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Graduate Student's Perception on Effectiveness of Virtual Education during Covid-19: Evidence from Structural Equation Modelling in Nepal

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Abstract

Background: The COVID-19 pandemic forced educational institutions worldwide to shift to online learning, disrupting traditional academic calendars. In Nepal, this transition significantly impacted graduate students, raising concerns about the effectiveness of virtual education.

Objective: This study aims to examine the effectiveness of virtual education on student satisfaction and performance during the COVID-19 pandemic among graduate students in the Kathmandu Valley.

Method: Based on the achievement goal theory, 203 graduate students from management colleges in Kathmandu Valley were selected through purposive sampling. Data were collected using a structured questionnaire administered via KOBO Toolbox. Both descriptive and inferential analyses, including Structural Equation Modeling (SEM), were employed to analyze the data.

Result: The findings reveal that while the majority of students showed a positive attitude toward online classes, dissatisfaction arose due to a lack of training and familiarity with new information technologies. The SEM results indicate that course design, prompt feedback, and student expectations significantly influence student satisfaction, which in turn mediates the relationship between these factors and student performance. Challenges such as power outages, difficulty concentrating, lack of access to technology and insufficient instructor knowledge were identified as major obstacles.

Conclusion: Although graduate students in Kathmandu Valley reported a generally positive outlook towards virtual education, several significant challenges need to be addressed to improve the effectiveness of online learning, particularly in terms of instructor quality and technological infrastructure.

Paper Types: Research Paper

Keywords: COVID-19, Virtual Education, Management Student, Effectiveness, Graduate Students Perception

JEL Classification: D83, I20, L86, A23

Introduction

Virtual education is a new concept that is delivered through the use of information and communication technology and can accommodate a large number of pupils at various academic levels (Kim, 2020), where the country unifies through expanded higher education options, standardized curricula, technology-based instructional methodologies, and equal access to higher education (Zhang et al., 2021).

In developed countries, online and virtual schools are anticipated to become more appealing to students and parents whereas virtual schools in Europe may differ from those already operating in other regions of the world due to social, cultural, and historical factors. Moreover, some virtual school sites have restricted access, as instructors don't want random web surfers looking through private areas of their website which insists that there is also a lack of publicly available impartial evaluations and reports on virtual schools (Gutiérrez et al., 2022). Likewise, Asanov et al. (2021) reveals that developing countries will always be at the bottom of the virtual education utilization scale thus, governments can do a lot to help foster an environment that is conducive to virtual higher education. Therefore, partnerships with more developed countries, and increased cross-national collaboration will all aid in the development of virtual education capacity (Lokhtina et al., 2022). Moreover, virtual education has the potential to significantly reduce the knowledge gap while also aiding the growth of underdeveloped countries. Therefore, governments can do a lot to create a hospitable environment for virtual higher education which could help to overcome the access, expensive expense, and lack of flexibility throughout the developing world (Zeide & Nissenbaum, 2018). Nevertheless, expertise gained with virtual training throughout the epidemic has the potential to revolutionize normal education methods around the world (Chatziralli et al., 2021).

Nepal is one of the nations that is in desperate need of contemporary technology to boost remote education quality (Paudel et al., 2018) where the government and higher education institutions are already falling behind in satisfying the rising demand of a new generation that chooses to study online (Pandey et al., 2022). Thus, to address the requirements of a younger generation that prefers online education, Nepal's government must spend more in the development of digital technologies (Pangeni, 2016). Traditional distance education at Nepalese (Higher education institutions) HEIs was text-based, but technology has made it possible to change the open and distance learning (ODL) culture and introduce an inclusive learner model for adaptive suggestion in virtual education to help and aid students with dyslexia or reading issues (Mejia et al., 2017). Some of the studies were carried out in order to have a better understanding of the contextual realities of ODL practices in Nepal to understand more about the contextual realities of open and distance learning (ODL) practices in Nepal (Dawadi et al., 2020) and suggest that college management needs harness modern technologies to improve the quality of distance education by investing more in development of digital technology.

COVID-19 pandemic has affected severely in educational field which is complete disaster. The impact of COVID-19 on the education institution has created considerable challenges, placing immense pressure and hindering their ability to make informed and strategic decisions (Paudel et al., 2021; Adhikari et al., 2023). In Nepal, availability of adequate electronic equipment, public internet centers, and cyber cafes are still lacking. Beside this, there are also few readily available, reasonably priced internet connections. Therefore, academic institutions were shut down for a considerable amount of time during the lockdown, and some of them began to organize alternative methods of instruction as the lockdown lasted longer (Pradhanang et al., 2022). However, there are still several questions unanswered: What is the status of virtual education during COVID-19 in Kathmandu Valley? What are the challenges

and opportunities of virtual education and COVID-19 in Kathmandu Valley? What is the managerial solution for the challenges of virtual education in Kathmandu Valley during COVID-19? Therefore, this study aims to examine effectiveness of virtual education on the satisfaction and performance of the students during COVID-19 pandemic in Kathmandu valley by analysing the possible challenges of virtual education and thus to recommend proper management strategy for effective virtual education.

This study is broken down into five sections: The literature review is covered in Section 2, and research technique is covered in Section 3. The acquired data is presented and analyzed in Section 4. Finally, Section 5 summarizes the findings of this research.

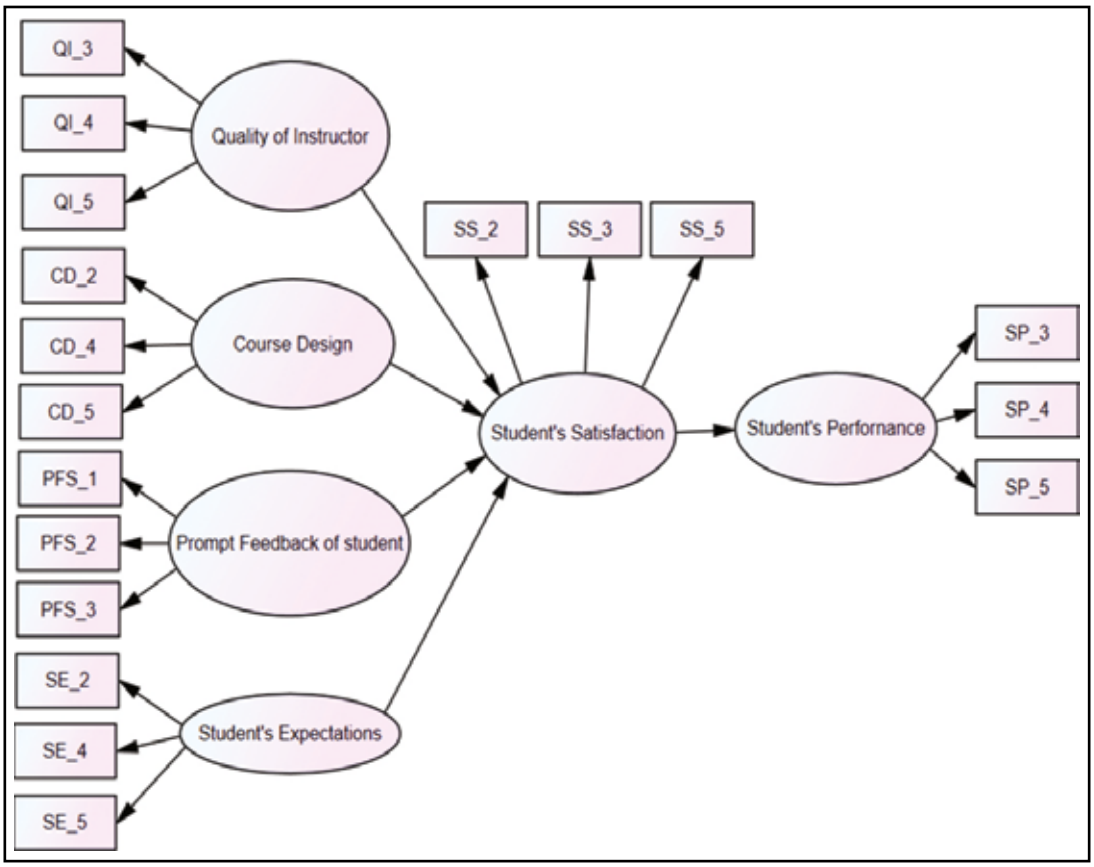
Research Method

Conceptual Framework

The researcher opted to discuss five theories in this study, all of them are widely utilized by many scholars and researchers. They are social theory (Ahmad et al., 2015), scientific theory (Zuhairi et al., 2019), Socio- Cultural Theory (Pangeni, 2016), Learning Theory (Ahmad et al., 2014) and Achievement Goal Theory (Maehr, 2015). According to social theory, a relationship between the individual and society was made conceivable by social theory, as was a picture of how social structures might be modified by human will. Individual aspirations were linked with their expression or lack thereof in social theory, which provided a relationship between positive social theory and normative social philosophy (Ahmad et al., 2015). Similarly, sociocultural theory is a perspective used in domains such as psychology and education to describe individuals' awareness of their surroundings and how their behaviors are influenced especially by their environmental, social, and cultural variables (Pangeni, 2016). Likewise, scientific theory has underlined the role of social class and gender inequities, cultural variations, and economic forces in explaining historical growth in education. It has also reflected criticisms of current educational system shortcomings (Zuhairi et al., 2019). Similarly, learning theory defines in a network of learners, learning takes place through interaction, sharing, dialoguing, and thinking together. Technology aids in the storage and manipulation of knowledge via networked communication. If the theory is established, network learning can be used to define web-based ODL in the future (Pangeni, 2016). Similarly, accomplishment goal theory defines the types of objectives (purposes or reasons) that guide achievement-related behaviors. It is critical to understand how the goals specified by achievement goal theory are related to and distinct from other goal structures in general (Maehr, 2015).

Among these theories, Achievement Goal Theory (AGT) best fits for this study as it explains how a student's internal feeling of ability might be high or low depending on prior performance where two conflicting accomplishment goal states are based on these ability concepts (Maehr, 2015). Moreover, based on Achievement goal theory, various models such as the 2x2 Achievement goal model (Lin, 2018), Performance-approach model (Phan, 2008), Motivated Behavior model (Kamarulzaman et al., 2013), Achievement motivation behavior model (Jaitner et al., 2019), Perceived performance model (Gopal et al., 2021), were abstracted to develop the conceptual framework for this study. Therefore, figure 1 shows the conceptual framework opted and modified from Gopal et al. (2021) where student's performance is the dependent variable and student's expectations, prompt feedback of student, course design and quality of instructor, and thus, student's satisfaction is a mediating variable that are drawn on the basis of literature review.

Figure 1: Conceptual Framework



Source: Adopted and modified from Gopal et al. (2021)

Hypotheses Formulation

Quality of the Instructor and Student's Satisfaction

Instructors that are dedicated to their students' learning have a favorable impact on their satisfaction. The quality of the instructor is one of the most important factors in student happiness, which leads to the success of the educational process (Munteanu et al., 2010). Assume the teacher teaches the class well and has a positive influence on the students' academic performance. Ladyshewsky (2013) identifies that this technique, in such situation, results in student pleasure and improves the learning process. Furthermore, the instructor's comprehension of the learner's needs improves student happiness (Kauffman, 2015). As a result, the hypothesis that the quality of instruction has a major impact on student satisfaction was included in this study.

H1: The quality of the instructor has significant impact on student's satisfaction

Course Design and Student's Satisfaction

Through their course expectations, the technical design of the course is greatly persuading the students' learning and happiness (Lin et al., 2008). When compared to a traditional design, active course design reveals the students' successful outcomes (Black, 2014). Furthermore, when designing an online course, it's important to remember that we're providing an experience for students with various learning styles. Moreover, Jenkins (2015) revealed that the course design qualities might be developed and used to improve student achievement, according to the study. As a result, the hypothesis that course design has

a considerable impact on student satisfaction was included in this research.

H2: Course design has significant impact on student's satisfaction

Prompt Feedback and Student's Satisfaction

The goal of this research is to discover how prompt feedback affects satisfaction. The information regarding the students' successful performance is provided through feedback (Simsek, 2017). Students' learning and teachers' learning experiences can both benefit from good feedback practices (Yorke, 2003). As a result, the hypothesis that prompt feedback has a major impact on satisfaction was included in this research.

H3: Prompt feedback has significant impact on student's satisfaction

Expectations and Student's Satisfaction

Expectations are a critical component that has a direct impact on a student's fulfillment. Theory of Expectation Disconfirmation (EDT) (Oliver, 1980) depending on their expectations, was used to measure their level of satisfaction (Schwarz & Zhu, 2015). Finally, the positive attitude used in many online learning programs has been demonstrated to instill a high level of expectation in students (Gold, 2001), resulting in favorable results. As a result, the hypothesis that student expectations have a major impact on satisfaction was included in this study.

H4: Expectations of the students has significant impact on student's satisfaction

Student's Satisfaction and Student's Performance

Zeithaml (1988) in their study expressed that satisfaction as the result of any educational institution's performance. Student happiness is a result of positive interactions between the instructor and the pupils (Ali et al., 2010). Student satisfaction is measured in terms of motivation, learning, assurance, and retention (Biner et al., 1996). Furthermore, a student's academic success is the primary foundation for learning knowledge and improving abilities. According to Narad and Abdullah (2016), regular evaluations or assessments are necessary for assessing students' academic achievement over a set period of time in order to achieve better results. As a result, the hypothesis that student satisfaction has a major impact on their performance was included in this study.

H5: Students' satisfaction has significant impact on the performance of students.

Satisfaction as Mediator

According to achievement goal theory, students will perform better if they are aware of the elements that influence their success. In terms of the aforementioned variables, course design and instructor quality are two institutional elements that influence student satisfaction through performance (DeBourgh, 2003), prompt feedback, and expectation (Fredericksen et al., 2000). As a result, this study contained the premise that the instructor's quality, course design, rapid feedback, and student expectations had a substantial impact on students' performance through satisfaction.

H6: Quality of the instructor, course design, prompt feedback, and student' expectations affect the students' performance through satisfaction.

H6a: Students' satisfaction mediates the relationship between quality of the instructor and student's performance.

H6b: Students' satisfaction mediates the relationship between course design and student's performance.

H6c: Students' satisfaction mediates the relationship between prompt feedback and student's performance.

H6d: Students' satisfaction mediates the relationship between student' expectations and student's performance

Variable and its Definition

This section discusses the research variables for the study which were identified and defined. The variables listed below may not be the only ones utilized in the study, and the variables required are chosen based on the study's purpose (see table 1).

Table 1: Observed Variable and Description

Construct	Observed Variables	Variable Notation	Explanation
Quality of Instructor	Concern for Learning	QI_3	Instructor concern about statistical learning
	Respect	QI_4	Instructor respectfulness on student learning
	Accessible	QI_5	Accessibility of instructor for online course
Course Design	Learning Oriented	CD_2	Design to allow assignment to be completed in different learning environment
	Efficient Learning	CD_4	Efficient learning environment through webinar
	Ability to Learn	CD_5	Quick learning of educational statics
Prompt Feedback of Student	Webinar	PFS_1	Response use of webinar
	Course Requirement	PFS_2	Response on requirement of course
	Assignment	PFS_3	Response towards assignment
Student's Expectations	Example	SE_2	Use of example to explain statically concepts
	Teaching Materials	SE_4	Use of teaching material to make it understandable
	Explanation	SE_5	Ideas of things explaining
Student's Satisfaction	Interest	SS_2	Level of interest in online education
	Understanding	SS_3	Level of understanding in online education
	Time	SS_5	Requirement of time for online learning
Student's Performance	Organized	SP_3	Ability to plan the work
	Encouragement	SP_4	Improvement of academic interest
	Confident	SP_5	Tackling unfamiliar problem

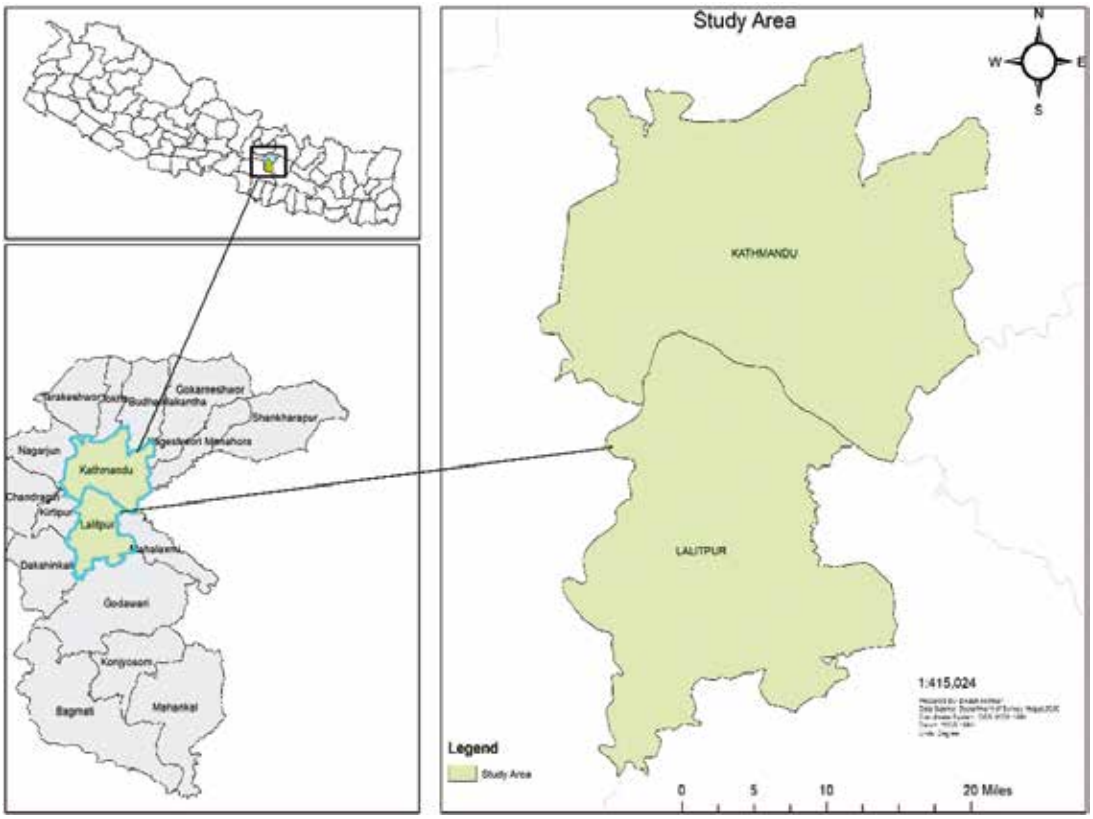
Note: QI_1, QI_2, CD_1, CD_3, PFS_4, PFS_5, SE_1, SE_3, SS_1, SS_4, SP_1 and SP_2 were dropped after performing Confirmatory Factor Analysis as its value remains below 0.5 during factor loading.

Study Area and Population

Kathmandu valley was chosen as the area of study (see figure 2). Most of the collegees are located in the Kathmandu valley. The city has been important economically, administratively, and politically for hundreds of years. Kathmandu valley is surrounded by the Bagmati river system, which has eight tributaries that drain the city. Kathmandu valley is located between the latitudes of 27°3803200 and 27°450700 north and the longitudes of 85°160500 and 85°2203200 east (Bhandari et al., 2021). The city is situated at a height of 1350 meters above sea level (Thapa & Murayama, 2008). Moreover, the Kathmandu valley located in Nepal's central middle hill region, is around 19 by 25 kilometers in size. This tectonic valley is a tertiary structural basin surrounded on all sides by mountains over 1,800 meters high and covered in fluvial and lacustrine sediments. The valley is located in a moderate

temperature zone with a well-balanced climate (Pradhan, 2004). The valley is divided into three districts: Kathmandu, Lalitpur, and Bhaktapur, with a total area of 220 square miles (570 km square) (Maharjan et al., 2022).

Figure 2: Study Area



Source: GIS ArcMap

Because Kathmandu is Nepal's capital, it is home to the majority of the country's colleges. Various colleges and their networks in the valley can provide appropriate information and expertise to students, which will be beneficial to this research. In this study, only 8 of the 48 management colleges connected with Pokhara University in the Kathmandu Valley, 28 out of 48 which enroll 11,514 management students were included. To gather sufficient data on how students feel about and are happy with the online education system was the primary consideration in choosing this topic.

Sampling Technique, Data Analysis Technique and Sample Size Determination

The researcher uses probability sampling as population of the study is known. Moreover, purposive sampling was employed for data collection in which researchers choose participants for their surveys based on their own assessment (Paudel et al., 2018). Similarly, the sample size for the investigation was calculated using the formula: $n = N*X / (X + N - 1)$, Where, $X = Z_{\alpha/2}^2*p*(1-p) / MOE^2$, $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$ (e.g., for a confidence level of 95%, α is 0.05 and the critical value is 1.96), MOE is the margin of error which is 0.05, p is the sample proportion (90% of the respondents are students who take online class), and N is the population size. The sample size is 138. We also add non-respondent error 5%. Thus, the sample size needed 144 but the researcher chose a sample size of 203, within in 8 colleges because in order to carryout SEM there must be minimum 200 samples.

The data was gathered through a survey of graduate students from February to March of 2022. KOBO Toolbox and SPSS, AMOS were utilized for data analysis, with Microsoft Excel being used for data entry and research tallying. Data analysis was performed using descriptive analysis and inferential analysis.

Data Analysis and Results

Socio-Demographic Status

Socio-demographic information generally deals with the personal characteristics of the respondents. Findings revealed that almost equal proportion of sex had been distributed accounting 47.78% are females and 52.22% are males whose age lies between 24-25 (32.51%) involving in MBA/MBA-Finance/MBA-Global/EMBA program (72.91%) (see table 2). It indicates that there is no biasness of gender in this study, students who took classes virtually are generally aged 24-25 years old who involve in MBA/MBA-Finance/MBA-Global/EMBA program during COVID-19 pandemic respectively. The study conducted by Baber (2020) in South Korea reveled majority of respondents are male, Rodriguez et al. (2020) in Spain depict that every surveyed respondents were between 20-29 age group who study MBA/BBA, respectively.

Table 2: Socio-Demographic Status

Variable	In Number	In Percentage
Sex		
Male	106	52.22%
Female	97	47.78%
Age		
20-21	21	10.34%
22-23	51	25.12%
24-25	66	32.51%
26-27	36	17.73%
28-29	18	8.87%
Above 29	11	5.43%
Program		
MBA/MBA-Finance/MBA-Global/EMBA	148	72.91%
BBA/BBA-TT/BBA-BI	55	27.09%

Effectiveness of Virtual Education during COVID-19

This section usually gives the brief ideas about the effectiveness of virtual education which are carried during COVID-19 pandemic by various colleges affiliated to the Pokhara University inside Kathmandu Valley, Nepal. The result indicates that all of the surveyed student had taken online classes during the COVID-19 pandemic by using MS-Teams (65.02%) followed by Zoom (46.31%) and Google Meet (39.41%) in a favorable room environment (57.14%). Likewise, majority of students have highly reliable internet connection (76.35%) and 23.65% does not possess reliable internet connection to

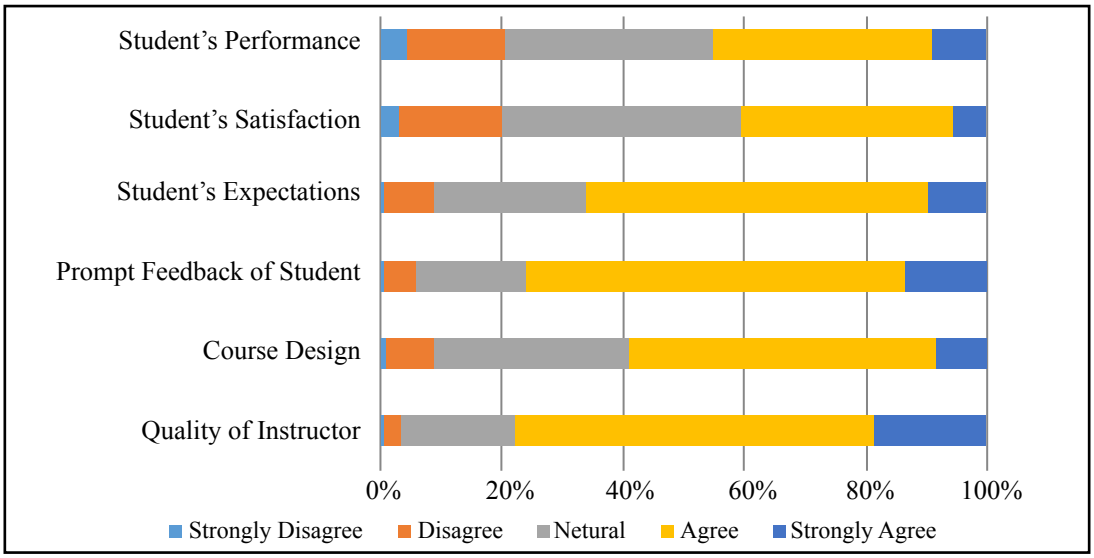
carry out online classes during COVID-19 and dictates low connection speed and connection problem due to high users are the main reason for not having a reliable internet connection. Moreover, online classes appear to be less interactive (80.7%) than physical classes in terms of student involvement and behavior tracking. Although students are satisfied with instructors' delivery but they claim that there are huge changes in result of online class and virtual class (83.25%) when compared. Finally, the majority of students erupts online classes were well managed while conducting teaching learning activities. Moreover, similar study was conducted by Chakraborty et al. (2021), Pokhrel & Sapkota (2020), Adnan (2020), Vinichenko et al. (2016), Muthuprasad et al. (2021) and Agormedah et al. (2020). They found that variety of software such as zoom, messenger groups, Microsoft team, google classroom indicating zoom as the most preferred platform to conduct online classes but students reported that signals availability/strength are the major problems behind limited internet access, and consider internet services too expensive for regular online connectivity, finds the environment of the room favorable for learning but online class were not much interactive. Overall, students were satisfied with instructor delivery.

Impact of Virtual Education on the Satisfaction and Performance of Students during COVID-19 Pandemic

Under this section various factors about impact of virtual education on the satisfaction and performance of students during COVID-19 pandemic are described in order to know about the present information about virtual education. Six variables are mentioned below i.e., Quality of Instructor, Course Design, Prompt Feedback of Student, Student's Expectations, Student's Satisfaction and Student's Performance. These variables are measured in five scale under Likert scale (1 = strongly agree, 2 = Agree, 3 = Neutral, 4 = Disagree, 5 = strongly Disagree.)

Quality of Instructor contains the explanatory variables such as concern for learning, respect and accessibility. The result indicates that concern for learning will increase when the instructor is qualitative and respectful. Additionally, they declared that their instructor was accessible outside the regular course time. Likewise, course design contains the explanatory variables such as learning oriented, efficient learning and ability to learn. The outcome shows that the course is set up to enable completion of assignments across several learning-oriented areas for a productive learning environment. Students also believe that the webinar course style has accelerated their learning. Similarly, Prompt Feedback of Student contains the explanatory variables such as webinar, course requirement and assignment. Thus, the result indicates that instructor use to respond promptly to their questions about general course requirement as well as course assignment about the use of webinar. By the same token, student's expectations contain the explanatory variables such as example, teaching material and explanation. The result indicates instructor used good examples to explain statistical concepts by using webinar design instructional material and made them understandable. Likewise, students claim that lecturers were very good while explaining the things which meets student's expectations. Likewise, student's satisfaction contains the explanatory such as interest, understanding and time. The result indicates there is no change in understanding of educational statistics, the time was neither enough nor excess through understand and learn new things. Additionally, students claim that online class neither increases nor decreases their interest in educational statistics. Similarly, Student's Performance contains the explanatory variables such as organized, encouragement and confident. The findings reveal that online classes have encouraged them and develop their academic interest which also helped them to develop the ability to plan their own work. Likewise, students agreed the fact that they were able to tackle with unfamiliar problem during online sessions.

Figure 3: Overall Discussion of Variables



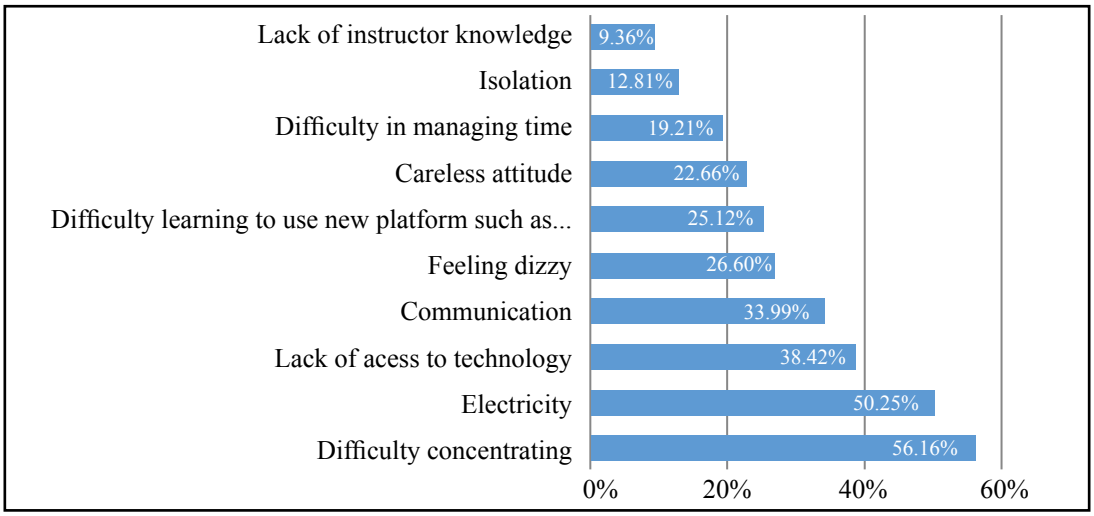
Source: Field Study

From the figure 3, it shows that student of management college feels that quality of instructor, better course design, prompt feedback of student, student's expectation, student's satisfaction and student's performance is required for the overall improvement of the virtual education successfully.

Challenges of Virtual Education during COVID-19

This section identifies how many respondents had a challenge, as well as the issues they faced, at what level they had faced such a problem or challenges, and what the problems were when completing an online course. Respondents were asked whether there are any challenges in virtual mode of learning, the result indicates that majority (89.66%) of respondents think there are obstacles in virtual education. Difficulty in concentrating, frequent electricity cut-off, lack of access to technology and one-way communication are major challenges of virtual education during COVID-19 (see figure 4).

Figure 4: Major Challenges of virtual education during COVID-19



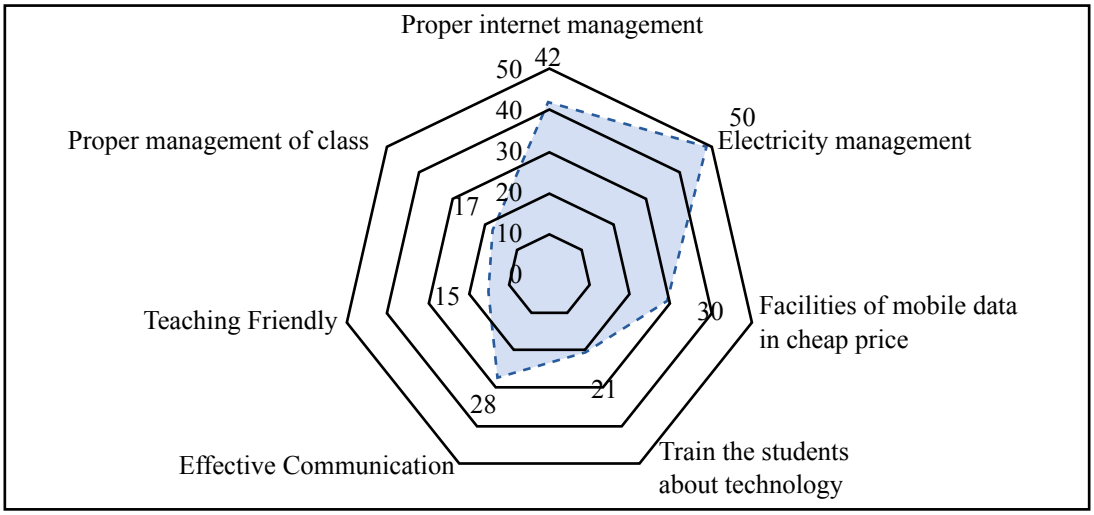
Source: Field Study

Likewise, the respondent was also asked about where all these challenges are arrived form. The findings revealed majority (64.04%) of the student who said that there are challenges blame internet service provider as the responsible party, 51.72% think the electricity, 49.26% thinks student themselves are responsible for challenges, 29.12% of the students think college is responsible, 28.57% think that teacher is responsible for challenges and 2.46% say that family, pandemic and less familiar online session users are responsible for challenges.

Managerial Solution

This part deals with descriptive analysis for the study's goal of providing essential managerial strategies for virtual education efficacy. Respondents were asked whether the challenges are manageable of not the result revealed that majority (170) of students think that the problem is manageable where 33 students think the problem is not manageable. Moreover, students were asked about what could be the further preparation strategy. The result revealed that in the certain points are effective communication, adopting high internet speed, time management, knowledge to handle e-learning, self-factors and concentration from both sides. Moreover, majority of respondents revealed that the problem of virtual education can be not manageable due to lack of proper electricity management, lack of technology, students won't concentrate and no proper schedule.

Figure 5: Preparation Strategy



Source: Field Study

From the figure 5, the researcher saw the clear image to measure preparation strategy from the respondent. They are proper internet management (42), electricity management (50), facilities of mobile data in cheap price (30), train the students should about technology (21), effective communication (28), teaching friendly (15) and proper management of class (17). Similarly, the study conducted by Paudel (2020) in Nepal claims that effective communication, practice and engaging the students in several meaningful activities and tasks for better learning outcomes, online course needs to be carefully designed etc. are the preparation strategy of online class in future which is similar to our research.

Inferential Analysis

Summary Statistics

Mean and standard deviation lies in the range from 3.1379 to 3.9704 and 0.68705 to 1 indicating that the majority of standard deviation values are low, signaling that the majority of replies are not significantly different from the mean data. In this study, the value of skewness of data lies between -2

to +2 and is right skewed. Similarly, the value of kurtosis lies between -3 to +3 which represent that the distribution not excessively raised. It should lie between -10 and +10 in order to be free of normality for both kurtosis and skewness. Our acquired kurtosis and skewness results are both normality-free because they lie inside that range.

Exploratory Factor Analysis and Common Method Bias

Exploratory factor analysis is a statistical technique for condensing data into a smaller number of summary variables and assessing the events' underlying theoretical structure (Stevenson et al., 2019). In EFA KMO and Bartlett's Test was carried out therefore, KMO value is 0.870 which indicates that the taken data is meritorious, and if the value is less than 0.7, the factor analysis result will not be very relevant (Chan & Idris, 2017). Likewise, the data is also significant since the result of the Bartlett's Test is 0.00, which is less than 0.05, indicating that the data is significant. Similarly, this study utilizes the Herman's single factor statistical technique to assess the common method bias and found to be 40.521% which is less than 50% criterion. This indicates that there are no any issues of common method bias in the data.

Confirmatory Factor Analysis

The fit between observed data and a priori-conceptualized, theoretically grounded model that outlines the hypothesized causal relationships between latent components and their observable indicator variables is assessed using CFA (Allua & Thompson, 2009). The CMN/DF, RMR, RMSEA, GFI, IFT, TLI, and CFI fitness indices are used to assess if the model fit is good or not. The CMN/DF (1.760<5), RMR (0.038<0.08), RMSEA (0.061<0.08), GFI (0.894>0.80), IFI (0.956>0.90), TLI (0.943>0.90) and CFI (0.955>0.90) which satisfies the criteria for model fit.

Measurement Model

The measurement model is a model that explores the link between latent variables and their measurements, as well as how measured variables come together to describe the theory (Hoque et al., 2018). In this study, we must meet two criteria in terms of validity: convergent validity and discriminant validity in order to assess the measurement instruments and also helps in the analysis of construct validity (Nath & Goel, 2016). As shown in the table 3 and 4, convergence validity and discriminant validity were used to determine the data's reliability and validity. To ensure convergence validity, the data must fulfill the requirements of CR>0.70 and AVE>0.50. To establish discriminant validity, the data must also fulfill the requirements of AVE >MSE and square root of AVE > correlation. The result of this inquiry demonstrates both convergence and discriminant validity since it fits the above-mentioned criteria.

Table 3: Reliability and Validity

Construct	Indicators	Factor Loading	Cronbach's Alpha	CR	AVE	MSV
Quality of Instructor	QI_3	.777	0.767	0.890	0.733	0.458
	QI_4	.775				
	QI_5	.659				
Course Design	CD_2	.638	0.804	0.790	0.562	0.274
	CD_4	.793				
	CD_5	.780				
Prompt Feedback of Student	PFS_1	.775	0.876	0.814	0.597	0.317
	PFS_2	.843				
	PFS_3	.771				

Construct	Indicators	Factor Loading	Cronbach's Alpha	CR	AVE	MSV
	SE_2	.748				
Student's Expectations	SE_4	.816	0.845	0.877	0.705	0.483
	SE_5	.688				
	SS_2	.839				
Student's Satisfaction	SS_3	.838	0.884	0.846	0.648	0.483
	SS_5	.784				
	SP_3	.757				
Student's Performance	SP_4	.752	0.816	0.822	0.607	0.458
	SP_5	.784				

Table 4: Latent construct correlation

	SS	QI	CD	PFS	SE	SP
SS	0.856					
QI	0.309	0.750				
CD	0.554	0.502	0.772			
PFS	0.254	0.517	0.492	0.840		
SE	0.559	0.523	0.563	0.695	0.805	
SP	0.677	0.318	0.467	0.452	0.569	0.779

Mediation Analysis

The concept of mediation examines how the variables in the research interact (i.e. dependent variable and independent variable). While monitoring the relationship between variables, it is vital to determine whether or not mediators are present. The SOBEL test, which examines the mediation impact among measuring factors, is utilized to establish whether or not a mediation relationship exists between dependent and independent variables for the purposes of our research. Table 5 shows the Sobel test results.

Table 5: Sobel Test Result

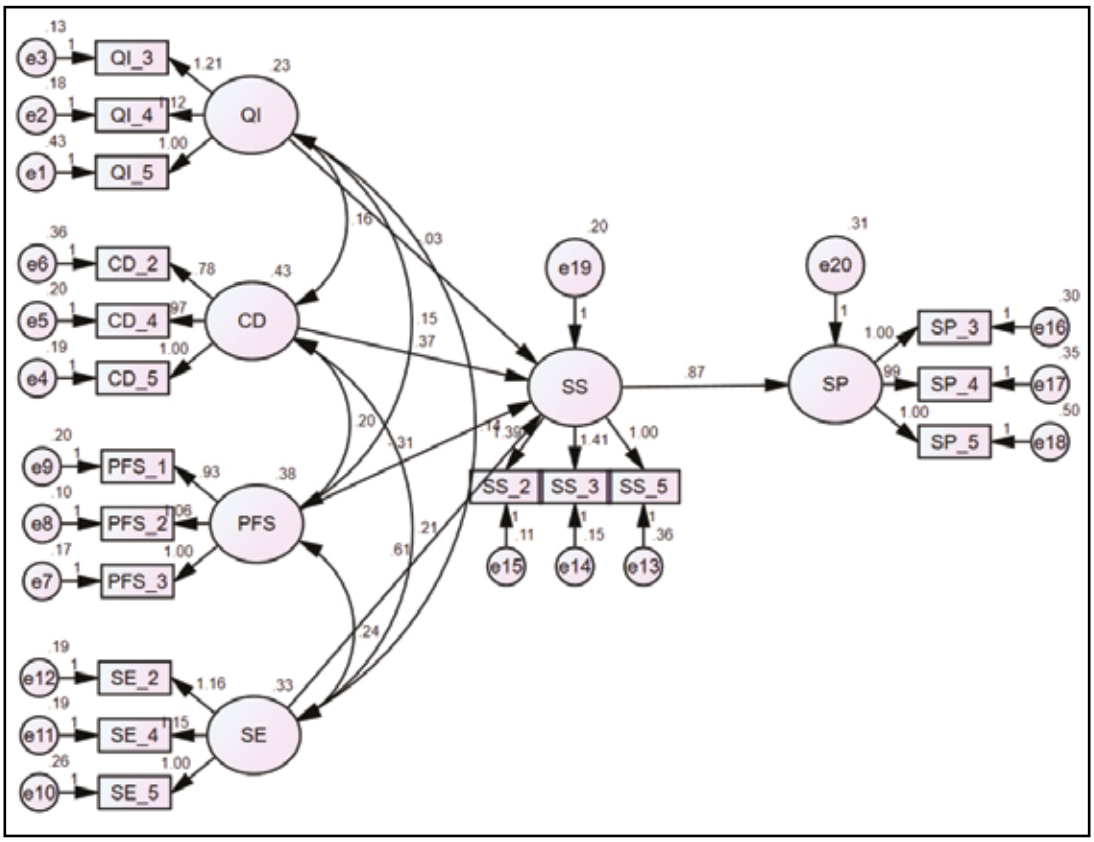
			Mediating Effect		Test statistic	p-value
			b	S_b		
QI → SS → SP	A	0.384	0.592	0.060	3.87984057	0.00010452
	S_a	0.091				
CD → SS → SP	A	0.580	0.556	0.065	5.73649838	0.00000001
	S_a	0.075				
PFS → SS → SP	A	0.323	0.565	0.057	3.58494386	0.00033715
	S_a	0.084				
SE → SS → SP	A	0.608	0.515	0.066	5.73093317	0.00000001
	S_a	0.072				

The table 5 shows that since p-values are less than 0.01 the result concludes that there is partial mediation relationship between Student's Satisfaction (SS), Student's Performance (SP) and independent variable are Quality of Instructor (QI), Course Design (CD), Prompt Feedback of Student (PFS), Student's Expectations (SE).

Test of Hypothesis

As shown Table 6, H2, H3, H4 and H5 are accepted which implies that there is significant relationship. In contrast, H1 is rejected that leads to the conclusion that there is insignificant relationship between the variable in the respective hypothesis. The degree to which a variable participates in the transmission of change from a cause to its consequence is measured by mediation analysis. The influence of the mediating factors was investigated using the Sobel test, t shows that p ≤0.05 After performing the Sobel test, it was discovered that the mediating variable (student's satisfaction) has a mediating effect on the relationship between the independent variables (quality of instructor), (course design), (prompt feedback of student), (student's expectations), and the dependent variable (student's performance). The structural model showing the relationship among variables is presented in figure 6.

Figure 6: Structural Model



In the inferential phase of the investigation, SEM is used to investigate regression analysis, variable analysis, and the normality pattern. Four components are studied based on latent variables in relation to observable factors. The model's fitness criteria demonstrate fitness. The consequence shows an outcome of X^2 /df (CMIN/DF) of 1.760 (1.760<3). According to the data, the p value indicating a significant relationship between latent variables and observable variables is less than 0.05. The hypotheses in this study are widely accepted since the mean level of all hypotheses (p-value) is less than 0.05. As a

consequence, all independent variables included in this study had a significant impact on all contingent factor hypotheses, resulting in the elimination of all hypotheses.

Table 6: Path Estimates for Structural Model

Hypothesis	Estimate	S.E	CR	P	Hypothesis result
H1: Quality of Instructor → Student's Satisfaction	-.033	.111	-.298	.766	Insignificant
H2: Course Design → Student's Satisfaction	.369	.088	4.188	***	Significant
H3: Prompt Feedback of Student → Student's Satisfaction	-.305	.103	-2.954	.003	Significant
H4: Student's Expectation → Student's Satisfaction	.612	.132	4.646	***	Significant
H5: Student's Performance → Student's Satisfaction	.869	.110	7.914	***	Significant

Discussion

To develop and test the link between the variables, the reliability test and multiple linear correlation were utilized in this study. The authors of this study looked at a variety of parameters that were directly associated to students' happiness and performance in online classes during COVID-19. Because of the worldwide epidemic, all schools and institutions have been forced to go online by their individual governments. Because no one knows how long the epidemic will last, the teaching technique has been switched to an online format. Despite the fact that some of the educators were not tech-savvy, they upgraded their skills to deal with the unexpected situation (Pillai et al., 2021). The findings of this study will aid instructors in improving student happiness and performance in online classes. The current study aids educators in comprehending the many aspects that are essential for online instruction. The supported hypothesis 2,3,4,5 states that course design, prompt feedback of student, student's expectations and student's performance affect the student's satisfaction.

H_2 was supported and is significant. It's critical to remember while designing an online course that we're providing an experience for students with various learning styles. It was claimed that course design characteristics may be established and used to improve student performance. Hypothesis that course design has a considerable impact on student satisfaction was included in this research (Jenkins, 2015).

The third factor is prompt feedback, and results show that feedback has a positive relationship with the satisfaction of the students ($p \leq 0.05$). Hence, H_3 was supported. Students can use prompt feedback as a self-evaluation tool to help them improve their performance. The impact of feedback on future practice and student learning development was highlighted. Students' learning and instructors' learning experiences may both benefit from good feedback practices (Yorke, 2003).

The fourth factor is students' expectations. The results show a positive relationship between students' expectation and students' satisfaction with online classes ($p \leq 0.05$). Hence, H_4 was supported. The greatest strategy to boost student happiness is to meet their expectations. Many online learning programs adopt a positive approach that has been proved to raise learners' expectations and lead to excellent outcomes (Gold, 2001).

The fifth factor is student's performance. The result shows a positive relationship between student's performance and student's satisfaction with online classes ($p \leq 0.05$). Hence, H_5 was supported. By

achieving successful outcomes, teaching quality and course material improves student happiness. Student satisfaction is measured in terms of motivation, learning, assurance, and retention (Biner et al., 1996).

Students' satisfaction somewhat mediates the favorable relationship between teacher quality and student performance, as seen in table 6. As a result, H_6(a) was accepted. Furthermore, satisfaction partially mediates the favorable association between course design and student performance, according to the mediation study results. As a result, H_6(b) was accepted. However, satisfaction fully mediates the favorable association between fast feedback and student performance, according to the mediation study results. As a result, H_6(c) was accepted. Finally, Table 5's findings revealed that satisfaction somewhat mediates the positive association between students' expectations and their performance. As a result, H_6(d) was accepted.

Conclusion and Recommendations

This study was conducted at identifying and analyzing the graduate student's perception on effectiveness of virtual education during COVID-19 in Kathmandu valley. There is need to measure learner satisfaction with using online learning platforms as Pokhara university students now rely on them to continue their studies due to the COVID-19 pandemic. Online learning has arisen as an alternative to traditional learning during the pandemic. Most students have experienced online classes for the first time. Variables such as quality of instructor, course design, prompt feedback of student and student's expectations are important determinants of perceived student learning and student satisfaction. In response to this need, the current study successfully applied the achievement goal theory and exhibited the direct and indirect impacts of quality of instructor, course design, prompt feedback of student, student's expectations, student's performance in university, and student's satisfaction with online learning platforms. The current study can help researchers better comprehend the theoretical, methodological, and practical aspects of university students' happiness with online learning platforms, which have been recognized as essential emergency instructional tools.

In the situation of Corona, the majority of students expressed a positive view about online classrooms, according to this study. Online learning was determined to be useful since it offered learners with flexibility and convenience. Students appreciated content that was well-structured and included recording video that were uploaded to college websites. They also mentioned the importance of interactive sessions at the end of each lesson with quizzes and assignments to maximize the learning experience. However, because of technology limits, delayed feedback, and the instructor's failure to adequately handle Information and communication technologies, most students reported that online classes were more challenging than traditional classrooms.

College should provide resources to help students assess whether they are ready to take an online course and offer suggestions for preparation. They should make accommodations for students who either do not have access to devices at all or lack devices that support the e-learning platforms. Since, internet accessibility is expensive in Kathmandu valley at the moment college should provide Free data sim to the students. College should orient students through instructions on how to transit to remote learning/teaching via e-learning platforms. College management should provide instructional support through instructional activities that can help students in appraising their preparedness and readiness, effective communication, time management, concentrated from both sides and managing their expectations about learning online, which can help increase students' chances for success in an online course. College administration should be patient and empathetic with students who are having trouble accessing and using the platform, and allow extra time when logging into online learning systems.

Based on the findings, the researcher makes the following suggestions for improving the effectiveness of virtual education in college, as well as for students, policymakers, universities, and the government to gain a better knowledge of online classes.

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