Assessing Indian Student Sentiments towards Education in the COVID-19 Era

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The COVID-19 pandemic has forced schools to find face-to-face teaching alternatives. As a result, an unprecedented amount of online teaching and learning has been used by educators and learners. The research met its requirements using a cross-sectional design. The study was conducted with 40 questionnaires of 200 Indian academic learners from diverse locations to collect initial information on e-assessment attitudes. The findings showed that students are excited about using the internet and they want to continue using it once the pandemic passes. The problems that are emphasized include unsuitable study environments, unequal access to gadgets, poor quality online study materials, sluggish or nonexistent internet speeds and power outages. Students' studies are affected by the issues above, as seen by their minor or nonexistent participation and proxy attendance in the online course. Additionally, it's been observed that taking lessons via online has a negative impact on students' health. Pupils suffered from poor vision, weight gain, sleep loss and behavioral issues. Despite the COVID-19 pandemic, students were cheery and lecturers were polite. Thus, instructors must help pupils appreciate digital learning.

Keywords: Corona Virus Illness (COVID-19), Education, Information and Communication Technology (ICT).

1. Introduction

COVID-19 is globally concerned and it has spread in devastating waves across a number of

countries. Without question, this epidemic affected the educational system. The rapid adoptions of social distance laws and new norms restricting physical conduct, including school/college closures, have resulted from these rising tendencies [1]. As a consequence of the COVID-19 disaster, educators have little choice but to rely on digital technology as the primary method of instruction having less faith and experience with the use of such tools for students. Students have been affected differently by the COVID-19 epidemic, both in terms of their level and field of study is the stage they have reached in their respective programmers. Particular difficulties arise for persons transitioning from one level of schooling to another, such as from high school to college or university or from college to the workforce [2]. It has allowed professors to use information and communication technology (ICT) for both classroom instruction and student assessment of course progress. Teachers, students and school officials are working together to make the most of technology in the classroom. Reasons for its popularity include a low learning curve and a manageable setting that facilitates experimentation. Despite its many benefits, e-learning has a number of drawbacks, including a need for more human connection between teachers and students as well as problems with connectivity [3]. Students in higher education have to adjust their study habits as a result of the lockdown brought by COVID-19, given it occurred during the midst of the even semesters. A major pedagogical issue for these students was making the switch from classroom instruction to online learning when the epidemic forced the immediate and complete closure of educational facilities [4]. The phrase ICT has become more common in the digitized world, covering a wide range of computing-related topics. There are a number of factors contributing to the increased prevalence of ICTs in educational settings. It will make it easier for students to learn and retain information, as well as it will boost the efficiency with which educational initiatives are implemented [5]. The term "e-exam" is shorthand for electronic examination, in which a student takes an examination via computer. Using electronic inquiries to Grade College and university students will make grading more fair [6]. Many nations have urged future doctors to work alongside their country's existing medical professionals. These future doctors are under a lot of anxiety and stress since they have to interact with infected patients. The increased risk of psychological problems among kids is attributable to the worry, stress and anxiety brought by a COVID-19 infection. There has been no significant research done on Indian student mental health during the present epidemic [7]. Sadness, anxiety, rage, stress and post-traumatic stress are the examples of widely distributed mental health issues that impact individuals all over the world. Students' mental health can be affected by factors outside of school, such as drug addiction, rule-breaking, peer pressure and technological difficulties encountered when engaging in independent study. This research aimed to fill the knowledge gap on students' stress levels during times of academic isolation and restraint [8].

1.1 Significant of the study

To understand the far-reaching effects of the epidemic on the academic scene, it is essential to evaluate Indian students' attitudes towards education in the post-COVID-19 period. This research looks deeply into the complicated emotional and psychological components of students' experiences with online education along with other paradigm shifts. Exploring student emotions uncovers the difficulties and possibilities that have evolved during this exceptional moment. It elucidates whether students can adjust to online learning environments, how practical online pedagogical approaches are and the toll that social isolation have on

students' willingness to study. In addition, this evaluation gives politicians and teachers helpful information that can be used to develop efficient plans to fortify the educational system. By evaluating attitudes, the research intends to identify areas of improvement, create a supportive learning environment and encourage innovations that match the growing requirements of students. Finally, gaining an appreciation for Indian students' perspectives on education in the post-COVID-19 era is about more than just numbers; it provides a nuanced view of the human side of learning during a time of crisis and contributes to a more holistic approach to reshape education in the wake of the pandemic.

1.2 Research gap of the study

During the COVID-19 epidemic, internet education is essential in poor countries. A cross-sectional research of 200 Indian college students found their passion for digital learning. Poor study conditions, technological access, online resources, sluggish internet and power outages are significant obstacles. Low engagement and proxy attendance harm pupils' health with impaired eyesight, weight gain, sleep deprivation and behavioral concerns. Despite difficulties, students appreciate professors' help, emphasizing the importance of academics in promoting digital learning throughout the pandemic.

1.3 Objective of the study

The objective of this research is to examine students' views on online learning during the COVID-19 epidemic in resource-constrained. The cross-sectional analysis used a Google Forms survey to obtain primary data from 200 Indian higher education students from various regions. Results showed students' enthusiasm for online education despite poor study conditions, uneven device access, poor online content, sluggish internet connections and power outages. The research found negative consequences on students' health, including impaired eyesight, weight gain, sleep difficulties and behavioral concerns, emphasizing the need for educators to promote digital learning throughout the pandemic.

2. Related works

According to the author of, [9] described that universities and colleges throughout the globe has suspended classes because of the COVID-19 outbreak. The majority of universities and colleges rely on digital learning platforms to maintain their academic programmers. There was a need for more knowledge regarding the design, effectiveness and suitability of e-learning, particularly in developing countries like India, where connectivity and technology compatibility pose serious obstacles. Evaluated the subjects' level of education; a standard percentage distribution was utilized. Seventy percent or so of students used some electronic learning during the lockdown [10]. The vast majority of students enrolled in an online course utilized an Android-powered mobile device. Author [11] described that depression along with anxiety, a lack of reliable internet access and a hostile at-home study environment were a few of the issues that students have been grappling recently. In particular, students from underserved communities and far-flung locations confront daunting obstacles to their education as a consequence of this epidemic. To determine that there need to be more knowledge regarding the design, effectiveness and suitability of e-learning, particularly for developing countries like India [12], where connectivity and technology compatibility pose

serious obstacles. The most significant behavioral determinants of clinical outcomes were examined, along with the knowledge, attitudes and behaviors of college students. To detailed the catastrophic effects seen all around the globe after the spread of the new corona virus (nCov) [13]. The COVID-19 pandemic forced instructors to cancel in-person classes and student interactions, which left students and other education system stakeholders in the dark. To determined that creating high-quality e-learning content, including instructional videos and written materials [14], is crucial if they want their students to benefit from the research they outlined and complete their education with confidence. The importance of creating and using an e-learning system has never been higher than it was in the midst of the current COVID-19 pandemic. The purpose of this research was to measure this by looking at how learners' perceptions of the risks associated with COVID-19 affect their reactions to the quality of the online learning materials they were provided with. The study [15] defined a worldwide initiative known as Emergency Remote Learning (ERL) has been launched as a rapid reaction to the COVID-19 pandemic and its impact on medical education. Despite widespread reports of heightened anxiety among medical students, the elements in the academic context during ERL that affected these reports have not yet been investigated. To described it as crucial to evaluate the possible implications of this significant shift in pedagogy when the Indian state of Assam was forced to move fast to online education from conventional techniques due to the COVID-19 and shutdown [16]. To look at how machine learning (ML) [17] can be used to gauge how much time spent on digital devices was detrimental to one's mental and emotional health, as well as the amount of sleep one gets in the midst of the current COVID-19 epidemic. In response to the global spread of the COVID-19 epidemic, several countries had instituted lockdowns. The lockdowns had forced individuals to stay indoors, increasing their reliance on digital technology like the internet, social media and cell phones. Inappropriate usage of these digital gadgets can have adverse effects on their psychological and emotional well-being.

3. Methods

3.1 Data collection

The participants had around a month, from March to April, to complete the questionnaires. To determine the efficacy of the created instruments, a small number of diverse respondents were given a prototype version of the online questionnaires. To assess the effectiveness of the created agents, a restricted number of respondents with various characteristics were first given a pilot version of the online surveys. Evaluating the questionnaire design helped make sure that the phrases used were understandable and that it was valid (i.e., the questions asked what they needed to know) and consistent. To ensure that the data collected was accurate, member checking was employed. The 200 responses were gathered and taken into account for analyzing the data, as shown in Table 1 [18].

Table 1: Participant characteristics according to demographic variables

Demographic	Percentage (%)	Frequency(N)

Study path		
Science	22	43
Humanities	31	62
Law	20	39
Social science	30	60
Academic credential		
Postgraduate	43	96
Graduate	48	106
Gender		
Male	71	141
Female	31	61

3.2 Statistical analysis

After the dataset was assembled, methods for quantitative data analysis were applied to assess the information. The terms mean, median and standard deviation are used in descriptive statistics. Analysis of variance (ANOVA), multiple regression analysis and patient chi-square are examples of statistical inference procedures that are required to examine relationships, differences, or connections between the variables of interest. Patient data confidentiality and privacy must be respected and results must be analyzed to avoid misunderstandings or incorrect inferences that might compromise patient safety and treatment.

3.2.1 Analysis of Variance (ANOVA)

ANOVA is a statistical technique for comparing mean values across many groups or conditions to identify significant differences. To assess the significance of the observed mean differences, they can examine the variance (both within and across groups). Information is sped up in an ANOVA by grouping it by a categorical independent variable. A continuous scale is a common representation of the variable of interest. Using an ANOVA, one can determine whether or not there are substantial differences between groups regarding the values of the defined variables. It compares the differences in variance between and groups to establish whether or not the observed differences in means are significant. The following equation describes the most common kind of ANOVA in Equaiton (1):

$$\text{Total Sum of Squares (SST)} = \text{Sum of Squares between (SSB)} + \text{Sum of Squares within (SSW)} \tag{1}$$

3.2.2 Total Sum of Squares (SST)

Modeling and ANOVA both use the sum of squares to quantify the spread of values in a given dataset. It is a means to assess the relative size of the differences between various sources of variation and a measure of how far the responding variable is from its mean value.

3.2.2.1 The sum of Squares between (SSB)

The SSB is a measure of data dispersion or variability that can be used in ANOVA. This can be measured by comparing the group's mean to the total standard of the dataset.

3.2.2.2 The sum of Squares within (SSW)

In ANOVA, the groups SSW are used to measure dispersion in the data across each group. It's a statistical method for gauging how widely data points fall into specific classes.

Following is the formula for determining these factors in Equations. (2-4):

$$SST = \Sigma(Y - \widehat{Y})^2 \tag{2}$$

$$SSB = \Sigma(n * (\widehat{Y}h - \widehat{Y})^2) \tag{3}$$

$$SSW = \Sigma(Y - \widehat{Y}g)^2 \tag{4}$$

Where:

Y - symbolizes a single item of information from the collection.

$\widehat{Y}$- is the mean value obtained from all of the data points.

$\widehat{Y}h$ - is the mean for every condition or group.

n- Represents the number of data points in each group or condition.

When the components of the sum of squares (SST, SSB, and SSW) are computed, the degrees of freedom (df) corresponding to each element are determined in Equations. (5-10):

$$dfSST = N - 1 \tag{5}$$

$$dfSB = K - 1 \tag{6}$$

$$dfSW = N - K \tag{7}$$

N - is the number of data points across all groups or circumstances.

K - denotes the quantity of the groups or circumstances that are compared.

Mean squares (MS) are calculated by adding up the yards and counting the number of independent variables:

$$MSB = SSB / dfSB \tag{8}$$

$$MSW = SSW / dfSW \tag{9}$$

The E-value is determined by dividing the MSB by the MSW to determine the significance level of the differences between the two sets of data:

$$E = MSB / MSW \tag{10}$$

After that, the p-value related to the F-value and degrees of freedom $(dfSB, dfSW)$ is determined using the E-distribution. The p-value is the likelihood of a result as severe as the observed E-value if the groups are not different. If the p-value falls below a certain level of significance, such as .05, it indicates significant differences in means between groups or circumstances.

3.2.2.3 Multiple Regression Analysis

The purpose of multiple regression analysis is to ascertain the association between several independent variables and multiple dependent variables. The goal is to forecast the dependent variable's value based on the independent variables while taking other factors' effects into account. In multiple regression analysis, the dependent variable is a variable of interest that aims to predict or explain. The terms "independent variables," "predictor variables," or

"repressors" refer to the elements that are utilized to forecast or define the dependent variable. A regression coefficient describes the connection between each independent variable and the dependent variable. These coefficients indicate the strength and direction of each independent variable's influence on the dependent variable. The multiple regression models have the following Equation. (11):

$$Y = \beta0 + \beta1X1 + \beta2X2 + \ldots + \beta n * Xn + \varepsilon \tag{11}$$

Y- depicts the relying variable.

$X1, X2, \ldots, Xn$ - representing independent variables.

$\beta0, \beta1, \beta2, \ldots, \beta n$ - indicate the coefficients of the regression.

ε - denotes an inaccurate component or residual that accounts for the dependent variable's unaccounted-for fluctuation.

3.2.3 Chi-square test

Chi-square analysis is a useful statistical tool for evaluating hypotheses in clinical trials because of a limited number of parameters. Unlike other statistics, the Chi-square statistic can offer precise information on the groups causing the variances as well as the size of any significant variability in Equations. (12-14):

$$\sum C_{j-n}^2 = \frac{(N-B)^2}{B} \tag{12}$$

Where: N = present point.

B = real point.

$C2$ = Chi-square value.

$\sum C2$ = total of the entire cell' Chi-square values.

Chi-square values can be predicted using the following formula.

$$A = \frac{B_E \times B_R}{S} \tag{13}$$

Where: A = work value of the unit,

B_R = cell nucleus row edge,

B_E = cell's raw edge and

S = sample group as a whole.

Row and column marginal for each cell are used to divide the sample size.

$$D^2 = \frac{(M-A)^2}{A} \tag{14}$$

Statistics experts employ correlation measures to gauge the importance of a relationship. Cramer's V is the most used Chi-square power test. It is straightforward to calculate using the following Equation (15):

$$\sqrt{\frac{D^2/S}{(f-1)}} = \sqrt{\frac{D^2}{S(f-1)}} \qquad (15)$$

The Chi-square is an effective tool for data analysis and for determining the type of information that is analyzed.

4. Result

The participants' demographic characteristics are presented in Table 2. With 56.7% of the 1,449 participants as female and 43.4% of the participants as male, the study was conducted willingly. The participants' average age was 21.3. Among the participants, those enrolled in Bachelor of Science degrees made up the majority (74.3%), with the remaining participants (25.7%) in Master's programs. Additionally, 52.4% of participants lived in urban areas and 7.8% of participant's in rural areas.

Table 2: The participants' demographic characteristics (N = 1,449) [Source: Author]

OPTIONS	F percentage (%)
Degree of education	
Bachelor's degree	74.3
Master's course	25.9
Belongs to	
Rural region	47.8
Metropolitan region	52.4
Gender	
Male	43.4
Female	56.8

The opinions of students on online learning are shown in Table 3. Presently 27.1% of pupils used e-learning modes prior to COVID-19. Ninety-three percent of pupils studied online during the pandemic. Further research found that 50.8% of respondents are optimistic about accessing the internet after the pandemic. Furthermore, 52.2% of students reported feeling at ease using the resources and online learning that were available to them; 46.1% of students reported feeling uncomfortable and that the gadgets were not available. Compared to 54.2% of students, 46.1% are adept in online surfing, portable devices and networking. Furthermore, 54.8% feel uneasy about their security when learning online. Similarly, 69.9% of participants reported experiencing digital tiredness after taking extended online courses.

Table 3: The approach of students to Internet learning (N = 1,449) [Source: Author]

Variables	Authentic F (%)	False %
Is there a possibility of digital tiredness if you take an online course for an extended period?	69.9	30.3
Regarding the tools, were you trained? (Laptops and desktop computers, online and web browsing)	54.2	46.0
Is security and privacy a problem for online learning?	45.3	54.8
Do you feel at ease using the technology on the tool or platform that has been made accessible to you?	52.2	48.0
Did you use online education prior to COVID-19?	27.0	73.2
When the COVID-19 situation passes, do you plan to employ e-learning?	50.8	49.4
During COVID-19, are you utilizing the e-learning mode?	93.1	7.1

The socioeconomic characteristics influencing online learning were disclosed by participants in Table 4 and Figure 1. Of the students, 79.9% acknowledged that they spend little money on online education and that it can save time. But according to 87.9% of students, studying online is less enjoyable than learning in a conventional classroom. Due to their rural origins, the majority of students in experience slow internet speeds and 69.2% of them experience power outages.

Table 4: Perspectives on health, wealth, and education held by BZU distance learners (N = 1,449) [Source: Author]

| Variables	True F %	False F %
Prevention		
Gaining weight	82.4	17.8
Immune to the corona virus	72.7	27.5
Impacted vision	72.9	27.3
Education		
A proxy was present	74.1	27.1
Training for online system usage	61.7	38.5
Whole syllabus	49.9	50.3
The online approach is adequate for all subjects	44.2	56.0
Student participation	51.5	48.7
Economic and social		
Time and money savings	79.9	20.3
Online pupils are less engaged	87.9	12.3
Internet speed problem	81.9	18.3
Parents engaging	81.1	19.1
Electricity load shedding	69.2	31.0
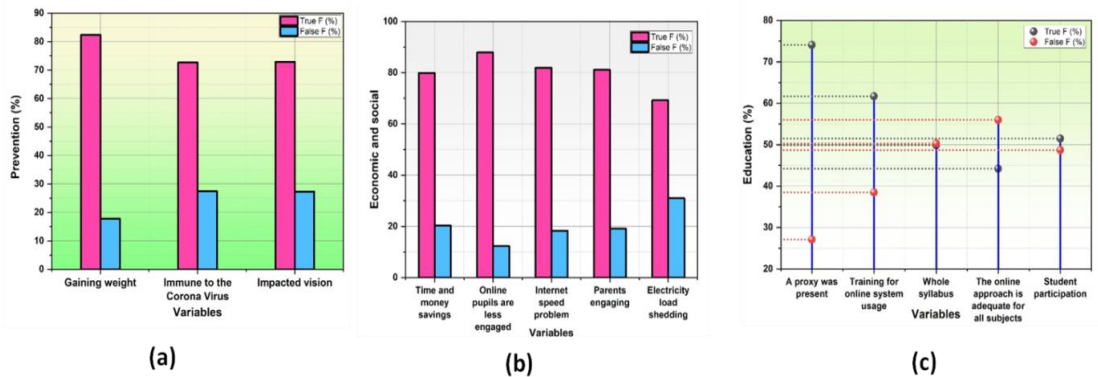
Figure 1: Outcomes of Perspectives for distance learners (a) Prevention, (b) Economic and social, (c) Education [Source: Author]

The other finding showed that students' health was impacted by laptops and other devices used for online learning; 72.9% of respondents felt that the light from computer screens was impairing their eyesight. According to the data, 82.4% of students acknowledged that there is significant health risks associated with increased technology use. Overeating, not exercising and utilizing technology for knowledge-seeking can contribute to overweight and obesity in kids during COVID-19 and the lockdown. Students have less public interaction as a result of the online courses, which slows the COVID-19 virus's spread. Additional data showed how

online learning affects education. Since the epidemic impacts the educational institutions, fewer students are communicating with instructors and peers online. These lockout and curfew scenarios highlight the basic requirements of distance learning students. The findings showed that online programmers teach pupils how to use devices, do web searches and browse the internet. Students' opinions on the benefits of online learning were as follows: 61.7% said it would help them learn and 51.5% said it would let them share their knowledge with others outside of their classroom. A student pointed out that one drawback of online learning was that it needed to allow them to complete their course material in the allotted time. Likewise, a majority of students, 56.1%, thought that virtual learning would replace in-person instruction. 74% of students who participated in online learning said that proxy attendance was a significant issue.

The amount of support from teachers and classmates during online classes is shown in Table 5 and Figure 2 results. Overall, despite the unique circumstances of the COVID-19 pandemic, children demonstrated the positive attitude of their professors. The encouragement that students receive from their educators, family and peers is the foundation of a learning attitude. 52% of respondents said they are happy with how fairly their teachers treat them. Remarkably, the data showed that 75.3% of students feel much supported by their teachers in case they require more assistance with their schoolwork. Comparably, 75.1% of pupils indicated that their teachers were prepared to help them use their devices and browse the internet. The way educators handled their students was polite and kind. Thus, educators are essential in assisting students in increasing the value of digital learning. When a large number of kids are confined indoors is aware of someone who is unwell or has passed away from COVID-19, listening is sufficient. Another critical component is the support of one's peers. According to the data, 67.6% of students communicate their joys and sorrows with one another and receive assistance from their peers. The findings show that 64% of students complete group projects and receive help from their peers when working on assignments in class.

Table 5: Collaborative Online Learning Community (N = 1,449) [Source: Author]

| Online Learning Community	In particular, F %	True F %	False F %
Products that classmates back			
Get assistance in class work and assignments	10.0	63.2	26.2
Share joy and sorrow	14.9	67.6	17.8
Accepts me as I am	22.1	68.0	10.3
Open about sentiments with friends	22.1	68.0	10.3
Support items for teachers			
Treat fairly	11.5	51.9	36.9
The teachers are excellent and friendly	25.4	55.3	19.5
Teachers available when needed	11.2	75.0	14.1
Online lessons allow me to gain additional support	17.2	75.3	7.8

(A)

(b)
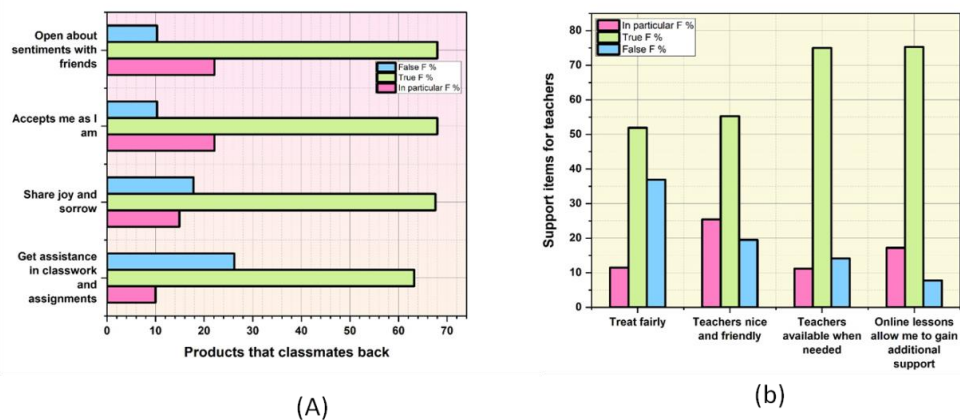
Figure 2: Outcomes of online learning (a) Products that classmate back, (b) Support items for teachers [Source: Author]

Table 6 and Figure 3 Compared to class instruction, online anatomy students have less engagement with professors. Twenty-five percent of first-year students, twenty-eight percent of sophomores and twenty-three percent of juniors and seniors report have trouble in maintaining a fast and dependable internet connection. Students in the first, second and third years attest to the need for lecturers to get e-learning communication skills training, while students in the third year attest to the same. Students in their first, second and third years are more likely to agree that online learning takes more time to grasp than classroom instruction.

Table 6: The most frequent issues students experienced during lockdown [Source: Author]

Problem	Students (%)		
	First -Year Students	Second -Year Students	Third-Year Students
Lacks Interaction	28	36	37
Need reliable access to internet	22	24	25
Lecturers require training	18	18	19
Requires much time	19	18	21
Takes longer to get feedback	20	19	21
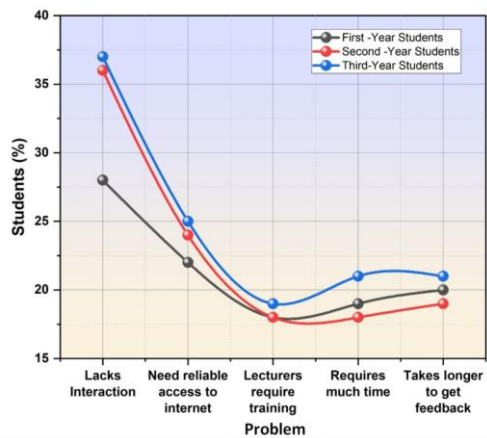
Figure 3: Pandemic Anatomy Instruction Challenges Histogram [Source: Author]

5. Discussion

In an effort to combat COVID-19, several countries have shut down educational institutions. To maintain children's right to education, educators, school administrators and instructors had to find alternatives to in-person teaching once schools, universities and institutions closed unexpectedly. To study at home, online courses are essential. Online teaching has produced an unparalleled number of programmers. Students need help to finish remote emergency training and education platforms online. During the worldwide epidemic, many nations prioritized food and medical facilities above schooling. Table 2 shows that 74% of pupils didn't use e-learning pre-COVID-19; hence, most needed to be equipped with internet devices when online sessions started. Despite these challenges, students like online learning and want to use it once COVID-19 ends. Thus, using technology in the classroom is essential nowadays. Teachers use webinars, PDFs, presentations and writings. During the pandemic, teachers use various methods to provide study materials. Teachers have organized seminars and video conferences to address the problem. They promote innovative learning throughout the crisis rather than using standard ways. Most students lack specific online learning resources. Less digital resources have increased the digital gap and student impoverishment. Many managers struggle to supervise them when they first encounter online schooling. Table 3 indicated that students' inability to study alone hindered their online learning at home. E-learning was less engaging than class because student–teacher contact and the classroom environment were more significant and simpler. Large internet traffic and instructional applications can provide technical challenges. Parents are stressed and struggling due to the recession due to their combined roles. Parents and teachers encourage children academically and technologically. The new research shows that kids are used to old-fashioned training. Table 3 shows that students require a decent learning environment, resources, motivation and mental health, especially in developing countries. Hence, e-learning programmers are inadequate. Technology usage has affected health in various ways (Table 3). Overuse of computers, tablets, smart phones and other gadgets for online learning contribute to physical and mental health issues. Online education has increased youngsters' digital use. Computer screen light causes significant visual impairment. Staying home and using technology excessively might cause obesity, poor eyesight, sleeplessness, anxiety, anger and behavioral disorders in youngsters.

E-learning basics must be learned firsthand. Practical courses cover a few fundamental online conduct issues. Learning is complex without hands-on experience and handy tools. Learning useful topics without graphics, 3D animations, textbooks and apps is neither practical nor ideal for students. Students face opposing concerns throughout this global epidemic. Students are affected by increased proxy participation and diminished in-class contact. Students need help to accomplish their assignments on time since they need personal gadgets or time to verify internet speed. In the face of the pandemic, teachers must create a learning atmosphere that motivates students. Despite the COVID-19 epidemic, students liked their lecturers. Students' learning mindsets are built on teacher, family and peer support. 51% stated they were happy with their instructors' fairness. Unexpectedly, 75.2% of students said their instructors give great study help.

6. Conclusion

Online learning has been essential during the COVID-19 pandemic. In university students in distance education confront problems, according to this study. Education is more straightforward and more effective with online courses. The two most significant impediments to learning are poor learning settings regarding pupils' incapacity to meet educational standards. The violations of digital security regulations regarding open files, rural internet outages and urban network slowness have been discussed. Online learning has yet to be shown to interest, hold, or concentrate pupils.

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