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The Impact of Covid Pandemic on Students' E-learning in the Higher-education Digital Pedagogy in Nepal

Basanta Prasad Adhikari¹, Cha-Hsuan Liu², Krishna Bahadur KC³, Sarad Kafle⁴

ABSTRACT

COVID Pandemic 19 has created a significant challenge to educational institutions, teachers, students, parents, government authority, and other stakeholders of educational institutions around the world, with no exception of Nepal, situated in the Himalayas. The available digital pedagogy design in Nepal today is based on traditional pedagogy as a supplement to the face-to-face class experience, which may hinder the practical students' learning experiences and their rights to quality online courses for a long period. This study aimed to examine the students' experiences and opinions on the availability of digital pedagogy features during online courses in Nepal's Higher educational institutions. Quantitative data were collected from 459 Nepalese college and university students by using a self-administrated online survey. The statistical results show that students were not satisfied with the current digital pedagogy practices of online classes. The difficulties faced include the low quality of the online course design, hardware and software, content quality, and supportive digital learning method. The results further indicate that there was a significant association between temporary educational strategy, students' motivation in digital pedagogy, quality of digital pedagogy, standard features of the digital pedagogy, and students' experiences for their satisfaction with digital learning methods in Nepalese Higher-level educational institutions. This study's implication will help educators of Higher-level institutions and policymakers improve digital learning pedagogy.

Keywords: Educational institutions, Covid-19, digital pedagogy, learning satisfaction, online education

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INTRODUCTION

The first case of COVID 19 was found on November 17, 2019, in a 55-year old citizen in the Hubei province of China. In a few months, the COVID 19 pandemic has spread to more than 200 countries globally. Seeing no race, gender, or social class, the COVID-19 virus has affected both developed and developing countries (Livingston and Bucher 2020). To date, although vaccination has taken place, mainly in the developed regions, scientists and government authorities over the world have had not yet answered when the spread of the COVID 19 will be contented. The situation is especially drastic for low-income countries.

In Nepal, the pandemic was formally identified on January 25, 2020, when a 32-year Nepali student tested positive for COVID-19 after returning from Wuhan city. All schools, colleges, and university campuses in Nepal had been temporarily closed for nearly more than two months after January 25, 2020. As of the second week of May 2020, UNESCO had estimated that about nine million students in Nepal would be affected by these closures in response to the pandemic (Nguyen and Huynh 2020). The compulsory closure of schools, colleges, and university campuses for a considerable period of time has led to dramatic changes in the education system, with a distinctive shift from traditional teaching methods to online learning systems.

This transition to digital pedagogy systems also posed challenges for educators who were used to traditional education delivery systems. For example, educators must adapt to new digital delivery methods in order to provide high-quality education in an online environment. Online learning needs to be created within a curriculum design framework that focuses on practical pedagogical principles to avoid a poor-quality learning experience. It is further supplemented by understanding what makes online learning work for students (Evans, Kandiko, Howson, and Forsythe 2018).

While teaching and learning are being undertaken remotely on digital platforms through E-learning, there are many challenges around equitable access to these digital platforms. It was estimated that only 56% of Nepalese people have internet access, where 35% of schools have internet access but only 13% of schools can run online classes (Pandit 2020). Khatri and Bhatta (2020) pointed out that students in Nepal experience four main issues with online education. Firstly, students find it challenging to adapt to technology for their online education, and often struggle to post assignments and log in to their classes. Secondly, some students consider online classes to be less

interactive. Third, poor Internet connectivity in many areas of Nepal has made it difficult for students to attend classes and post assignments. Fourth, the unavailability of computers poses a challenge in learning. Three of them concern the accessibility to online courses. More importantly, when institutions have turned from face-to-face learning to virtual learning, they have to make sure that whether the students have proper devices to participate in the virtual learning to fulfil or not. Although students have no computers to participate in E-learning pedagogy, they use different phone sets to participate in E-learning classes. Electronic devices are fundamental for the effective implementation of E-learning along with the good internet connection and electronic devices are fundamental features of physical facilities during virtual learning practices. Because of poor monetary conditions, uneven geological territory, and mal foundation, students have confronted difficulties with admittance to the internet facilities. Nepal lies in the 123rd position in the world in information communication and technology (ICT) service (Sharma & Kim, 2016). This straightforwardly affects the legitimate execution of online education

There is a large gap among people in low-income countries such as Nepal regarding their socio-economic, education, and literacy background. The COVID-19 pandemic has created a severe complication to the achievements of students' learning experiences. Nepal's existing education system and the uneven distribution of its resources often widen the gaps between rich and poor citizens (Dawadi et al. 2020). In the advent of COVID-19, the digital divide and the uneven access to E-learning have fostered these gaps by widening the inequalities between social-economical advantaged and disadvantaged students. While several schools, colleges, and universities in urban areas have already started online classes to minimize the impact on students' learning activities, schools in rural areas were still dealing with the low accessibility of internet service. Yet, the Nepal Government has not yet launched any new digital learning strategy to help rural areas students to cope with the pandemic's educational environment and inequalities that have been noticed regarding students' access to digital learning. According to Dawadi et al. (2020) and Fay (2020), more than 55% of students do not have online access to Nepal's digital classes and over 55 million students are still out of Nepal's digital learning system. Moreover, the students' drop-out rate has increased after the pandemic intruded in Nepal (Mahato et al. 2020). Paudel & Neupane (2021) concluded two main reasons for the rise of students' drop-out rates. First, many parents have lost their jobs due to the Pandemic and their economic crisis has been worsened than ever before, by which some parents may not be able to afford their children to attend schools. Second, the

discrepancy of the current Information Communication Technology (ICT) infrastructure and its distribution of access in the urban and rural areas have created the second-tier inequality of education in Nepalese society (Saraswati et al. 2020). The first one is the gap between students who live in the urban and the rural area, and the latter is the gap between the rich and poor who can barely afford to access internet facilities. students could not continue their education because of the limited access to the online course.

This study aims to deepen the understanding of the current operation of online education in low-income and less technologically advanced countries such as Nepal and seek possible solutions to mitigate the hurdles based on the students' experience. Since a wide range of organizations has embraced online learning education, a research survey of students around Nepal is adopted in this study to explore more profound aspects of the situation. It encompasses two main objectives. The first objective is to investigate the impact of the digital learning platform on the student learning processes as compared to a traditional school, college, and campus education. Second, this research investigates the possible challenges that students might face during the transition and suggest solutions to ease the tension. The six-factor model of digital pedagogy (Ozkan and Koseler 2009) is introduced below as the theoretical framework of this research. The results of this study help instructor, learners, educators, and curriculum designers proactively enhance their educational insights and develop better online teaching and learning solutions.

Digital Pedagogy

In the second decade of 21 century, digital pedagogy is rapidly emerging in the current education market. Both students and instructors have invested a large amount of costs and time to adapt to this new way of learning. Practitioners, educators, school leaders, and policymakers have been facing the constant challenge of refining teaching and learning techniques to keep up with students' increasing demands and expectations, described as digital excitement (Lewin, Cranmer, and Mcnicol 2018).

E-learning as digital pedagogy

One of the identical characters of digital pedagogy is the use of E-learning methods which has been widely used in medical education across various specialties, educational settings, and training levels (Chu et al. 2019, Zainuddin et al. 2020). E-learning is a digital platform using web browsers as an interface method to communicate with learners and other programs and is considered an innovative studying method that utilizes technological devices consisting of a tablet, computer, laptop, interactive television, audio, video, Internet connection, satellite broadcast, and so forth to deliver the content of the lessons (Kaplan-Leiserson 2000; Vermeer, 2001). While E-learning is the most well-known and extensively adopted phrase used in teaching and learning activities (Strutynska & Umryk 2020), other terms are used interchangeably to define this education method, such as distance education, electronic learning, internet learning, online courses, or learning portals (Gewirtz 2020). Being a digital platform, the E-learning system can store, manage, or modify educational content while also facilitating interaction between participants as they assimilate and input data. Digital pedagogy aims to provide education via the E-learning methods which allows learners to use web browsers as an interface method to acquire knowledge from and communicate with the education providers across other programs (Gewirtz 2020).

To meet students' needs and expectations on rich digital technology for their teaching and learning activities in the years of formal schooling via, the digital pedagogy has to cover the application of scientific knowledge for practical purposes, focus on its practice on community and collaboration, remain open to diverse, international voices, collect a discord of voices, and have its use and application outside traditional education institutions (Lewin et al. 2018). As information and communication technology advances, it changes the education process by affecting how

information transmission and communication are conducted. When the information process is involved, so are the operations and education organizations involved (Al-Rahmi et al. 2020).

The Six-Factor model of Digital Pedagogy

To optimize the performance of online learning, Ozkan and Koseler (2009) developed a six-factor model of digital pedagogy for educators' consideration. The six components of this model are system quality, content quality, service quality, instructors' attitude, learners' perspective, and the supportive issues of digital learning processes. These factors can be further concluded into two categories: human factors and technological factors. Chu et al. (2019) found that about 42% of respondents in their study in China reported that they had enough support from educational institutions before and during their remote study. Their study entitled Health Communication Through News Media During the Early Stage of the COVID-19 Outbreak in China. further added that many educational institutions were taking the initiative to adopt a new teaching environment and performed well in increasing support and encouragement for students.

It was further found that the service quality of educational institutions has a strong effect on user satisfaction. Shehzadi et al. (2020) highlighted that the quality of E-learning is embedded in the E-learning tutor's ability, the quality of material in the course, the quality of E-learning administration, and service support. Shehzadi et al. further highlight that the digital pedagogy system quality is associated with students' learning requirements, availability of better education, and web-based education systems (Ozkan and Koseler 2009).

There was a positive statistically significant relationship between learner's attitudes, system quality, information quality, supportive issues, service quality of the remote access. Overall, learners' satisfaction with digital pedagogy is associated with the assistants' attitudes, and the services provided by the administrative staff. It was further highlighted that motivation, belief, confidence, computer anxiety, fear, anxiety apprehension, enthusiasm, excitement, pride, and embarrassment were identified as learner characteristics by which the outcome of digital learning can be measured (Putten 2021). It was discovered in Indonesia that the average student learning experience is categorized as very good, although the study finds indications of difficulties and limitations in a whole online learning activity that can be further evaluated (Putten 2021).

Ozkan and Koseler (2009) found that specific factors of students' dissatisfaction were the lack of face-to-face communication with teachers and friends, distractions from the surrounding environment, inefficient time management, and decreased self-satisfaction. Our paper sheds light on the effects of the COVID-19 pandemic on high school, college, campus, and university students' experiences in Nepal. To optimize the performance of online learning, Ozkan and Koseler (2009) developed a six-factor model of digital pedagogy for educators' consideration. The six components of this model are system quality, content quality, service quality, instructors' quality, learners' perspective, and the supportive issues of digital learning processes. These factors can be further concluded into two categories: human factors and technological factors.

Service quality

Service quality is characterized by an evaluation of a service that contributes to customer satisfaction. This includes evaluating a service's quality level and convenience. Assurance, reliability, access, and IT staff competencies are dimensions of service quality. The users' experience with accessing and interacting with a service is crucial in identifying the quality level of the service (Al-Momani 2000; Wahab, Mohd & Al-Momani 2010). Service quality has been proven to directly impact users' satisfaction in various information systems (DeLone & McLean 2004). Haider and Riaz (2019) further pointed out that service quality directly impacts users' experience in the context of E-learning. High service quality provides users with simple navigation, ease of search engine used for needed information, and available technical support. Moreover, E-learning platforms with high service quality can also increase students' interactivity and eagerness to explore content.

Content quality

Content quality is defined as the system's final output, which is also called the system's outcome or information quality. Typical information quality features include accuracy, relevance, timeliness, adequacy, reliability, comprehensiveness, format, and accessibility (Al-Alwani, 2014; Bailey and Pearson 1983, 518; Seddon, 1997, 247). Regarding E-learning, students assessed the quality of the information based on these features. The study of Roca, Chiu, and Martinez (2006) showed that the quality of information directly relates to the satisfaction of the user, and indirectly related to the perceived utility. Similarly, Harrandi (2015, 425) and Uukkivi (2015) found that

courses with well-structured content had a positive impact on students' E-learning motivation. Notably, the course content should be comprehensively planned by the instructor to ensure students are motivated to pursue the best material for their E-learning process. The students' self-exploration of the content is one of the main goals of an efficient E-learning process.

System quality (Hardware and software quality)

System quality is described as the quality of information transmission from web-based knowledge resources to remote learners (Delone and McLean 2004, 17). A particular example of an information system is cloud systems such as "Microsoft" and "Google", which offer free tools to educational organizations, including e-mail, contact lists, schedules, database stockpiling, document creation and sharing, and website creation (Shehzadi et al. 2020). Besides the essential contributions of human factors, service quality, and content quality, potential predictors for users' purposes and satisfaction include low complexity, reliability, and technical support (Fleming, Becker, and Newton 2017, 80). A program's consistency, knowledge, resource quality, and instructional quality positively impact user experience, in turn maximizing the E-learning approach's advantages. From this standpoint, the E-learning program itself is a critical component that improves student engagement and should be highly invested to maximize ease of use, ease of access, and versatility (Kim et al. 2012).

Learner's perspectives

Students' attitudes can be considered to have a significant impact on the E-learning process in which learners are highly encouraged to self-study, self-discover, and self-organize their learning procedures (Ozkan and Koseler 2008). Additionally, learners' attitudes are evaluated by self-productivity, pleasant experiences, communication with teachers and classmates, and learning. Passerini and Granger (2000) pointed out in their research that learner characteristics, such as attitudes, enthusiasm, confidence, and trust, must be recognized first. If the students' perspective is appropriate, the E-learning process will toil and vice-versa.

The student-centred approach, which generates substantial public interest, is an emerging strategy to improve the service quality in many educational institutions (Stodnick and Rogers 2008). This approach's fundamental concept is to consider students as customers, and the educational institutions aim to provide the best education facilities for students; thus, increasing student

satisfaction and loyalty to educational institutions (Martinez-Arguelles and Batalla-Busquets 2016). Due to this emerging student-centred strategy, many research types have been conducted to evaluate students' satisfaction with E-learning implementation in different levels of educational institutions.

Instructor attitudes and acceptance

Instructors are the key role players for the quality of the E-learning model during E-learning pedagogy. Personal qualities, for example, IT skills, creativity, innovative ideas, and personal innovativeness on technology acceptance are the main characteristics of an instructor who can make E-learning more effective and of standard quality (Ozkan and Koseler 2009). In this context, the study of Piccoli (2001) studied the instructor's characteristics and highlighted that instructor attitudes are the critical issue of E-learning for the acceptance and use of a learning management system (LMS). They are the major drivers of LMS because individual attitudes of the instructors positively affect the outcomes of E-learning for LMS. Usoro and Abid (2008), Levy (2008), and Wan, Fang, and Neufeld, (2007) suggested that the current level of computer skills and the extent of use of computing skills of instructors are significant issues on instructors' acceptance of technology use in education. The interactive teaching styles of the instructors are critical to the E-learning outcome via a digital learning system. Moreover, Lrvi (2008) insisted on the personal innovativeness of instructors is critical to maintaining the quality of the E-learning management system that has been recently highlighted in the E-learning literature. Schillewaert et al. (2005) found that personal innovativeness in the context of information technology mare person's attitude reflecting their tendency to experiment with and to accept new information technologies independently of the communicated experience of others. Ozkan and Koseler (2009) argue that 'instructor' is the major aspect of E-learning. Within learning environments, instructors should have enough time to interact with students in their learning process.

Supportive issues of the E-learning management system

Support is required for the beginning, marketing, and promotion of E-learning programs which is imperative for establishing and managing technology platforms and infrastructure. The technical infrastructure staffed with technical talent such as network managers, web administrators, security specialists is deeply rooted in the supportive activities of LMS (Kaplan-Leiserson, 2000).

Assistance is also required for the management of feedback and its reporting. Supportive issues are essential organizational factors for the acceptance of learning management systems. The organizational factors influence the use of technology in teaching in terms of motivators, training, technology, alignment, organization support, and technical support (Nawaz & Zubair Khan, 2012). Ozkan and Koseler (2009) concluded that the wellness of microphones, earphones, electronic blackboards, electronic mail, online eased discussion boards, synchronous chat, and desktop videoconferencing are fundamental factors of supportive issues of E-learning. Nawaz and Zubair Khan (2012) argue that technical support is a key inseparable factor of the supportive issue of E-learning. It supports both teachers and students because teachers need technical support to ensure that they have sufficient resources and skills necessary for technology integration into the class practices. Similarly, technical support helps students in the acquisition of knowledge and skills necessary to fulfil their unique curriculum requirements. Al-Alwani (2014) conclude that supportive issues of technical support are installation, operation, maintenance, network administration, and security that increase privacy and security risks, web accessibility, the readiness of the users, requirement for further standardization of E-learning technologies, and social issues in term of increase of the digital divide.

Students' E-learning experiences and Digital Pedagogy

This study applied quantitative research to examine the effectiveness of digital courses which are currently used as an alternative teaching pedagogy during the pandemic in Nepal. The six-factor model of digital pedagogy is applied as the theoretical framework to investigate the relations between students' E-learning experiences and the current practices of digital pedagogy. Only the features of the six factors theory that is related to the learners' perspectives are included in the survey instrument: 'service quality', 'system quality', 'content quality' and 'learner's perspectives. This study aims to understand the impact on their learning experience and the applied digital pedagogy during the COVID 19 Pandemic.

This research contributes to educators, policymakers, and practitioners of Higher education to know current issues of E-learning practices and features in developing countries, such as Nepal, India, Pakistan, and Sri Lanka. This study will also be valuable to the educators of different educational institutions to improve their current digital learning model and the quality of E-learning in Nepal.

METHODS

The quantitative research method was applied to answer the research questions. Data concerning the E-learning (digital learning) experience and attitude of students in Nepalese Higher education during the Covid-19 Pandemic were collected by a self-administrated online survey. The use of the survey made it possible to discover the E-learning practice in Higher education in Nepal and the factors that influence the quality of existing digital pedagogy based on students' experience.

Participants

Full-time students in Higher education institutes in Province 3 and 4 in Nepal were invited to participate in the current research. Only the students who have attended compulsory online courses at Higher educational institutes in the first semesters of the academic year (2020-2021) were legitimated for research participation. In total, 600 students joined the online survey, and eventually, 459 high education students completed the questionnaire. The participants were selected from the Higher-level students who have enrolled in Management, Humanity, Science, and Engineering Faculties. The successful response rate was 76.5%. The sample consisted of 44% male (202) and 56% female (257). The age breakdown of the respondents was 6.3% between 18-20 years old, 86.1% between 21-24 years old, and 7.6% above 30 years old. About 7.4 % of students from government institutions (n = 34) and 92.6 % (n = 425) students from the private institutions have participated in this study. The majority of students were enrolling in the Bachelor's level (92.8%; n = 425). Only 33 students (7.2%) were studying at the Master's level. Higher percentages of female students (56%, n = 257) participated in this research compared to male students (44%, n = 202).

Procedure

A self-administered questionnaire about the compulsory online learning experience of Higher education students was made by Google Form application (<https://docs.google.com/forms>). The invitation for the participation was circulated through e-mail, Facebook messenger, Viber, WhatsApp, Twitter, and Instagram by different stakeholders of colleges, campuses, and universities – including teachers, institutions' representatives, students, and educators. The survey link was accessible only through students' study institutions (college, campus, and university). This survey questionnaire was posted online in the second week of August 2020. The access to the

survey was closed when the desired number of participants (600) was reached, which happened within six weeks of posting the survey in the last week of September 2020. The online survey was applied in both Nepali and English languages (see Appendix 3) and the participants could choose the version based on their language preference.

Measures

The survey questionnaire measured the opinions and attitudes of students of Higher-level educational institutions in Nepal. The survey instrument had more than fifteen ($n = 15$) variables assessing four components underlying system quality (Hardware and software), content quality, service quality, instructors' attitude, and learners' perspective, which are examples of the four domains of this study. These components were assessed on a 5-point Likert scale (i.e., strongly disagree, disagree, I do not know, agree, and strongly agree). The survey instrument consisted of demographic information which measured the following: the students' attitudes and opinions of their enjoyment of current online class teaching methods, severe impact of COVID-19 on their study, their satisfaction with the facilities of the currently practiced online teaching methods, the effect of the pandemic on their future educational development, and their current practices of digital pedagogy with the opinions of Yes, and no (see Appendix 3). We also asked the participants to choose the languages they use when communicating with their friends, neighbours, and family members on a 5-point Likert scale. We assessed participants using twenty-five items (Cronbach's $\text{Alpha} \geq 0.65$). These items were administered from the literature of digital pedagogy.

The survey questionnaire measured the opinions and attitudes of students of the Higher-level educational institutions in Nepal. The survey instrument has twenty-five items (Cronbach's $\text{Alpha} \geq 0.65$) assessing four components underlying system quality (Hardware and software), content quality, service quality, and learners' perspective on a 5-point Likert scale of statements related to students' online learning experiences (i.e., strongly disagree, disagree, I do not know, agree, and strongly agree). For example, "What is your experience and opinions for the features of the existing practices of digital learning pedagogy in Higher education institutions in Nepal?" and "What is your experience and opinions on the impact of the existing digital learning education in Higher education institutions?". These items were administered from the literature of digital pedagogy (e.g. Ozkan and Koseler, 2009).

The survey instrument consists of demographic information which measured the students' attitudes and opinions of their enjoyment of current online class teaching methods, severe impact of COVID 19 on their study, their satisfaction with the facilities of the currently practiced online teaching methods, the effect of the Pandemic for their future educational development and their current practices of digital pedagogy with the opinions of yes and no (see Appendix 3). We also asked the participants to choose the languages they use when communicating with their friends, neighbours, and family members on a 5-point Likert scale.

A pilot study of the survey questionnaire has conducted the instrument's reliability. The participants in the pilot study were carefully considered during this research. The instrument also examines the phenomenon other items match to what the authors intend to measure, which has ensured the instrument's validity. Age, sex, and educational levels were analyzed to understand their attitudes and opinions for the different online facilities learning features. The mean scores were used to examine the students' experience with currently practiced online learning methods and their satisfaction. Higher mean scores indicate a higher level of students' satisfaction, and lower mean scores indicate a lower level of students' satisfaction. The crisis management educational strategy in the COVID-19 pandemic, students' motivation in digital pedagogy, quality of digital pedagogy, and standard digital pedagogy features have measured the significant association between independent and dependent variables.

Analysis

The purpose of this study was to understand and explore the experiences of Higher-level students enrolled in Management, Humanity, Engineering, and Science to understand their experiences with how their digital pedagogy practices and features of digital pedagogy were facilitated for their online courses, as well as the perceived features of the digital pedagogy, and their satisfaction with the features of digital pedagogy during the pandemic. Principal Component Analysis (PCA) was used to examine students' experiences concerning digital pedagogy features due to its twofold nature. PCA reduces the dimensionality of the dataset by taking the dimensions that encode the most important information and removing the dimensions that encode the least important information. By reducing the number of dimensions, the data utilizes less space, thus allowing classification on larger datasets in less time. Further, by taking only the salient dimensions, PCA

projects the dataset onto dimensions that hold the most meaning, thus drawing out patterns in the dataset (Cohen, Manion, and Morrison 2018).

Binary Logistic Regression analysis has been applied to predict the probability of occurrence of a dependent variable (student satisfaction with E-learning pedagogy) given the values of Independent variables (four factors model of digital learning) (Creswell & Tashakkori, 2007; Cohen et al. 2007), and as to the satisfaction of the students, are you satisfied with digital teaching model was judged as the independent variable. Yes, was judged as “0” and No was judged as “1” in the Binary Linear Regression Model. Research questions, measurement scales, and subscales are tabulated.

Ethical considerations

This research is taken place and consisted out of an online survey with students in Nepalese Higher education. It is objected to protecting the student participants, making this study manageable and achievable, and fulfilling the research aims by minimizing the errors of the research processes and for the good governance of the educational research (Glass, 2013; Comstock, 2013; Creswell 2008). According to Roberts and Allen (2015), students in educational institutes should be considered as members of a “vulnerable” population due to the complexities resulting from the sensitivities within educational contexts. Therefore, extra care should be taken to minimize risk and adverse consequences, should students choose not to participate or withdraw consent before a study’s completion. To limit possible harm, this research has been established to ensure the participants’ anonymity by avoiding collecting personal data that could be traceable and the emotionally triggering content. Protentional participants were provided with an informative consent form in both English and Nepali language to collect the rich data. Only those with consent were able to enrol in the online survey and can withdraw from the survey any time without giving reasons (Morrow and Richards 1996; Khoo & Lantos 2020). The research design is approved and supervised by the research committee of Oxford College of Engineering and Management, Gairidkot, Nawalparasi of Nepal.

RESULTS

Descriptive statistics results

The PCA resulted in four subscales, i.e. crisis management educational strategy, students' motivation in digital pedagogy, the impact of the pandemic on students' mental health, and benefits of digital pedagogy. The results indicate that a higher number of students answered that they were satisfied with the current online classes model (58.2%, $n = 267$) compared with the students who chose not satisfied (41.8%, $n = 192$). The results further confirm that the mean score for the male students ($n = 202$) on the first subscale, *temporary educational strategy*, during COVID-19 ($M = 2.79$, $SD = 0.891$) was statistically significantly [$t(424.91) = -3.615$, $p = .001$] lower than the female students ($n = 257$) for the same variable ($M = 3.09$, $SD = 0.862$) (see Appendix B). The results further indicate that the first subscale (3.17) has the highest mean value compared to the lowest mean value of the third subscale (2.69). Similarly, the fourth subscale has a greater mean value (3.02) than the second subscale (2.97). The Alpha values of each subscale are greater than 0.71 (see Table 1). Four hundred and fifty-nine ($n = 459$) students completed the questionnaire and shared their learning experiences of the digital pedagogy during the COVID-19 pandemic. The results showed how the COVID-19 pandemic commonly impacted students' learning experience. Among the participants, the most commonly used digital tool for the online course among respondents was Microsoft Teams (51.7%). Simultaneously, approximately 26.4% of respondents used Zoom Virtual while 18.8% of them used Tim Virtual. Few respondents used Google Meet (1.2%) and Messenger (0.07%). Only a small percentage of students (0.03%) went to Higher educational institutions to get their assignments individually during the COVID-19 pandemic.

The characteristics of Higher-level institutions are the government and private where the greater number of participants ($n = 425$, 92.6%) were from private Higher-level institutions compared with government Higher-level institutions ($n = 34$, 7.2%). The results show that 50.5% of students were involved in online classes from the same location of the Higher-level institutions, and 49.5% of students were participated in online classes from different locations of the Higher-level institutions, indicating that 49.5% of students of Higher-level institutions had enrolled from other locations rather than the institutions' locations.

Principal Component Analysis (PCA) was used to examine students' experiences concerning digital pedagogy features (four factors) due to its twofold nature. Four factors were derived from the variables of the questionnaire. The first factor covers strategy to retain existing students, loading (3.14), the strategy of receiving fees, loading (2.90), way of publication, loading (2.79), online procedural method, loading (3.14), only procedural activities, loading (3.25) and only considering government direction (3.10). Similarly, the second factor covers the best teaching method during the pandemic, loading (4.00), an effective online education method, loading (3.42), the last teaching method in the pandemic, loading (3.93), and the contemporary way of instruction during the pandemic, loading (3.71). The third factor covers online classes creating frustration, loading (2.58), depression, loading (2.13), and tension, loading (2.74). Finally, the fourth factor covers students eager to get online education, loading (3.21), easily time passed, loading (3.54), effective online classes, loading (3.26), all students have online access, loading (2.46) and parents have knowledge of E-learning, loading (2.10). Even though all students participate in current online education, this education method has created inequalities among students (see Table 1). Furthermore, four principal components (PCs) have been extracted from the Principal Component Analysis namely, *a crisis management educational strategy during COVID-19 (six variables)*, *students' motivation to digital pedagogy (four variables)*, *the impact of the pandemic on students' mental health (three variable)*, and *benefits of digital pedagogy concerning their satisfaction (five variables)* (see Appendix 1). The analysis indicates that students' satisfaction with the crisis management educational strategy in COVID-19 and students' digital pedagogical experience were the first and second PCs as the first and second scale variables (see Table 1). Both variables account for 49.86 % of the total variance explained, and the first PC accounts for a higher percentage of total variance explained (26.88%) than the second PC's total variance (19.99%). Again, the third PC (see Table 1), *the impact of the pandemic on student mental health*, and the fourth PC (see Table 1), *benefits of digital pedagogy*, were the other two PCs, which account for 54% of the total variance. The third PC accounts for a higher percentage of the total variance explained (34%) than the fourth PC (20%). The results are concluded in Table 1.

Table 1. Mean, standard deviation (SD), and Cronbach's Alpha of the subscales of Principal Component Analysis for the impact of COVID-19 on students learning experience (N = 459)

Name of the subscales	Mean	SD	Alpha values
SV ¹ = Crisis management educational strategy	3.17	.904	0.70
SV ² =Students' motivation in digital pedagogy	2.97	.872	0.70
SV ³ =Impact of pandemic on student mental health	2.69	.737	0.82
SV ⁴ =Benefits of digital pedagogy	3.02	.799	0.71

The first subscale has the highest mean value (3.17) compared with the lowest mean value (3.03) of the fourth subscale, indicating that students were neither satisfied nor dissatisfied with the first and second subscales for online courses in different Higher educational institutions in Nepal (see Table 1). The mean values of the second and third subscales were lower than the average mean value ($2.97 \text{ \& } 2.69 < 3$), indicating that students were not satisfied with the existing digital pedagogy of online courses in corresponding Higher educational institutions (see Table 1).

The impact of COVID-19 on students' E-learning

After adding the data into SPSS, the second step was to conduct a multicollinearity test to understand *the impact of COVID-19 on the service quality, content quality, and features of digital pedagogy on students' experiences in online courses in Higher-level education institutions*. For this linear regression, as mentioned in tolerance and VIF (see Table 1) should be verified. The results show that both tests validated the variables since all tolerance values are greater than 0.1 and VIF values are lower than 10 (see Appendix A Table 2). Thus, the analysis can proceed. As previously mentioned, all independent variables were inserted in a single block due to this research's exploratory character. It is worth highlighting that only Block zero and Block 1 was generated because a single block was run.

Table 2. Summary table of block 1 models

Models	Chi-square	df	Sig.	Cox and Snell's R square	Nagelkerke's R square	-2Log -likelihood
Omnibus T test results	130.210	4	.000			467.002
Model summary results				258	.346	
Hosmer and Lemeshow test results	3.140	8	.925			

Thus, the analysis presented focuses on Block 1 results. As shown in Table 2, the Chi-square test's significance values were all lower than 0.05, indicating that the model with independent variables was better than the model with no independent variables (Block 0). The second item to verify was the -2 Log-likelihood (overall model fit). It was useful to compare different models and identify which model better explains the information. This comparison cannot be made since this study analyses a single model; Nagelkerke's R Square value shows that its effect size is 34.60% (see Table 2). As stated by Chapman (2017), Nagelkerke's R Square adjusted Cox and Snell's calculus to enable the value to theoretically reach 1; therefore, Nagelkerke's R Square is always greater than Cox and Snell's. It is the reason for considering Nagelkerke's R Square value in this research. In Hosmer and Lemeshow Test, the significance was higher than 0.05, indicating that the model properly fits the data (see Table 2). The results of the classification table show that it is possible to observe that the model correctly classified 69% of the 459 cases. It is especially interesting when compared with the rate from Block zero, in which no variable was considered. This rate was 58.3% in Block zero, which shows that the validated variables positively impact the model since Block 1 correctly classifies a higher percentage of the 459 cases. Through the analysis of Table 2, it was possible to verify that all variables were validated by Wald's test (significance lower than 0.05) from all variables analyzed. The results indicate that it was possible to analyze the variables' impact on the model's odds. Thus, according to the model generated, [$V^1 =$ *Crisis management educational strategy*, $V^2 =$ *Students' motivation in digital pedagogy*, $V^3 =$ *Impact of pandemic on student mental health*, and $V^4 =$ *Benefits of digital pedagogy*] for Higher-level students' satisfaction on digital pedagogy's learning experiences, the students' own beliefs lead to *crisis management educational strategy* positively influencing their engagement in digital pedagogy of online courses, showing the value of an odds ratio was 1.513 smaller than students whose beliefs lead to the impact of the pandemic on students' mental health during online classes (2.023) (see Table 3). The odds to engage in *students' digital pedagogical motivation* to online courses agree that their beliefs negatively lead to students' digital pedagogical motivation, showing the odds ratio was 0.627 greater than students whose beliefs lead to *students' digital pedagogical experience* on benefits of digital pedagogy (.516) (see Table 3).

Table 3 Binary logistic model Binary logistic regression model to predict the impact of COVID 19 on students' learning experiences by the factors associated with the students' satisfaction with digital pedagogy (N=459)

Independent variables	B	S.E	Wald	df	Sig	Exp(B).	95% C.I. for Exp(B)	
							Lower	Upper
Crisis management educational strategy	.414	.129	10.365	1	.001	1.513	1.176	1.946
Students' motivation of digital pedagogy	-.467	.134	12.229	1	.001	.627	.483	.814
Impact of pandemic on student mental health	.705	.124	32.339	1	.001	2.023	1.587	1.580
Benefits of digital pedagogy	-.662	.131	24.445	1	.001	.516	.399	.667
Constant	-.334	.114	8.620	1	.003	.716		

Results of Chi-Square Test between students' gender and the impact of COVID-19 for the future educational development during COVID-19

Table 4. Chi-square and one-way ANOVA between gender and students' future development.

	Model = Chi-square			Model = One-way ANOVA				
	Value	df	Asymptotic Significance (2-sided)	Mean	Mean square Between Groups	Mean square Within Groups	F	Sig.
Pearson Chi-Square	7.711a	2	.021					
Likelihood Ratio	7.679	2	0.22	Male = 127	1.721	222	7.769	.006
Linear-by-Linear Association	7.765	1	.006	Female = 1.14				
N of Valid Cases	459							

H₀ There is no difference between students' gender and the impact of COVID 19 on their future educational development.

H₁ There is a difference between students' gender and the impact of COVID 19 on their future educational development.

The results indicate that the value of Chi-Square is 7.711 and the significant associated value is $.021 < 0.05$, indicating that the null hypothesis is rejected (see Table 4). We accept the null hypothesis that there is a gender difference in the mean percentage of the impact of COVID-19 on students' future educational development (see Table 4). This present study supports the previous research of Xiong et al. (2022), who found that demographic changes and shifting students' characteristics, such as their gender and preferences, were influential in impacting students' online class experiences via digital pedagogy. The results show that the F value is equal to 7.769 and its associated p-value is reported as .006, indicating the probability of the observed value is happening by chance. The results further show that the difference between the means of two groups (categories) of gender is significant. Thus, we accept the null hypothesis and say that there is the

difference in the mean Percentage of the impact of COVID 19 on students' future development across gender (see Table 4).

DISCUSSION

This study applied the six-factor model of digital pedagogy (Ozkan and Koseler, 2009) as the theoretical framework to examine the impact of COVID-19 on Higher education students' digital learning experiences. For the analyzed sample, only four variables that are related to the learners' experience were validated as determinants. It does not mean that the other motives were not present in reality, but they were not under our analysis. The purpose of this research was to examine how Higher-level students might predict their likelihood of being involved in virtual learning. This study used cross-sectional survey data gathered on 459 Higher-level students. A Binary Logistic Regression model was used to examine the impact of the COVID 19 pandemic and students' motivation on E-learning pedagogy. The binary model was verified for all reasons, which differentiated the experience of the satisfied and dissatisfied students with Higher-level institutions' digital E-learning pedagogy practices. Results from the study confirmed that a crisis management educational strategy during COVID-19, students' motivation to digital pedagogy, the impact of the pandemic on students' mental health, and benefits of digital pedagogy concerning student's satisfaction were significant predictors of students' motivation during COVID 19 pandemic. The research findings provide a foundation for continued research, as well as a framework for understanding how pandemics may influence Higher-level students' motivation to E-learning pedagogy in Nepal. The study identified a need for educators to understand the perceptions of Higher-level students on crisis management educational strategy, students' motivation to digital pedagogy, the impact of the pandemic on students' mental health, and the benefits of digital pedagogy have significant on students' motivation to E-learning pedagogy. Results from this study offer explicit recommendations and guidance to educational institutions for making guarantees how to improve students' motivation to E-learning pedagogy; it is one of a small number of studies in educational contexts to provide such guidance for students' engagement in E-learning pedagogy. (see Table 3). The current results have supported the previous study of Shamsudin and Abdul Majid (2019) and Papp-Dank (2019), who found that the digital pedagogy's currently used crisis management strategy was positively correlated with Higher-level students'

satisfaction with online learning activities during the pandemic. The results further supported the previous study of Hanaee and Rashidi (2020) and Crawford et al. (2020), who found that the Higher education providers have applied short-term strategies for rapid curriculum revision and redevelopment for fully digital offerings, they found that students' satisfaction in online learning activities via digital pedagogy was found satisfactory.

Further, digital modality should cover the different dimensions of students' online learning activities, consequently leading to different improvement strategies which can ultimately contribute to the promotion of the quality of digital pedagogy and the success of E-learning initiatives in Higher-level education institutions. Importantly, Higher-level students were found unsatisfactory with the current digital learning courses compared with lower-level students, indicating that the current virtual modality did not fulfil all online facilities (Crawford et al. 2020). Students at the Higher education level have identified four main issues regarding online courses during the pandemic as Khatri and Bhatta (2020) found in our literature section. These all issues have been created inequality in education in Nepal.

The results show that there was a statistically significant relationship between students' satisfaction in online learning activities via digital pedagogy and their motivation in digital pedagogical modality, indicating that students' motivation in digital pedagogy has a negative impact on students' satisfaction with currently applied digital pedagogy of online courses (see Table 3). The current study has further supported the previous study of Azlan et al. (2020, 10-16), who highlighted that students who experienced that digital pedagogy was challenging to focus on curriculum content quality because of distractions, lack of engagement, and mental stress. They also shared that digital pedagogy's quality had technical problems, for example, poor internet connectivity and limited data plans, which also compounded the problem during online courses. The current study has also supported the previous study of Ivanytska and Kern (2015, 22-26), who found that low quality of digital pedagogy hindered students' learning opportunities, creating demotivation and dissatisfaction among students during the pandemic.

Our results indicate that there was a statistically significant relationship between the impact on pandemic on students' mental health and students' satisfaction in learning activities with the digital pedagogy during the COVID-19 pandemic, indicating that there is a positive relationship between

the impact of the pandemic on students' mental health and students' satisfaction with current practices of learning activities via digital pedagogy. This current study supports the previous study of Hyun et al. (2019), who found that high quality of learning activities via digital pedagogy had decreased students' mental stress with their individual and group learning processes.

Together, this current study suggests a statistically significant relationship between benefits of the digital pedagogy and students' satisfaction with the existing digital learning courses during the COVID-19 pandemic, indicating that there is a negative relationship between benefits of digital pedagogy and students' satisfaction with current practices of online classes in their respective institutions. The result has supported the previous studies of Shehzadi et al. (2020) and Kanojiya (2020), who found that standard features of ICT, e-service, and e-information, low features and untimely interaction between student and professors, availability of poor technical support, unstructured online class modules, and poor conduction of practical classes negatively contributed toward students' satisfaction. The regression model summary indicates a negative correlation between the currently practiced digital learning pedagogical model and students' learning experience for their online learning satisfaction among Higher-level students in Nepal. Our results have supported the previous study of Miller (2021), who suggests that a Higher-educational institution can implement a crisis management strategy successfully is also contingent on a campus community's ability to be familiar with a strategy and its various parts, indicating that campus investors have to regularly review and practice the strategy something that even though considered significant is often ignored. We can argue that majority of Higher-educational leaders sent their students to campus learning due to the lack of stored crisis management plan. Very limited Higher-level institutions might have decided to implement crisis management plans who had already faced such type of crisis before (Miller, 2021). Our investigation highlights that Higher-level educational institutions need to improve the current features of digital learning to satisfy our students in a developing country, such as technological devices of E-learning, instructors' strong skills to deliver E-learning courses, interactive E-learning classes, and understanding the problems of students during E-learning courses (Khatai and Bhatta 2020). We also highlight that the quality of E-learning motivates students in Higher-level students because E-learning is an element that affects students' motivation (Harandi, 2015).

Our investigation found that Private Higher education in Nepal has grown in size over the last two decades and exceeded public higher education. For example, Kathmandu University, a private university and has received large financial support from the government. The per-student University Grants Commission funding for Kathmandu University is more than the per capita grant given to the public colleges, affiliated with Tribhuvan University. Thus, while public institutions have got a poor number of students, private institutions have enrolled a large number of students. Private educational institutions have also served the middle and rich level classes that have attracted students to private educational institutions in Nepal. Our results also found that most of the private educational institutions had launched online classes in Nepal compared with public colleges. The reasons behind that would be the higher quality of education, different digital facilities, less bureaucratic enrollment processes, fewer students' union activities during the classes, parents' motivation to private educational institutions, and student's choice. Notably, private institutions have high fees structures compared with public colleges, however; students choose private colleges rather than public colleges. The present situation of public colleges is degrading in both quality and number of student's enrollment (Nikku, 2013). Our results also found that there were more facilities of E-learning classes in private institutions than the public institutions.

CONCLUSION AND RECOMMENDATION

This article aimed to analyze students' learning experiences via digital pedagogy during the pandemic to participate in voluntary activities using Higher-level education students' samples. It enabled the verification of what motives determine the learning activities in digital pedagogy participation via binary regression model. This study's primary purpose was to investigate the impact of COVID-19 on students' learning experience on digital pedagogy at Higher-level educational institutions in Nepal. The results show that the student's own beliefs lead to learning activities in digital pedagogy influencing their engagement in online classes. In addition to the relevance of students' beliefs and values, this study's findings showed the relevant role of temporary educational strategy, students' experience in digital pedagogy, quality of digital pedagogy, and standard digital pedagogy features in motivating students to engage in digital learning activities.

Higher-level institutions have several strategies to motivate their students through the quality and features of digital pedagogy. According to Higher-level educational institutions, there are several ways to engage students for each of these options, standard features, facilities, and digital pedagogy quality. From the findings of this study, it is possible to verify the relevance of online classes' digital pedagogical modality during the pandemic. Therefore, the need for quality, facilities and digital pedagogy support in Higher-level students to perform different online learning activities during the pandemic is mandatory for future research in the Nepalese context. Future professional educators should prepare to work towards support, ease, and accessibility to all students by considering the quality, facilities, and features of digital pedagogy (Khati and Bhatta 2020; Nguyen and Huynh 2020; Patrinos and Shmis 2020; UNESCO 2020).

Additionally, as highlighted by Adnan (2020, 45-51), few studies address this article's theme in developing countries, like Nepal. In this sense, this study contributes to the literature, providing evidence from Nepalese reality and enriching cross-country debates. This study's limitations must be highlighted. For example, the research data for this study were collected in Nepal and analyzed in the Nepalese context; thus, the findings will not be similar in developed countries. However, the sample size allowed for a binary regression model, providing interesting results to contribute to the literature. Regarding theoretical limitations, it should be cited that this analysis focused on quality, facilities, and features of digital pedagogy of online courses in the literature. The existence of other components of digital pedagogy is not under analysis.

Nonetheless, an extensive search in the literature was performed to ensure the quality of this research. Studying the current reality of Nepalese digital pedagogy of online courses regarding students' satisfaction provides opportunities for leaders of Higher-level education institutions to improve online courses' digital pedagogical modality based on this analysis. This analysis would enhance the facilities, quality, and features of Nepalese digital pedagogy of online courses possibilities and proposals for international debates regarding current digital pedagogy practices in Higher-level education institutions. An analysis of the features regarding advanced and fully equipped digital pedagogy model, future researchers have to conduct more extensive studies to address the current demands of the fully equipped digital pedagogical model.

The results confirm a gender difference between the study sample and their opinion on the impact of COVID-19 on their future development. The results show the severe effects of COVID-19 on students' learning outcomes at Higher-level educational institutions in Nepal. A modern digital modality needs to be discovered and implemented in Nepal's private and Government Higher educational institutions.

In this context, the digital learning environment's foundation must be improved in Nepalese higher-level educational institutions and manage equipped digital pedagogy. Minimal educational institutions have moved to strengthen the digital modality as online courses. Still, they need to formulate and implement the new educational policy for the compulsory digital modality at each Higher-level educational institution to meet digital pedagogy's international standards in Higher-level education institutions (Adnan 2020, 45-51). Three levels of the Government of Nepal and private sector educators have to investigate a large amount of annual budget to improve the foundation of internet facilities' infrastructure to give all Higher-level education students access to online classes.

This study revealed students' experience with digital pedagogy features, perceived satisfaction of the online class motivation, and how the digital pedagogy facilitated online classes for Higher-level students. Participants' experience with digital pedagogy for online courses was negative and did not prepare them for their future career development. These experiences led to information that may be used to assist with students' satisfaction with the features of digital pedagogy. Finally, the Nepalese government has to restructure its public colleges to compete with private colleges so that the impact of the crisis on students' E-learning motivation can be enhanced in public colleges. Future studies have to focus on E-learning motivation in public colleges students and the possible challenges faced by students.

REFERENCES

- Adnan, M. (2020). Online learning amid the COVID-19 Pandemic: Students perspectives. *Journal of Pedagogical Research*, 1(2), 45–51.
- Al-Busaidi, K., & Al-Shihi, H. (2010). Instructors' Acceptance of Learning Management Systems: A Theoretical Framework. *Communications of the IBIMA*, 1–10. Retrieved from <https://doi.org/10.5171/2010.862128>. Accessed on 12 – 08 – 2020 ...
- AL-Farsi, F., & Basahel, A. (2014). Sequence of electronic service quality on customer satisfaction. *International Journal for Innovation Education and Research*, 2(3), 10–24.
- Azlan, C.A., Wong J.H.D., Tan, L.K, Huri, A.D., (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. Retrieved from <https://doi.org/10.1016/j.ejmp.2020.10.002>. Accessed on September 24, 2020;
- Azzi-Huck, K. & Shmis, T. (2020). Managing the impact of COVID-19 on education systems around the world: How countries are preparing, coping, and planning for recovery. Retrieved from: <https://blogs.worldbank.org/education/managing-impact-COVID-19>. Accessed on November 24, 2020;
- Borra, M. (2020). Encuesta de CSIF. Un 93% de docentes sufre desgaste emocionalmente esters por el confinamiento. CSIF. Retrieved from <https://www.csif.es/contenido/nacional/general/297367>. Accessed on December 14, 2020;
- Chamber of Commerce & Industry -Chitwan, N. (2019). Chitwan at a glance. Chitwan CCI. Retrieved from <https://www.ccichitwan.org.np/index.php/welcome-to-chitwan/chitwan-at-a-glance>; Accessed on November 12, 2020.
- Chitwan District Education Office. (2017). Name lists of headteachers of community schools in Chitwan district. Retrieved from Www.Deochitwan.Gov.Np; Accessed on 12-08-2020.
- Chu, A., Biancarelli, D., Drainoni, M.-L., Liu, J. H., Schneider, J. I., Sullivan, R., & Sheng, A. Y. (2019). Usability of Learning Moment: Features of an E-learning Tool That Maximize Adoption by Students. *The Western Journal of Emergency Medicine*, 21(1), 78–84.
- Dhital, H. (2018). Opportunities and Challenges to Use ICT in Government School Education of Nepal. *International Journal of Innovative Research in Computer and Communication Engineering*, 6(4), 2–7.

- Edusanjal. (2019). Colleges in Chitwan Retrieved from <https://edusanjal.com/college/filter>;
Accessed on 12-08-2020.
- Espino-Díaz, L., Fernandez-Caminero, G., Hernandez-Lloret, C.-M., Gonzalez-Gonzalez, H., & Alvarez-Castillo, J.-L. (2020). Analyzing the Impact of COVID-19 on Education Professionals. Toward a Paradigm Shift: ICT and Neuroeducation as a Binomial of Action. *Sustainability*, 12(14), 1-10.
- European Centre for Disease Prevention and Control. (2020). The case definition for coronavirus disease (COVID-19). Retrieved from <https://www.ecdc.europa.eu/en/covid-19/surveillance/case-definition>. Accessed on December 12, 2020
- Fay, L. (2020). More than half of students are not tuning in to online classes. Informal teacher survey shows | LA School Report. *Laschoolreport.com*. Retrieved from <http://laschoolreport.com/more-than-half-of-students-are-not-tuning-in-to-online-classes-informal-teacher-survey-shows/>. Accessed on December 25, 2020
- Harandi, S. R. (2015). Effects of E-learning on Students' Motivation. *Procedia - Social and Behavioral Sciences*, 181, 423–430. Retrieved from <https://doi.org/10.1016/j.sbspro.2015.04.905>. Accessed on December 26, 2020
- Hong, K. S., Lai, K. W., & Holton, D. (2003). Students' satisfaction and perceived learning with web-based courses. *Educational Technology and Society*, 6(1), 116–124
- Ivanytska, N., & Kern, M. (2015). Features of online learning in Austria. *Information Technologies and Learning Tools*, 46(2), 22-26.
- Kaplan-Leiserson, E. (2000). Learning Circuits E-learning Glossary. Retrieved from citeseerx.ist.psu.edu. <http://citeseerx.ist.psu.edu>. Accessed on December 28, 2020
- Kedra, K., & Kaltsidis, C. (2020). Effects of The Covid-19 Pandemic on University Pedagogy: Students' Experiences and Considerations. *European Journal of Education Studies*, 7(8). Retrieved from <https://doi.org/10.46827/ejes.v7i8.3176>. Accessed on December 29, 2020
- Khatri, K., & Bhatta, K. (2020). Challenges of Online Education during COVID-19 Pandemic in Nepal. *International Journal of Entrepreneurship and Economic Issues*, 4(1), 45–49.
- Lamichhane, A. (2020, May 15). Effects of COVID-19 Pandemic in Daily Life of Nepalese People. *Public Health Update*. Retrieved from <https://publichealthupdate.com/effects-of-covid-19-pandemic-in-daily-life-of-nepalese-people>. Accessed on April 25, 2020

- Levy, Y. (2008). An empirical development of critical value factors (CVF) of online learning activities: An application of activity theory and cognitive value theory. *Computers & Education*, 51(4), 1664–1675.
- Lewin, C., Cranmer, S., & McNicol, S. (2018). Developing digital pedagogy through learning design: An activity theory perspective. *British Journal of Educational Technology*, 49(6), 1131–1144.
- Mahato, P., Tamang, P., Simkhada, P., Shahi, P., Teijlingen, E. van, Aryal, N., & Regmi, P. (2020). Effects of COVID-19 during the lockdown in Nepal. *European Journal of Medical Sciences*, 2(2). Retrieved from <https://doi.org/10.46405/ejms.v2i2.91>. Accessed on January 3, 2021
- Md Shamsudin, N., & Abdul Majid, F. (2019). A framework of Virtual Reality learning system for teacher's trainee programme at Malaysian higher education / Nurshamshida Md Shamsudin and Faizah Abdul Majid. *ESTEEM Journal of Social Sciences and Humanities*, 3(3), pp. 19–28.
- Miller, M. T. (2021). Do learning organizations learn? Higher education institutions and pandemic response strategies. *The Learning Organization*, ahead-of-print(ahead-of-print). Retrieved from <https://doi.org/10.1108/tlo-09-2020-0159>. Accessed on May 25, 2020
- Nawaz, A., & Zubair Khan, M. (2012). Issues of Technical Support for E-learning Systems in Higher education Institutions. *International Journal of Modern Education and Computer Science*, 4(2), 38–44. Retrieved from <https://doi.org/10.5815/ijmecs.2012.02.06>. Accessed on March 25, 2020
- Nguyen, T., & Huynh, N. (2020). Impact of the Covid-19 pandemic Outbreak on the Online Learning Process. Retrieved from www.Theseus.Fi. <https://www.theseus.fi>. Accessed on December 27, 2020
- Nikku, B. R. (2013). Nepal: Public vs. Private? *International Higher Education*, 70, 16–18. Retrieved from <https://doi.org/10.6017/ihe.2013.70.8709>. Accessed on 20th October 2021.
- Ozkan, S., & Koseler, R. (2009). Multi-dimensional students' evaluation of E-learning systems in the Higher education context: An empirical investigation. *Computers & Education*, 53(4), 1285–1296.

- Patrinou, H. A., & Shmis, T. (2020). Can technology help mitigate the impact of COVID-19 on education systems in Europe and Central Asia? Retrieved from <https://blogs.worldbank.org/europeandcentralasia/can-technology-help-mitigate-impact-covid-19-education-systems-europe>. Accessed on October 24, 2020
- Piccoli, G., Ahmad, R., & Ives, B. (2001). Web-Based Virtual Learning Environments: A Research Framework and a Preliminary Assessment of Effectiveness in Basic IT Skills Training. *MIS Quarterly*, 25(4), 401.
- Putten, L. van. (2021). Digital education: what's working well, and what can we improve? Leiden University. Retrieved from <https://www.universiteitleiden.nl/en/news/2021/02/digital-education-whats-working-well-and-what-can-we-improve>. Accessed on November 12, 2020
- Schillewaert, N., Ahearne, M. J., Frambach, R. T., & Moenaert, R. K. (2005). The adoption of information technology in the sales force. *Industrial Marketing Management*, 34(4), 323–336.
- UNESCO (2020): COVID-19: Impact on Education. UNESCO; Retrieved from <https://en.unesco.org/covid19/educationresponse>. Accessed on November 16, 2020
- Usoro, A., & Abid, A. (2008). Conceptualizing Quality E-learning in Higher education. *E-learning and Digital Media*, 5(1), 75–88.
- Vaidya, A., Simkhada, P., & Simkhada, B. (2020). The Impact of Federalization on Health Sector in Nepal: New Opportunities and Challenges. *Journal of Nepal Health Research Council*, 17(4), 558–559.
- Vermeer, R. (2001). The Virtual University: The Internet and Resource-based Learning. *Computers & Education*, 37(2), 179–182.
- Visit Nepal. (2020). Chitwan District Information: Chitwan Tourism. www.Chitwantourism.Com. Retrieved from <http://www.chitwantourism.com/articles-and-information>; Accessed on 12-08-2020.
- Volery, T., & Lord, D. (2000). Critical success factors in online education. *The International Journal of Educational Management*, 14(5), 216–223
- Wadjdi, F., & Djamin, Z. (2021). The Relationship between E-Service Quality and Ease of Use on Electronic Customer Relationship Management (E-CRM) Performance Mediating by

- Brand Image. *Asian Journal of Economics, Business, and Accounting*, 9–19. Retrieved from <https://doi.org/10.9734/ajeba/2021/v21i430367> Accessed on March 12, 2020
- Wan, Z., Fang, Y and Neufeld, H. (2007), 'The Role of Information Technology in Technology-Mediated Learning: A review of the past for the future,' *Journal of Information Systems Education*, 18(2), 183-192.
- Wiles, R., Crow, G., Heath, S., & Charles, V. (2008). The Management of Confidentiality and Anonymity in Social Research. *International Journal of Social Research Methodology*, 11(5), 417–428.
- Zainuddin, Z., Shujahat, M., Haruna, H., & Chu, S. K. W. (2020). The role of gamified e-quizzes on student learning and engagement: An interactive gamification solution for a formative assessment system. *Computers & Education*, 145, 103729. Retrieved from <https://doi.org/10.1016/j.compedu.2019.103729>. Accessed on December 25, 2010

APPENDIX 1: Consent Form for Participants to Access Parts in Research

Please complete the portion of the consent form below:

Saraswoti Kendra Nepal assures Dr Basanta Prasad Adhikari and Mr. Sarad Chandra Kafle, who are crucial members of Saraswoti Kendra Nepal members. They are willing to commence their research in Higher education students' educational institutions at Kathmandu, Lalitpur, Bhaktapur, and Chitwan district. We kindly request Higher education students' educational authorities to support Dr Adhikari. Liu and Mr. Kafle conducted this study and solicited students' participation from different High education students' academic institutions, Nepal.

Date: Name of the educational institution
 Name of Faculty:Title and name of faculty head

We are happy to permit you to our organizations. Yes No

Authorized signature:

Seal of educational institutions

Signature of the secretary of SKN

APPENDIX 2

Group Statistics

	Gender	N	Mean	Std. Deviation	Std Error Mean
Sub1	Male	202	2.7913	.89119	.06270
	Female	257	3.0899	.86207	.05377
Sub2	Male	202	2.2731	.86208	.06066
	Female	257	2.2082	.73151	.04563
Sub3	Male	202	3.4604	1.15605	.08134
	Female	257	3.6355	1.11488	.06954
Sub4	Male	202	2.9713	.83824	.05898
	Female	257	2.8222	.78193	.04878

Independent Samples Test (Levene's Test for Equality of Variances; t-test for Equality of Means).

	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
Sub1	.473	.492	-3.629	457	.000	-.29855	.08228	-.46023
			-3.614	424.918	.000	-.29855	.08260	-.46091
Sub2	2.922	.088	.872	457	.383	.06493	.07443	-.08134
			.855	393.843	.393	.06493	.07590	-.08429
Sub3	.561	.454	-1.644	457	.101	-.17514	.10655	-.38453
			1.637	424.265	.102	-.17514	.10702	-.38549
Sub4	.473	.492	-3.629	457	.000	-.29855	.08228	-.46023

APPENDIX 3: The survey questionnaire

Please give your thoughts on currently practiced online classes

1. Do you have online access to continue your education? a. Yes, b. No
2. What is the level of your study?
 - a. Bachelor degree
 - b. Master degree
 - c. MPhil/PhD
3. Tick the type of your educational institution
 - a. Government b. Private
4. Please mention our gender
 - a. Male b. Female c. Other
4. What is your age?
 - a. 18-20 years b. 21-24 years c. 25 years above
5. Are you in the same place where you study?
6. A. Yes, b. N
7. What types of internet facilities are you using for your online class?

1 = Mobile data. 2. Sharing from others 3. Internet support of relatives/friends' house 4. self-house internet available 4. Others
8. What apps are you using in your online class?
 - a. Zoom virtual
 - b. Messenger
 - c. Tim virtual tool
 - d. Google met
 - e. Microsoft team
 - f. Teacher community support learning
 - g. Institutional visit assessment learning

Students' experiences on digital learning

- 13a Online course is an only procedural activity
- 13b. Online class has created tension for me. You can choose more than one options
- 13c. Online class is a strategy to retain existing students
- 13d. Online class is a strategy of receiving fees
- 13e. Online course was a way of institutional publication
- 13f. Online course was the only procedural method
- 13g. Online course was an effective method of online education
- 13h. Online course was the best method of teaching during Covid19
- 13i. Online course was an unavoidable way of teaching in Pandemic
- 13j. Running online approach was considering government direction only
- 13k. Online course was a contemporary way of teaching during Pademetic
- 13l. The features of online courses were minimal and low Quality
- 13m. Online classes were not properly structured as well as timely delivered during Pandemic.

Current practices of online education as an alternative method of teaching and its features

- 14a. All students have access to current online education
- 14b. Online education of digital pedagogy has created discrimination among students
- 14c. I am eager to get online classes
- 14d. My parents know about online education
- 14e. Online course has created tension
- 14f. Online class has created frustration
- 14g. Online class has created depression
- 14h. There is vast variation between online courses and face to face school teaching
- 14i. My time during the online class and handed assignments quickly passed.
- 14j. COVID19 has increased my time to watch T.V
- 14k. COVID 19 has improved my skills to use mobile as a teaching tool
- 14l. I have got time to play the outdoor game during the COVID19
- 14m. COVID 19 has increased the distance between students and teachers
- 14n. I am very much worried about my future educational development
- 14o. Online classes via digital pedagogy were not useful.

Measurement variables

- 15a. Do you enjoy current online classes?
 - a. Yes
 - b. No
- 15b. Has COVID19 severely affected your study?
 - a. Yes,
 - b. No
- 15c. Are you satisfied with the facilities of the currently practiced online class?
 - a. Yes,
 - b. No
- 15d. Has COVID 19 affected your future opportunity?
 - a. Yes
 - b. No
- 15e. Are you satisfied with the currently practiced digital teaching pedagogy?
 - a. Yes,
 - b. No