learning and E-learning platforms: In terms of education, India has made huge strides since independence, especially in areas of positive primary education turnout rate and increasing literacy to roughly three quarters of the population. Policy makers and educationists have cited India's improved education system of having contributed to its robust economic rise.

Much of the progress has been made by public institutions operating in the domain of higher education and scientific and technical research.

In the transformational era of technology, e-learning and e-learning platforms play an essential role in opting for a suitable study course or stream by providing information like course detail, career details, proactive faculty members, best colleges, books etc.

Apart from data on courses, e-learning platforms also provide information on competitive exams, job and career opportunities and preparation strategy for various national and international educational exams. The growth of accessing information online is linked to the growth of internet and IT technology all over the world.

KPM, a global advisory firm has forecasted that the online education industry will be a \$1.96 robust billion industry by 2021 in India and \$5 billion by the year 2025. This is evident with the growth in brands like Unacademy, Udemy, Uprgad, Byju's etc. Also, the student base adopting online platforms for test preparations (SAT, NEET, NET LSAT) is

expected by policymakers and e-learning entrepreneurs in the near future

Cheap 4G internet, smartphone penetration, low cost of E-learning platforms, demand for skilled courses is pushing people towards to adopting E-learning. Also, various social media sites have made it easier for students to access information. Facebook itself has been credited with influencing more than 90% of the university students on US campuses. (Cheung et al, 2012). Contrary to popular belief, young students do use social networks for studying and discussing schoolwork (Cachia et al., 2005). Students who want to pursue long distance programs also find the use of technology an important tool for accessing information. Online educators can incorporate tools like graphics, text, audio-video materials, cartoons etc. that can enhance teaching and learning interactivities and enable students to continue their education in a flexible and convenient manner (Simonson et al., 2006).

E-learning has helped students and learners motivate themselves to educate themselves more (Dunken, 1990). In fact, many library resources have created online links to help students in accessing information (Farkas, 2007). Many colleges are also using the concept of 'Blended Learning' or the 'combination of face-to-face with computer-mediated instruction to enhance pedagogy; (Graham, 2008). Other factors that involve the use of educational websites are teacher's attitudes and its smooth initiation into teaching according to a study by Huang & Liaw, 2005). Also in many developing countries, women are being encouraged to use ICT tools and access information to help in the development of the nation (Hashim, 2008, Kaul, 2006). India with its large English-speaking population and growth of the internet has also been able to contribute to its IT services sector which in turn encouraged other occupational segments such as pharmaceuticals, biotechnology, and engineering design to join the IT service wagon (Agarwal, 2006).

E-learning: A study by Markus in 2008 described E-learning as a "continuous learning process created and sustained by interactions

with digitally delivered content, network-based services, and tutoring support.”

Applications and processes of e-learning include web and computer-based learning, and virtual education opportunities. According to researchers Zahedi and Dehghan (2019), e-learning is considered as using ‘electronic technology’ to access educational programs via the internet of using digital tools using the internet. E-learning has also been explained as the ‘acquisition of knowledge’ and information with the help of electronic media devices such as desktop, laptop, computer sets, mobile phones, iPods, and iPads in a study by Bakare & Orji(2019). It has also been described as the delivery of knowledge & educational content through technology and the internet (Gros et al. 2016; Hong et al. 2017; Aljawarneh 2020).

Almost all universities and colleges all over the world have developed e-learning portals for the students and faculties (Moore et al. 2011), especially in the light of the Covid pandemic. According to a study by Azhari and Ming (2015), e-learning creates a significant and compelling impression on students, especially those who are part-time, full-time or distance learning students in higher education institutions. Nowadays, most of the post-graduate pupils and working professionals are registered as part-time students. E-learning helps them a lot because of their time constraints and saves them money from travelling to long distances. This aspect has become even more pronounced with continuous lockdowns all over the world.

2.2 Relevant barriers in the adoption of educational websites: Despite the rise in consumer consumption, levels of education and globalization, there are certain hindrances in the adoption of internet and ICT and New Media tools, which has deterred students and users from accessing e-learning. There are also certain problems that have been specified; their argument on the quality of learning impacted through e-learning and their subsequent satisfaction of students (Baber, 2020). According to Pokhrel & Chhetri, (2021), the most mentioned online learning issues are availability, economics, adaptability,

instructional methodology, durable education, and teaching practices.

Despite a considerable drop in prices all over the world, many parts of the population are unable to buy the products. ICT technology is also expensive. Budget constraints and negative perceptions and hesitancy towards e-learning (Kibuku et al, 2020) pose a challenge in accessing e-learning websites. Also, high internet tariff prices are a deterrent to many (Gulbahar, 2007).

Most universities have issues with internet connectivity or communication/digital devices required to merge online learning opportunities properly in low-and middle-income countries. (Agormedah et al., 2020).

For many developing countries, adoption of ICT and barriers to accessing the Internet are markedly different than first world countries. Updated technology and ICT have still not permeated to a great extent in many higher learning institutions in most developing countries often seen due to socio-economic and technological hindrances. During Covid, the issues became even more pronounced (Belaid, L. (2021). Researcher by Ssekakubo, Suleman, and Marsden (2011) found that that the majority of e-learning initiatives implemented in developing countries tend to fail, either partially or entirely.

According to a study by Kundu (2020) and Kinker, P., Swarnakar, V., Singh, A. R., & Jain, R. (2021), the major challenge of e-learning is the stark discrepancy in access to devices like computers or smartphones. While only 24% Indians own a smartphone, only 11% of Indian households own a desktop computer, digital notebooks, laptops, netbooks, tablets and palmtops. Although many students prefer online classes, some (low-income) students have complained that face-to-face, video classrooms require more data packages (Simamora, 2020), as they have to keep their cameras the ‘on’ mode due to strict rules.

Lack of Internet connectivity coupled with lack of undisturbed power supply is another barrier which needs to be addressed by many developing countries to provide quality digital

learning capabilities (Taso, K., & Chakrabarty, A. 2020). Poor internet connection was cited as a barrier which restricted access to e-learning platforms (Sarkar, 2019; Adelakun, N. O., & Omolola, S. A. 2020). As per Scoonews (2020), a report by Quacquarelli Symonds shows that in the case of mobile data, 40.2% of the respondents face poor connectivity and 56.6% complained about signal issues.

'Poor network infrastructure' and low-quality content development were cited as the main issues of e-learning system adoption in many developing countries (Aung and Khaing, 2015; Fauzi, R. A., & Asri, Y, 2021). A study has found that data package is expensive for many students as well as spending too much time on the internet is putting these children in danger of cyber bullying (Drane et al., 2020).

Often weak cyber laws and intellectual property issues might dissuade educators from uploading information online (Alshehri and Drew, 2010). Studies have shown that lack of security and privacy concerns, security issues linked to personal information of students, and faculty members including the administration staff were acting as a barrier to accessing information through educational websites. (Bandara, et al. (2014); Pokhrel & Chhetri (2021)).

Often in countries with large populations and diverse communities and culture, users might hesitate to adopt newer technology and prefer the conventional method of information gathering. Some studies show that the lack of awareness about the internet and the unwillingness of students in taking accountability and responsibility for their own online learning was also a barrier in the growth of e-learning. Incapability and learner's inefficiency were also found to be a reason to deter students from accessing information online (Cher Ping Lim, 2004).

Further research has shown that the lack of skilled IT and tech professionals to teach IT, internet and skills required in the e-learning system may deter many people from using the internet. This in turn would lead to lack of access to e-learning tools and platforms. It has

also been found that language barriers hinder ICT growth and learning as English is the predominant mode of communication; however, it might not be the first language of many (Alshehri and Drew, 2010; Jónsdóttir, A. A., Kang, Z., Sun, T., Mandal, S., & Kim, J. E. (2021).

Another study conducted in Pakistan by Kanwal and Rehman (2017) revealed that internet experiences, system characteristics, and computer self-efficacy were the primary issues that hamper the successful adoption of the e-learning system. 'Perceived usefulness' was found to play a crucial role in building the attitude of students toward e-learning and achieving satisfaction and personal development of the users (Ejdys, J. 2021).

A study by Lauren Bringman-Rodenbarger and Michael Hortsch in 2020 showed that students were less motivated to pursue high-tech and often e-learning resources than commonly believed and as an alternative use interface with which they are familiar from before. Rhema and Miliszewska (2010) mentioned challenges with cultural & linguistic background of students & instructors and their awareness and attitudes towards e-learning. Underdeveloped and obsolete technological infrastructure, expensive educational technologies, lack of local skill in e-learning, and lack of administration backing for e-learning initiatives were cited as challenges by the study. Students might hesitate to access websites if they feel there is a lack of support from teachers and management in the adoption of learning from educational websites (Alshehri and Drew, 2010).

Many students have complained about the lack of a conducive environment for study. An NSSO Report (2017-18) discovered that 37% of households in India have one room setup; making it a luxury for many to attend lectures in an undisturbed environment.

Poverty is another barrier hindering the development of e-learning. A study conducted by Zake (2009) found that poverty is one of the most important barriers, especially in African countries than in developed countries because

ICT technology is considerably more expensive. According to a study by Pramod et al (2021), financial constraint was found to be playing a major role in inhibiting the adoption e-learning process in the engineering education. Some countries struggle to maintain a consistent internet connection and usage of digital equipment, and many poor students in developing nations are unable to purchase online learning tools (Adedoyin & Soykan, 2020).

Since learning from New Media is a new form of learning, faculties might not authorize study of material available online, which in turn might deter students from accessing information they feel are not relevant to their teachers. There is also the fear of misinformation (Bacow et al., 2012). It has also been found that teachers and instructors do not endorse online teaching because of the lack of control over the content; especially if they are third party websites (Bacow et al., 2012; Hashemi, A. & Kew, S. N. (2021)). In a study by Kim (2008), it was indicated that the main challenge of technology that impedes the implementation and use of e-learning in higher education was often faculty resistance.

Many students also feel that a lack of online interaction between learner and the instructor; with preference for face-to-face instruction may deter many from accessing information online (Allen et al., 2013). Students complained about lack of personal interaction with teachers as a barrier for interacting with teachers. (Kaur et al, 2021). Some skills such as 'Speaking' are difficult to practice online. Further issues include technical problems especially for some students who are unable to do self-study. Therefore, they need special direction from the subject teacher (Ja'ashan, 2020).

Shawai and Almaiah (2018) in a study mentioned that a lack of e-learning systems usage hampers the realisation of benefits by the students. Therefore, it led to an unsuccessful system and wastage of universities' money (Naveed et al. 2017).

According to the Global Education Monitoring Report released in 2020, 40% of the poorer

countries are not focusing on 'at-risk' learners during the Covid pandemic. Almost half of the world's population has no access to the net, making it a calamitous situation as per the World Inequality Database on Education (2020).

Unequal access to the internet has also intensified social stratification and has limited educational opportunities for poor and struggling students. While in India, 66% of the population lives in villages, only 15% of rural households is able to use internet services.

For urban households, the proportion is 42%. According to a report by IAMAI-Kantar ICUBE 2020 report, even though rural India clocked a 13% growth to 299 million internet users over the past year, rural India, especially women were lagging behind when it comes to digital infrastructure and purchasing power. A study by Eltahir (2019) showed that the challenges of accepting an e-learning system in developing countries remains a reality due to the digital divide within its citizens.

According to a study in Bangladesh, because of a dearth of access to proper ICT infrastructure, a large number of students has failed to harness the benefits of online learning. The conversion from classroom education to emergency e-learning has a vast digital divide between and within schools and countries (Agormedah et al., 2020). The digital divide showed during the COVID-19 pandemic and later e-learning was emphasized for Bangladeshi students. (Badiuzzaman, M.; Rafiquzzaman, M.; Rabby, M.I.I.; Rahman, M.M., 2021). Some students claimed that they had to take their sick parents, grandparents, or family members to hospitals, and therefore it was difficult for them to keep up with their lessons when they returned home (Imber-Black, 2020).

Lastly for developing countries, gender does play a hindrance in the adoption of technology and from accessing the internet. Often women and girls due to a variety of reasons might hesitate to learn/ be discouraged from using computers (Allen et al., 2013).

Accessibility issues are also a challenge in the e-learning process (Aboagye et al., 2020). This

was even more evident during the Coronavirus lockdown when there were reports of many families and students not having the tools to access online classes and access information online. Students were also not prepared for a complete online experience while social issues and lecturer issues affected students' intentions to study online (Zhao et al, 2021). Previous research found that online learning during COVID-19 was interrupted and disrupted by the students' financial status, technological competence, logistic blockades, lack of technical support, and communication (Abuhammad, 2020).

Based on the research of Azhari and Ming (2015), it emphasized several issues related to the Learning Management System (LMS) of universities in Malaysia such as the lack of trained lecturers, poor internet speed and WIFI coverage, weak infrastructure, interface of design, quality of content, system use and students' adoption. These factors show such barriers are a worldwide problem for educators to face.

Sarkar (2019) in a study found that e-learning resources are poorly designed and do not allow much interaction between students and lecturers. It was reported that while accessing e-learning respondents always faced the problem of difficult vocabulary and content not being available in the preferred language (29.28-33.57%). Respondents also mentioned that they always get stress on their eyes, increased fatigue levels due to e-learning and neck muscles were affected adversely by continuously studying via e-learning (Kawita Bhatt and Rajshree Upadhyay, 2020)

A study by Mulhanga and Lima (2017) and Abuhammad (2020) pointed to factors such as 'poor interface design', insufficient technical support and dearth of productive IT skills are the main barriers that hinder the successful implementation of existing e-learning ventures. Kenan et al (2013) claimed that cultural, political, and economical constraints were the main reasons behind the failure of e-learning initiatives in Libya. Vershitskaya et al (2020) cited the lack of acceptance of new technology

and e-learning methods as a barrier to accessing online education.

E-learning demands self-discipline which is absent in many students. The interference that comes with using the internet (Azlan et al., 2020) is a new demon for parents. YouTube, Facebook, Twitter, Instagram, TikTok, news websites, pop up ads are enough to side-track the students. One of the major factors obstructing the advancement of online education is a lack of enthusiasm or motivation, which in turn increases the number of dropouts from the online course, according to Aragon & Johnson (2020). Wilczewski et al. (2021) mentioned that 'isolation' and 'home quarantine' amplified the level of anxiety, frustration, insecurity, and hopelessness among students which further affected their psychological health and that the lack of appropriate and necessary social interaction demoralized the students from adopt e-learning courses.

3. Problem Definition

India with its growing population and drive for better educational opportunities has given rise to many start-ups, colleges, and private universities. The Internet is also penetrating the market at a high rate. However, the biggest challenge for educators, online instructors and government alike is to encourage users to access information online; also access credible information. As only 32% of the Indian population has access to the internet, there is a need to study the access of e-learning among students and teachers alike. The use of technology and websites will markedly be different than other countries. Lastly, with the internet and the young population growing in India, more and more studies are needed to understand the barriers in the adoption of e-learning of among Media students. Since Media courses are heavily skill-based learning, it has become imperative to study the barriers so as to understand the evolution of Media based courses in the era of blended learning.

4. Methodology

To get the required results to the above definite problem, a solution methodology is proposed which include four steps:

- Extensive review of literature of barriers hindering adoption of E-learning among Media students in India and its relevant stimuli
- Focus group discussion of university-level students
- In-depth interviews of academicians, e-learning experts and media professionals
- The application of interpretive structural modeling

Interpretive Structural Modeling can be an optimal methodology to achieve our research objective as it may provide an exact replica of barriers in the adoption of E-learning of among Media students in India by developing a structural model for all the considered relevant barriers.

4.1 In-depth interviews and focus group discussion: In-depth interviews are considered as one of the most effective qualitative techniques for investigating different facets of any concept. For understanding the actual reasons and challenges of e-learning adoption among Media students in India, a total of 30 interviews were conducted. 10 Media Academicians, 10 Media Professionals and 10 E-learning experts were interviewed. 2 Focus group discussions of university level Media students were undertaken to collect more data. After the qualitative analysis of data collected through interviews and focus group, different barriers of e-learning adoption among Media students evolved. Like, issues related to technology adoption and transfer of technology; lack of awareness; learner's inefficiency; resistance to accept new thing; orientation for the traditional teaching pedagogy etc.

4.2 Interpretive Structural Modeling (ISM): Warfield, 1974 defined 'Interpretive Structural Modeling (ISM) as an interactive learning process using graphics as well as words to

portray a systematic model for the complex issue and field of study'.

The model was developed through ISM. It illustrates a contextual and direct connection between dissimilar and divergent elements of the main issue. The main aim of ISM is to transmute a complex system into several sub-systems (elements). Therefore, according to Warfield, 1974; Sage, 1977, this model constructs a multilevel structural model by establishing order and direction on the complexity of relationships among elements of a system. This model will present the interaction between barriers of the complicated issue. Many researchers and academicians have found this method very useful for modeling of complex fields of study.

The procedures and steps involved in using 'ISM' techniques for the factors hindering the adoption of E-learning by media students below:

Step1: Identification of barriers in adoption of e-learning from extensive review of literature and focus groups

Step 2: In-depth interviews of education practitioners to explore the barriers

Step 3: Experts' opinion and listing barriers of e-learning adoption

Step 4: Questionnaire development (SSIM matrix) and data collection

Step 5: Developing initial reachability matrix from SSIM

Step 6: Transitivity check and developing final reachability matrix

Step 7: Level partitioning of final reachability matrix

Step 8: Establishing conical form of final reachability matrix

Step 9: Developing diagraph and then interpretive structural model

Step 10: Constructing driving power and dependence power diagram

Step 11: Result, discussion, and conclusion for the ISM of barriers of e-learning adoption of university level media students

The step wis flow diagram of ISM methodology is displayed in Figure.1. The flow diagram denotes the synchronised action plan required for applying this specific technique through interactive learning.

4.3 Questionnaire Development: To analyse the barriers in adoption of e-learning among Media students in India, twelve barriers were considered from the literature and qualitative data collected through in-depth interviews and focus groups. These experts are the highly qualified academicians who analysed the concept of e-learning among media students. According to these experts, among the different barriers that were identified from review of literature and in-depth interviews of 30 experts, 12 barriers are considered to be more significant such as — lack of ICT infrastructure, intellectual property rights issues, resistance to learn new technology, lack of technical support and collaboration, language barriers, shortage of financial resources, lack of awareness of accredited online courses, lack of control on irrelevant online information, learner's inefficiency, lack of online interaction between learner and instructor, gender biasness, and preference to traditional teaching pedagogy. Then, a questionnaire was prepared to capture the contextual relationship among the above barriers.

4.4 Application of ISM: For the further analysis, ISM suggests collecting the responses from the experts. Thus, responses were collected from 10 Media Academicians, 10 Media Professionals and 10 E-learning experts who were interviewed. Each expert carefully filled the questionnaire to represent the contextual interrelationships among twelve barriers by using the criteria "leads to".

Structural Self-Interaction Matrix (SSIM): To keep in mind the contextual relationship, SSIM is developed and established by indicating "leads to" relation between any two barriers (i

and j). To show the relationship between i and j, four symbols are used as discussed below:

V: Barrier i leads barrier j

A: Barrier j leads to barrier i

X: Barrier i and barrier j both leads each other

O: Barrier i and barrier j are unrelated

The SSIM for the barriers of educational websites adoption is shown in Table2. This matrix represents the relationship between barriers i and j.

Initial Reachability Matrix: According to the researcher Warfield (1973), Initial Reachability Matrix signifies the binary form of all the entries in the cells of SSIM. Based on SSIM, an initial reachability matrix is developed by converting the SSIM matrix into binary form (0,1) for each cell, thus showing the relationship between barrier (i and barrier (j) shown in Table 3.

To covert the entries of SSIM into binary form, following rules are considered:

Rule 1: If the entry in the cell (i,j) is V then, (i,j) cell becomes 1 and (j,i) cell becomes 0 in the initial reachability matrix.

Rule 2: If the entry in the cell (i,j) is A then, (i,j) cell becomes 0 and (j,i) cell becomes 1 in the initial reachability matrix.

Rule 3: If the entry in the cell (i,j) is X then, (i,j) and (j,i) cells both become 1 in the initial reachability matrix.

Rule 4: If the entry in the cell (i,j) is O then, (i,j) and (j,i) cells both become 0 in the initial reachability matrix.

Final Reachability Matrix: Initial reachability matrix is further converted to final reachability matrix by checking out the relationship among different barriers (i) and (j).

For an instance if A leads B and B leads to C then A will also lead to C. Hence the entry of cell (i,j) for A and C will be 1 to represent the relationship between A and C. Thus, the final reachability matrix is established and developed by checking out the relationship

among different barriers (Table.4). The final reachability matrix then shows the final extracted relationship between barrier (i) and barrier (j) by using binary digits 0 and 1.

Level Partitions: Level Partition is the way to arrange the different factors in hierarchy by keeping the consideration of relationship between different factors, as defined by Warfield, in 197.

For this Reachability Set, an antecedent set is collected from the final reachability matrix. Intersection Set is also developed by taking the common barriers from reachability and antecedent set for each factor. And then based on five iterations, five levels for 12 barriers of E-learning are found for developing the hierarchical paradigm (shown in Table.5). It is further used for making interpretive structural model for this study.

Conical form of final reachability matrix: According to the levels of the barriers hindering adoption of E-learning involved in Table.5, final reachability matrix is converted to conical form by clubbing up all the barriers at the same level together to effectively evaluate the barriers at different levels and the interrelationships among them. This conical form of final reachability matrix (Table.6) depicts the dependence and driving power for each barrier of E-learning adoption, which is further used to allocate these barriers in driving power and dependence power diagram (Figure.3).

Formation of ISM based model: Level partitions in Table.5 is further used to develop a hierarchical model for the barrier of educational websites adoption. The relationship between the barriers (j) and (i) is shown by an arrow pointing from (i) to (j). The resulting graph is called a Diagraph. Removing the transitivity as described in the ISM methodology, the Digraph is finally converted into the ISM model shown in Figure.2.

This ISM model shows the dependencies and interdependencies among different barriers at five levels.

4.5 MICMAC Analysis: MICMAC analysis is abbreviated as *Matriced Impacts croises-multiplication applique and classment* (cross-impact matrix multiplication applied to classification). It is constructed on the principle of multiplication of matrices to analyse and study the driving and dependence powers of each barrier. This analysis aids and helps in identifying the different categories of barriers based on the driving and dependence powers. These categories are as follow:

(i) **Autonomous barriers:** The barriers come in the first quadrant having very weak driving and dependence powers are known as autonomous barriers. They are relatively disconnected from the system.

(ii) **Dependent barriers:** The second quadrant barriers have weak driving power but strong dependence power hence these barriers act as dependent barriers in the system.

(iii) **Linkage barriers:** The barriers of third quadrant have strong driving as well as dependence power and they act as linkages between any two barriers. They are unstable and so any action on them will influence others and also a feedback effect on themselves.

(iv) **Independent barriers:** These barriers have strong driving power and weak dependence power, so they act as drivers of the system. These barriers are pre-requisite to emphasize for the main issue of the ISM.

The nodes and arrow heads used in the model represent the dependencies and interdependencies among barriers at different levels. The exact replica of categories of the barriers is represented in driving power and dependence power diagram in Figure number 3. This diagram explains the categories as well as role of each barrier in the model.

5. Results and Discussion

This research study provides significant insights for the usage of e-learning in India and reveals the different barriers that create hurdles in the adoption of e-learning among Media students in the Indian context. The study

emphasizes over the significance of e-learning in the development of sustainable and flourished education system in India. This study revealed different barriers from extensive review of literature, focus groups and in-depth interviews of experts, which are resisting the adoption of e-learning. Among those barriers twelve important barriers were taken into the consideration with the help of experts' opinions, like, lack of ICT infrastructure, intellectual property rights issues, resistance to learn new technology, lack of technical support and collaboration, language barriers, shortage of financial resources, lack of awareness of accredited online courses, lack of control on irrelevant online information, learner's inefficiency, lack of online interaction between learner and instructor, gender biasness, and preference to traditional teaching pedagogy.

The study further evolves the contextual relationships among the above barriers and segregates these barriers in to four categories of barriers. Like, language barrier is categorized as the independent barrier which is creating hurdles in the adoption of e-learning. Resistance to learn new technology, lack of awareness of accredited online courses and preference to traditional teaching pedagogy — these three barriers drawn into the category of dependent barriers. Linkage barriers include three barriers i.e., learner's inefficiency, shortage of financial resources and lack of technical support and collaboration. In addition to that, rest of the barriers like — lack of ICT infrastructure, intellectual property rights issues, lack of control on irrelevant online information, lack of online interaction between learner and instructor and gender bias — drawn into the category of autonomous barriers.

The study also depicts a systematic and hierarchical model for all the significant twelve barriers of e-learning adoption. This interpretive structural model consists of five levels for the twelve barriers and develops the contextual relationship among those barriers that helps in better understanding of the priority of the barriers and their impacts of creating hindrances in adoption of e-learning. Like intellectual property rights issues lead to lack of technical support and collaboration &

preference to tradition teaching pedagogy. And lack of technical support and collaboration has interdependency with learner's inefficiency.

The level of this interpretive structural model signifies the high obstructions due to some major barriers like — lack of technical support and collaboration, resistance to new learn new technology, learner's inefficiency, and preference to traditional teaching pedagogy thus for the facilitation of usage of educational websites these barriers must be avoided. This study demands the high technical support and collaboration from other technical sources i.e., transfer of technology, for inhibiting better learning skills and to facilitate the technical changes in traditional teaching pedagogy. Lack of ICT infrastructure is also a significant autonomous barrier that is creating direct or indirect obstacles in the adoption of educational websites. Some other barriers like complexity of intellectual property rights during transfer of technology in education sector. Irrelevant information available on internet and lack of online interaction between learner and instructor on educational websites, also hinder the smooth adoption of the educational websites for the educational learning. Gender biasness is also found as one of the barriers in India that hinders the adoption of educational websites. This barrier is somehow creating hurdle for the female learners especially due to some societal influences; it has to be reduced by facilitating liberal mindsets. Language barrier is also considered as the self-stimulating barrier which is leading to some linkage barriers and finally to some dependent barriers. Language barrier can only be removed when the learners in India have a strong orientation for the language used for educational websites.

These results will definitely benefit and aid in adoption the e-learning practices especially by university level media students in India in a sustainable way by eliminating or reducing the impact of the barriers. Interpretive structural model of these barriers may also help in filling the knowledge gap and will enable the education practitioners to understand this concept in a better way.

6. Limitations and Future Scope of the Study

This study identified twelve barriers of educational websites adoption in Indian context and later developed an ISM model for them. This study may be diversified by considering more barriers and then categorize them further by considering different parameters.

This methodology has some imitations also as it is more interpretive because a group of experts decide that the considered/selected barriers are related or not. So, it can be considered a bit too simple of a technique for developing a model from the complex set of barriers. This study is also limited to Indian context only and may be widened in future by considering the responses from the different cultures. Therefore, in future, this study can be extended by addressing the above limitations. A quantitative analysis is preferred for further evaluating the impact of these barriers in adoption of educational websites precisely. Also, studies can be conducted for specific programs for different educational groups and sub-groups and explicit demographic groups.

7. Conclusion

This study at a great extent can resolve the problem of prioritizing the different barriers creating hurdles in adoption of e-learning among Media students in India, and highlights the interrelationships among these particular barriers hindering adoption of e-learning by using interactive and hierarchical methodology for model development.

The levels or ranks of the barriers replicate a judicious and clear vision for understanding the inter-connections among these barriers and their role in hindering the adoption of e-learning of Media students in India. This study indicates that the barriers like — lack of technical support and collaboration, resistance to new learn new technology, learner's inefficiency and preference to traditional teaching pedagogy create high obstacles in the adoption of educational websites. The study recommends development for high

technological infrastructure and sustainable technical collaborations with some domestic and foreign technical giants so that a productive learning environment for educational websites. There is also a high need to overcome the personal barriers of learners like language orientation and resistance to adopt new technology. This study explicitly uncovers the barriers of e-learning adoption among Media students in India and demands some strategic course of actions to remove them so that high standards and state-of-the-art technology can be implemented in the Indian education sector. Then only Indian learners can get the privilege of acquiring high standard knowledge and can compete in this era of globalization.

Reference

- [1] Aboagye, E., Yawson, J. A., & Appiah, K. N. (2020). COVID-19 and E-Learning: The Challenges of Students in Tertiary Institutions. *Social Education Research*, 2(1), 1-8.
- [2] Adedoyin, O. B., & Soykan, E. (2020). Covid-19 pandemic and online learning: the challenges and opportunities. *Interactive Learning Environments*, 1-13.
- [3] Adelakun, N. O., & Omolola, S. A. (2020). A Pragmatic Study on E-Learning System for Higher Education in Developing Countries. Available at SSRN 3856391.
- [4] Adelakun, N. O., & Omolola, S. A. (2020). A Pragmatic Study on E-Learning System for Higher Education in Developing Countries. Available at SSRN 3856391.
- [5] Agarwal, P. (2006). Higher education in India: The need for change (No. 180). Working paper.
- [6] Agormedah, E. K., Henaku, E. A., Ayite, D. M. K., & Ansah, E. A. (2020). Online learning in higher education during COVID-19 pandemic: A case of Ghana. *Journal of Educational Technology and Online Learning*, 3(3), 183-210.
- [7] Al Gamdi, M. A., & Samarji, A. (2016). Perceived barriers towards e-learning by faculty members at a recently established university in Saudi Arabia. *International*

- Journal of Information and Education Technology, 6(1), 23.
- [8] Al-Araibi, A. A. M., Naz'ri Bin Mahrin, M., & Yusoff, R. C. M. (2019). Technological aspect factors of Elearning readiness in higher education institutions: Delphi technique. *Education and Information Technologies*, 24(1), 567–590.
- [9] Ali, S., Uppal, M.A. and Gulliver, S.R., 2018b. A conceptual framework highlighting e-learning implementation barriers. *Information Technology & People*.
- [10] Al-Khasawneh, A. M. and Obeidallah, R. (2019). E-learning in the Hashemite University: Success factors for implementation in Jordan. In *Advanced Online Education and Training Technologies* (pp. 135-145). IGI global.
- [11] Allen, I. E., & Seaman, J. (2013). *Changing course: Ten years of tracking online education in the United States*. Sloan Consortium. PO Box 1238, Newburyport, MA 01950.
- [12] Almaiah, M. A., & Al Mulhem, A. (2019). Analysis of the essential factors affecting of intention to use of mobile learning applications: A comparison between universities adopters and non-adopters. *Education and Information Technologies*, 24(2), 1433–1468.
- [13] Almaiah, M. A., & Almulhem, A. (2018). A conceptual framework for determining the success factors of e-learning system implementation using Delphi technique. *Journal of Theoretical and Applied Information Technology*, 96(17), 5962–5976.
- [14] Almaiah, M. A., & Alyoussef, I. Y. (2019). Analysis of the effect of course design, course content support, course assessment and instructor characteristics on the actual use of E-learning system. *Ieee Access*, 7, 171907–171922.
- [15] Almaiah, M. A., Jalil, M. A., & Man, M. (2016). Extending the TAM to examine the effects of quality features on mobile learning acceptance. *Journal of Computers in Education*, 3(4), 453–485.
- [16] Almaiah, M. A., Jalil, M. A., & Man, M. (2016). Extending the TAM to examine the effects of quality features on mobile learning acceptance. *Journal of Computers in Education*, 3(4), 453–485.
- [17] Alshehri, M., & Drew, S. (2010). Challenges of e-government services adoption in Saudi Arabia from an e-ready citizen perspective. *Education*, 29(5.1). *Applied Sciences (ICETAS)* (pp. 1-8). IEEE.
- [18] Aragon, S. R., & Johnson, E. S. (2008). Factors Influencing Completion and Noncompletion of Community College Online Courses. *American Journal of Distance Education*, 22(3), 146–158. <https://doi.org/10.1080/0892364080223996>
- [19] Aung, T. N., & Khaing, S. S. (2015, August). Challenges of implementing e-learning in developing countries: A review. In *International Conference on Genetic and Evolutionary Computing* (pp. 405–411). Springer, Cham.
- [20] Azlan, C. A., Wong, J. H. D., Tan, L. K., Huri, M. S. N. A., Ung, N. M., Pallath, V., et al. (2020). Teaching and learning of postgraduate medical physics using internet-based e-learning during the COVID-19 pandemic—a case study from Malaysia. *Physica Medica*, 80, 10–16
- [21] Bacow, L. S., Bowen, W. G., Guthrie, K. M., Long, M. P., & Lack, K. A. (2012). Barriers to adoption of online learning systems in US higher education (pp. 39–51). New York, NY: Ithaka.
- [22] Badiuzzaman, M.; Rafiquzzaman, M.; Rabby, M.I.I.; Rahman, M.M. The Latent Digital Divide and Its Drivers in E-Learning among Bangladeshi Students during the COVID-19 Pandemic. *Information* 2021, 12, 287.
- [23] Bandara, I.; Ioras, F. and Maher, K. (2014). Cyber Security Concerns in E-Learning Education. In: *Proceedings of ICERI2014 Conference, IATED*, 0728–0734.
- [24] Barclay, C., Donalds, C., & Osei-Bryson, K.-M. (2018). Investigating critical success factors in online learning environments in higher education systems in the Caribbean. *Information technology for development*, 24(3, SI), 582–611. <https://doi.org/10.1080/02681102.2018.1476831>
- [25] Belaid, L. (2021). Poster: Challenges to Implementing E-Learning in Developing Countries. In E. Langran & L. Archambault (Eds.), *Proceedings of Society for Information Technology &*

- Teacher Education International Conference (pp. 345-350). Online, United States: Association for the Advancement of Computing in Education (AACE). Retrieved January 4, 2022 from <https://www.learntechlib.org/primary/p/219153/>.
- [26] Belaid, L. (2021). Poster: Challenges to Implementing E-Learning in Developing Countries. In E. Langran & L. Archambault (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference* (pp. 345-350). Online, United States: Association for the Advancement of Computing in Education (AACE). Retrieved January 6, 2022 from <https://www.learntechlib.org/primary/p/219153/>.
- [27] Bhatt, K., & Upadhyay, R. (2020). E-Learning: Analysis of rural youth's problems impeding accessibility. *The Pharma Innovation Journal*, 9(10), 286-290.
- [28] Bozkaya, M., Aydın, I. E., & Kumtepe, E. G. (2012). Research trends and issues in educational technology: A content analysis of TOJET (2008-2011). *Turkish Online Journal of Educational Technology-TOJET*, 11(2), 264-277.
- [29] Bringman-Rodenbarger, L., & Hortsch, M. (2020). How students choose E-learning resources: The importance of ease, familiarity, and convenience. *FASEB BioAdvances*, 2(5), 286-295.
- [30] Cachia, R., Compañó, R., & Da Costa, O. (2007). Grasping the potential of online social networks for foresight. *Technological Forecasting and Social Change*, 74(8), 1179-1203.
- [31] Drane, C., Vernon, L., & O'Shea, S. (2020). The impact of 'learning at home' on the educational outcomes of vulnerable children in Australia during the COVID-19 pandemic. Curtin University, Australia.
- [32] Dunkin, M. J. (1990). The induction of academic staff to a university: processes and products. *Higher Education*, 20(1), 47-66.
- [33] Ejdy, J. (2021). Factors Affecting the Adoption of e-Learning at University Level. *WSEAS*
- [34] Eltahir, M. E. (2019). E-learning in developing countries: Is it a panacea? A case study of Sudan. *IEEE Access*, 7, 97784-97792.
- [35] Farkas, M. G. (2007). Social software in libraries: building collaboration, communication, and community online. Information Today, Inc.
- [36] Fauzi, R. A., & Asri, Y. (2021, March). Barriers and Solutions in Online Learning During the Covid-19 Pandemic, Indonesian Language Education Students at the Riau Islamic University. In *Ninth International Conference on Language and Arts (ICLA 2020)* (pp. 14-18). Atlantis Press.
- [37] Graham, C. R., & Dziuban, C. (2008). Blended learning environments. *Handbook of research on educational communications and technology*, 3, 269-276.
- [38] Gülbahar, Y. (2007). Technology planning: A roadmap to successful technology integration in schools. *Computers & Education*, 49(4), 943-956.
- [39] Hashemi, A. & Kew, S. N. (2021). The Barriers to the Use of ICT in English Language Teaching: A Systematic Literature Review . *Bilgi ve İletişim Teknolojileri Dergisi* , 3 (1) , 77-88 . Retrieved from <https://dergipark.org.tr/en/pub/bited/issue/63346/841574>
- [40] Hashim, J. (2008). Learning barriers in adopting ICT among selected working women in Malaysia. *Gender in Management: An International Journal*, 23(5), 317-336.
- [41] Huang, H. M., & Liaw, S. S. (2005). Exploring users' attitudes and intentions toward the web as a survey tool. *Computers in human behavior*, 21(5), 729-743.
- [42] Huang, H. M., & Liaw, S. S. (2005). Exploring users' attitudes and intentions toward the web as a survey tool. *Computers in human behavior*, 21(5), 729-743.
- [43] Imber-Black, E. (2020). Rituals in the TimeofCOVID-19:Imagination,Responsiveness, and the Human Spirit.*Family Process*, 59(3), 912–921.<https://doi.org/10.1111/famp.12581>
- [44] Imber-Black, E. (2020). Rituals in the TimeofCOVID-19:Imagination,Responsiveness, and the

- Human Spirit. *Family Process*, 59(3), 912–921. <https://doi.org/10.1111/famp.12581>
- [45] Ja'ashan, M. M. N. H. (2020). The Challenges and Prospects of Using E-learning among EFL Students in Bisha University. *Arab World English Journal (AWEJ)*, 11(1March).
- [46] Jacobsen, D. M. (1998). Adoption Patterns of Faculty who Integrate Computer Technology for Teaching and Learning in higher Education
- [47] Jónsdóttir, A. A., Kang, Z., Sun, T., Mandal, S., & Kim, J. E. (2021). The Effects of Language Barriers and Time Constraints on Online Learning Performance: An Eye-Tracking Study. *Human Factors*, 001872082111010949.
- [48] Kanwal, F., & Rehman, M. (2017). Factors affecting e-learning adoption in developing countries—empirical evidence from Pakistan's higher education sector. *IEEE Access*, 5, 10968–10978.
- [49] Kaul, S. (2006). Higher education in India; seizing the opportunity. (<https://eric.ed.gov/?id=ED428675>)
- [50] Kaur H, Singh A, Mahajan S, Lal M, Singh G, Kaur P. Assessment of barriers and motivators to online learning among medical undergraduates of Punjab. *J Edu Health Promot* 2021;10:123
- [51] Kenan, T., Pislaru, C., Othman, A., & Elzawi, A. (2013). The social impact and cultural issues affecting the elearning performance in Libyan higher education
- [52] Kibuku, R. N., Ochieng, D. O., & Wausi, A. N. (2020). e-Learning Challenges Faced by Universities in Kenya: A Literature Review. *Electronic Journal of e-Learning*, 18(2), 150-161.
- [53] Kim, M. R. (2008). Factors influencing the acceptance of e-learning courses for mainstream faculty in higher institutions. *International Journal of Instructional Technology and Distance Learning*, 5(2), 29-44.
- [54] Kim, S. S. (2021). Motivators and concerns for real-time online classes: focused on the security and privacy issues. *Interactive Learning Environments*, 1-14.
- [55] Kinker, P., Swarnakar, V., Singh, A. R., & Jain, R. (2021). Identifying and evaluating service quality barriers for polytechnic education: An ISM-MICMAC approach. *Materials Today: Proceedings*, 46, 9752-9757.
- [56] Kisanga, D. and Ireson, G. (2015). Barriers and strategies on adoption of e-learning in Tanzanian higher learning institutions: Lessons for adopters. *International Journal of Education and Development using ICT*, 11(2).
- [57] Kulyk, V . (2011). Language identity, linguistic diversity and political cleavages: Evidence from Ukraine. *Nations and Nationalism*, 17, 627–648. doi:10.1111/j.1469-8129.2011.00493.x
- [58] Kumar, P. (2020). Philanthropic & Literary Discourse On E-Learning Penetration In Rural Education System, India In View Of Covid-19 Lockdown.
- [59] Kundu, P. (2020). Indian education can't go online—only 8% of homes with young members have computer with net link. Blog, 5th May, 2020. Retrieved June 26, 2020, from: <https://scroll.in/article/960939/>
- [60] Kwofie, B. and Henten, A. (2011). The advantages and challenges of e-learning implementation: The story of
- [61] L. Pham, Y.B. Limbu, T.K. Bui, et al. Does e-learning service quality influence e-learning student satisfaction and loyalty? Evidence from Vietnam
- [62] Lim, C. P. (2004). Engaging learners in online learning environments. *TechTrends*, 48(4), 16-23.
- [63] Lwoga, E. T. and Nagunwa, T. (2012). Developing eLearning technologies to implement competency based medical education: Experiences from Muhimbili University of health and allied sciences.
- [64] Martha, A. S. D., Junus, K., Santoso, H. B., & Suhartanto, H. (2021). Assessing Undergraduate Students'e-Learning Competencies: A Case Study of Higher Education Context in Indonesia. *Education Sciences*, 11(4), 189.
- [65] Motlik, S. (2008). Mobile learning in developing nations. *The International Review of Research in Open and Distributed Learning*, 9(2). <https://doi.org/10.19173/irrodl.v9i2.564>
- [66] Mtebe, J. S., & Raisamo, R. (2014). Investigating perceived barriers to the use of open educational resources in higher education in Tanzania. *International Review of Research in Open and Distributed Learning*, 15(2), 43-66.

- [67] Mtebe, J. S., & Raisamo, R. (2014). Investigating perceived barriers to the use of open educational resources
- [68] Mulhanga, M. M. and Lima, S. R. (2017, December). Podcast as e-learning enabler for developing countries: Current initiatives, challenges and trends. In Proceedings of the 2017 9th International Conference on Education Technology and Computers (pp. 126-130).
- [69] Muthuprasad, T., Aiswarya, S., Aditya, K. S., & Jha, G. K. (2021). Students' perception and preference for online education in India during COVID -19 pandemic. *Social Sciences & Humanities Open*, 3(1), 100101. <https://doi.org/https://doi.org/10.1016/j.ssho.2020.100101>
- [70] Naveed, Q. N., Qureshi, M. R. N., Alsayed, A. O., Muhammad, A., Sanober, S. and Shah, A. (2017, November). Prioritizing barriers of E-learning for effective teaching-learning using fuzzy analytic hierarchy process (FAHP). In 2017 4th IEEE International Conference on Engineering Technologies and Applied Sciences (ICETAS) (pp. 1-8). IEEE.
- [71] Naveed, Q. N., Qureshi, M. R. N., Alsayed, A. O., Muhammad, A., Sanober, S. and Shah, A. (2017, November). Prioritizing barriers of E-learning for effective teaching-learning using fuzzy analytic hierarchy
- [72] Nwabufo, B. N., Umoru, T. A. and Olukotun, J. O. (2013). The challenges of e-learning in tertiary institutions in Nigeria. In International Conference the Future of Education Florence, June.
- [73] O'Doherty, D., Dromey, M., Loughed, J., Hannigan, A., Last, J., & McGrath, D. (2018). Barriers and solutions to online learning in medical education - an integrative review. *BMC MEDICAL EDUCATION*, 18. <https://doi.org/10.1186/s12909-018-1240-0>
- [74] Oly Ndubisi, N., & Jantan, M. (2003). Evaluating IS usage in Malaysian small and medium-sized firms using the technology acceptance model. *Logistics Information Management*, 16(6), 440-450.
- [75] Ozudogru, F., & Hismanoglu, M. (2016). Views of freshmen students on foreign language courses delivered via e-learning. *Turkish Online Journal of Distance Education*, 17(1), 31-47.
- [76] Pham, L., Limbu, Y. B., Bui, T. K., Nguyen, H. T., & Pham, H. T. (2019). Does e-learning service quality influence e-learning student satisfaction and loyalty? Evidence from Vietnam. *International Journal of Educational Technology in Higher Education*, 16(1), 1-26.
- [77] 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.
- [78] Pramod, V. R., Devadasan, S. R., & Murugesh, R. (2021). Inhibitors of e-learning in engineering education: an interpretive structural modelling approach. *International Journal of Management in Education*, 15(6), 559-579.
- [79] Ray, A., Bala, P. K., & Dwivedi, Y. K. (2020). Exploring values affecting e-Learning adoption from the user-generated-content: A consumption-value-theory perspective. *Journal of Strategic Marketing*, 1-23.
- [80] Rhema, A., & Miliszewska, I. (2010). Towards e-learning in higher education in Libya. *Issues in Informing Science and Information Technology*, 7(1), 423-437.
- [81] Sahu, P. (2020). Closure of universities due to coronavirus disease 2019 (COVID-19): impact on education and mental health of students and academic staff. *Cureus*, 12(4).
- [82] Sahu, P. Closure of universities due to coronavirus disease 2019 (COVID-19): Impact on education and mental health of students and academic staff. *Cureus*. 2020; 12 (4): e7541. Eng.) DOI: <https://doi.org/10.7759/cureus,7541>.
- [83] Sarker, M. F. H., Al Mahmud, R., Islam, M. S., & Islam, M. K. (2019). Use of e-learning at higher educational institutions in Bangladesh: Opportunities and challenges. *Journal of Applied Research in Higher Education*.
- [84] Scoonews (2020). As schools remain shut, India struggles with equal online education for all. Retrieved June 28, 2020, from: [https:// www.scoonews.com/news](https://www.scoonews.com/news)
- [85] Shahzad, A., Hassan, R., Aremu, A. Y., Hussain, A., & Lodhi, R. N. (2021). Effects of COVID-19 in E-learning on higher education institution students: the

- group comparison between male and female. *Quality & quantity*, 55(3), 805-826.
- [86] Shaikh, M. U., & Shamim, A. (2012). Barriers Faced by Underdeveloped Countries in Promotion of Web Based e-Learning. *INFORMATION-AN INTERNATIONAL INTERDISCIPLINARY JOURNAL*, 15(10), 4019–4026.
- [87] Shawai, Y. G., & Almaiah, M. A. (2018). Malay language mobile learning system (MLMLS) using NFC technology. *International Journal of Education and Management Engineering*, 8(2), 1.
- [88] Sife, A., Lwoga, E., & Sanga, C. (2007). New technologies for teaching and learning: Challenges for higher learning institutions in developing countries. *International journal of education and development using ICT*, 3(2), 57-67.)
- [89] Simonson, M. (2006). Growing by degrees: Latest report from the Sloan Consortium. *Quarterly Review of Distance Education*, 7(2), VII.
- [90] Sree Reddy, B. (2015). Challenges and Opportunity of E-Learning in Developed and Developing Countries-A Review. *International Journal of Emerging Research in Management & Technology*, 46, 2278–9359.
- [91] Ssekakubo, G., Suleman, H., & Marsden, G. (2011). Issues of adoption: Have e-learning management systems fulfilled their potential in developing countries? In *Proceedings of the South African Institute of Computer Scientists and Information Technologists Conference on Knowledge, Innovation and Leadership in a Diverse, Multidisciplinary Environment* (pp. 231–238). Cape Town, South Africa.
- [92] Suneeth, B. G., Kashyap, S., Reddy, G. M., & Kaushal, V. (2021). Resilience Adaptations in Tourism Education for the Post-COVID-19 Era – A Study of India. In V. GB Gowreesunkar, S. Wambugu Maingi, H. Roy, & R. Micera (Eds.), *Tourism Destination Management in a Post-Pandemic Context* (pp. 291–302). Emerald Publishing Limited. <https://doi.org/10.1108/978-1-80071-511-020211020>
- [93] Tarus, J. K., Gichoya, D., & Muumbo, A. (2015). Challenges of implementing e-learning in Kenya: A case of Kenyan public universities. *The International Review of Research in Open and Distance Learning*, 16(1), 120–141.
- [94] Taso, K., & Chakrabarty, A. (2020). E-learning in Higher Education in India: Experiences and Challenges—An Exploratory Study. In *Intelligent Computing and Innovation on Data Science* (pp. 715-723). Springer, Singapore.
- [95] Tawafak, R. M., Romli, A. B., bin Abdullah Arshah, R., & Malik, S. I. (2020). Framework design of university communication model (UCOM) to enhance continuous intentions in teaching and e-learning process. *Education and Information Technologies*, 25(2), 817-843.
- [96] Tawafak, R. M., Romli, A. B., bin Abdullah Arshah, R., & Malik, S. I. (2020). Framework design of university communication model (UCOM) to enhance continuous intentions in teaching and e-learning process. *Education and Information Technologies*, 25(2), 817-843.
- [97] Utomo, H., & Dodgson, M. (2001). Contributing factors to the diffusion of it within small and medium-sized firms in Indonesia. *Journal of Global Information Technology Management*, 4(2), 22-37.
- [98] Verma, H., & Singh, S. (2019). An exploration of e-impulse buying. *International Journal of Electronic Marketing and Retailing*, 10(1), 45-59.
- [99] Warfield, J.N., 1973. Binary matrices in system modeling. *IEEE Transactions on Systems, Man, and Cybernetics*, 3(5), pp.441-449.
- [100] Warfield, J.N., 1974. Developing interconnection matrices in structural modeling. *IEEE Transactions on Systems, Man, and Cybernetics*, (1), pp.81-87.
- [101] Warfield, J.N., 1974. Developing subsystem matrices in structural modeling. *IEEE Transactions on Systems, Man, and Cybernetics*, (1), pp.74-80.
- [102] Warfield, J.N., 1977. Crossing theory and hierarchy mapping. *IEEE Transactions on Systems, Man, and Cybernetics*, 7(7), pp.505-523.
- [103] Wielicki, T. R., & Cavalcanti, G. (2006). Study of Digital Divide: Measuring ICT Utilization and Implementation Barriers Among SMEs of Central California. In *BIS* (pp. 277-294).

- [104] Wilczewski, M., Gorbaniuk, O., & Giuri, P.(2021). The Psychological and Academic Effects of Studying From the Home and Host Country During the COVID-19 Pandemic. *Frontiers in Psychology*, 12, 718. <https://doi.org/10.3389/fpsyg.2021.644096>
- [105] Y., Wang, N., Li, Y., Zhou, R., & Li, S. (2021). Do cultural differences affect users' e-learning adoption? A meta-analysis. *British Journal of Educational Technology*, 52(1), 20-41.
- [106] Zake, J. (2009). Challenges to E-learning in Developing Communities of Africa. Available at: <http://digitalllearning>. (Accessed on August 28, 2013).