A Cross-sectional Survey of SWOT Analysis on Online Teaching Methodology during COVID-19 Pandemic among Undergraduate Students at a Tertiary Care Teaching Hospital

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ABSTRACT

Introduction: The outbreak of Coronavirus Disease-19 (COVID-19) was a global disaster that greatly impacted the education system. The Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis can be used to identify favourable and unfavourable factors and conditions in offline and e-learning systems, and to address problems in a targeted manner.

Aim: To evaluate the understanding and perception of students regarding the online learning system through SWOT analysis.

Materials and Methods: This cross-sectional study was conducted at a tertiary care teaching hospital in the Department of Pharmacology at a tertiary care teaching hospital in Tamil Nadu, India for a duration of one month in October 2021. The study included 589 undergraduate students from medical, dental, and allied health sciences. A preformed questionnaire using Google Forms was used to assess the students' perception of the online teaching methodology during the COVID-19 pandemic. Data was assessed using a five-point Likert scale, and results were expressed as numbers and percentages.

Results: The present study reported that 52.46% of the study participants had a strong positive opinion about the convenience and flexibility of online learning methods, as they can be accessed from anywhere and at any time. However, 214 (36.33%) participants agreed that monitoring students during online teaching was more difficult compared to classroom teaching. During the pandemic, when all educational institutions were closed, 412 (69.95%) students felt that completing a course within a stipulated period was made possible by the online method. On the other hand, 401 (68.08%) students believed that some countries do not recognise certificates from online learning systems, as they may not provide sufficient practical experiences compared to classroom teaching.

Conclusion: The current study showed that more than half of the study participants had a very favourable assessment of the portability and adaptability of online learning techniques. However, they also strongly felt that it was more challenging to keep track of students during online learning compared to traditional classroom methods. Online learning has both benefits and drawbacks, and it is important for individuals to decide how best to utilise it for their own gain while avoiding any negative side effects. Based on the experiences of the pandemic, it is crucial to find innovative solutions that are appropriate for different learning contexts.

Keywords: Class room learning, Coronavirus disease-19, e-learning system, Opportunity, Strengths, Threat, Weakness

INTRODUCTION

The COVID-19 is an acute infection affecting mainly the respiratory tract caused by a novel coronavirus {Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)} and is predominantly characterised by pulmonary inflammatory lesions [1]. The COVID-19 outbreak began in December 2019, causing devastation across the globe in all sectors, with the education system bearing the brunt. This pandemic had a significant impact on the progress of various government and private sectors. Millions of children were unable to attend school due to emergencies and ongoing humanitarian crises. According to the United Nations Educational, Scientific and Cultural Organisation (UNESCO), over 800 million learners were affected during the pandemic and unable to attend school or college [2]. The Ministry of Education instructed the closure of all educational centres and mandated the education department to make alternative arrangements for educating all students, regardless of their place of residence, circumstances, and socio-economic status. As a result, education has undergone a dramatic change, with a significant rise in e-learning and teaching being conducted remotely on digital platforms. Technology has played a crucial role in the education of students, teachers, and parents. The education system has been largely replaced by online learning methods through computers, laptops, and mobile phones [3]. SWOT analysis is an assessment and evaluation of various Strengths (S), Weaknesses (W), Opportunities (O), Threats (T), and other factors that influence a specific topic [4,5]. SWOT analysis is an instrumental way of analysing the current situation, both internally (strengths and weaknesses) and externally (opportunities and threats) [6,7]. This analysis can be used to identify favourable and unfavourable factors and conditions in offline and online learning systems, help solve problems in a targeted manner, and formulate strategic plans to guide informed decisions [8]. During the pandemic, e-learning helped bridge the digital divide between urban and rural populations in Nigeria and provided equal opportunities for students to continue their education. It became widely accepted and familiar to all age groups in a short period of time [9]. Although online learning during the pandemic has been extensively researched, undergraduate students in a medical or healthcare-related context face unique challenges and opportunities.

The present study adds a unique dimension to the existing research. Therefore, the present study was designed to evaluate the advantages and disadvantages of online learning methods and assess the understanding and perception of undergraduate students regarding the strengths, weaknesses, opportunities, and threats related to the online learning system in a tertiary care teaching hospital.

MATERIALS AND METHODS

The present study was a cross-sectional study conducted in the Department of Pharmacology at a tertiary care teaching hospital in

Tamil Nadu, India for a duration of one month in October 2021. The study was approved by the Scientific Committee and Institutional Ethical Committee (IEC/2933/23.9.2021). Written informed consent was obtained from all participants who agreed to participate.

Sample size calculation: The sample size was calculated using OpenEpi Info software using the formula.

Sample size (n)={[DEFF * N * p * (1-p)]/[(d^2/Z^2)(N-1)+p(1-p)]}

Population size for finite population correction factor or (fpc) (N): 70,000

Hypothesises % frequency of outcome factor in the population (p): 50%±5

Confidence limits as a percentage of 100 (absolute±%) (d): 5%

Design effect (for cluster surveys-DEFF): 1

At a 99% confidence interval, the sample size was found to be 658.

Inclusion and Exclusion criteria: All undergraduate students above 18 years of age who were willing to participate in the study were included. Those with incomplete submissions and those who were not willing to participate were excluded.

Study Procedure

A total of 589 medical, dental, and paramedical undergraduate students who met the inclusion criteria were enrolled in the study. A preformed questionnaire on SWOT [Table/Fig-1] using Google Forms was sent to the students. The questionnaire included demographic variables such as name, age, gender, email ID, and course details. It also included 24 questions related to restrictions and convenience of usage, network-related issues, understanding of online learning, cost, and cyber-crime in online education. There were six questions in each section: strengths, weaknesses, opportunities, and threats [10]. The questionnaire was validated using the face validation method. The five-point Likert scale was used to allow students to express their opinions, ranging from strongly agree, agree, neutral, disagree, and strongly disagree for each question. Scoring was based on the students' selections, with one point given for each option [11].

Strengths	Weaknesses
1. Overcomes the restrictions of time and place 2. Reduces cost of commuting/ transportation 3. Convenient and flexible 4. The spread of education on a larger scale 5. Ease of conducting webinars and scientific sessions and CME programs 6. Ease of accessing lecturers outside the official working hours	1. Slow and poor quality internet connection 2. Students are engaged with other websites during lectures. 3. Reduces the role of teachers in the educational process. 4. Lack of internet 5. Teachers lack skills and lack of interaction with the students 6. Difficulty in monitoring the students during online classes
Opportunities	**Threats**
1. Facilitating in-depth online learning 2. Conducting exams, interviews, job postings, and webinars on the online platform 3. Allows completion of courses within a stipulated time frame 4. Uniform reach of content 5. Handles faculty shortage 6. Provides one platform to connect students and teachers from faraway places during the lockdown period	1. Extra cost for students 2. Some countries do not recognise certificates of online learning. 3. Chat sessions and other distractions 4. Exchanging IDs and passwords for assignments 5. Risk of cybercrime 6. May affect overall health

[Table/Fig-1]: SWOT questionnaire.

STATISTICAL ANALYSIS

Descriptive statistics were used, and the data were entered into a Microsoft excel sheet. The results were expressed as numbers and percentages.

RESULTS

A total of 589 participants were included in the present study. The SWOT questionnaire included 24 questions, with each section

consisting of six questions. In the strengths section, 309 (52.46%) of the study participants had a strong positive opinion about the convenience and flexibility of the online learning method, allowing them to access it from anywhere and at any time [Table/Fig-2]. In the weakness section, 214 (36.33%) students reported difficulty in monitoring students online compared to classroom teaching [Table/Fig-3]. During the lockdown period, when the education system was at stake, completing a course within a stipulated period was a challenge, but it became an opportunity made possible by the online method, as agreed by the majority of undergraduates, i.e., 412 (69.95%) [Table/Fig-4]. Additionally, 401 (68.08%) students expressed concern that some countries may not recognise certificates from online learning systems, posing a threat to their future [Table/Fig-5].

Strengths (N=589)	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Overcomes the restrictions of time and place	161 (27.33%)	318 (53.99%)	90 (15.28%)	15 (2.55%)	5 (0.85%)
Reduces cost of commuting/ transportation	154 (26.15%)	411 (69.78%)	21 (3.57%)	2 (0.34%)	1 (0.17%)
Convenient and flexible	309 (52.46%)	193 (32.77%)	77 (13.07%)	7 (1.19%)	3 (0.51%)
The spread of education on a larger scale	168 (28.52%)	293 (49.75%)	109 (18.51%)	8 (1.36%)	11 (1.87%)
Ease of conducting webinars and scientific sessions and CME programs	154 (26.15%)	303 (51.44%)	122 (20.71%)	6 (1.02%)	4 (0.68%)
Ease of accessing lecturers outside the official working hours	209 (35.48%)	145 (24.62%)	174 (29.54%)	39 (6.62%)	22 (3.74%)

[Table/Fig-2]: Strengths.

Weaknesses (N=589)	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Slow and poor quality of internet connection.	174 (29.54%)	318 (53.99%)	90 (15.28%)	5 (0.85%)	2 (0.34%)
Students are engaged with other websites during lectures.	98 (16.64%)	254 (43.12%)	135 (22.92%)	57 (9.68%)	45 (7.64%)
Reduces the role of teachers in the educational process.	47 (7.98%)	97 (16.47%)	21 (3.57%)	303 (51.44%)	121 (20.54%)
Lack of internet at home for students.	165 (28.01%)	98 (16.64%)	126 (21.39%)	124 (21.05%)	76 (12.90%)
Teachers lack skills and lack of interaction with the students.	122 (20.71%)	143 (24.28%)	112 (19.02%)	153 (25.98%)	59 (10.02%)
Difficulty in monitoring the students during online classes.	214 (36.33%)	155 (26.32%)	174 (29.54%)	14 (2.38%)	32 (5.43%)

[Table/Fig-3]: Weaknesses.

Opportunities (N=589)	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Facilitating in-depth online learning	54 (9.17%)	47 (7.98%)	115 (19.52%)	139 (23.60%)	234 (39.73%)
Creation of an online platform for conducting examinations, interviews, job postings, webinars	159 (26.99%)	303 (51.44%)	112 (19.02%)	11 (1.87%)	4 (0.68%)
Allows completion of courses within a stipulated time frame	153 (25.98%)	412 (69.95%)	20 (3.40%)	2 (0.34%)	2 (0.34%)
Uniform reach of content	103 (17.49%)	199 (33.79%)	279 (47.37%)	4 (0.68%)	4 (0.68%)

Handles faculty shortage	168 (28.52%)	293 (49.75%)	113 (19.19%)	8 (1.36%)	7 (1.19%)
Provides one platform to connect students and teachers from faraway places in lockdown period	152 (25.81%)	305 (51.78%)	125 (21.22%)	3 (0.51%)	4 (0.68%)

[Table/Fig-4]: Opportunities.

Threats (N=589)	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Extra cost for students	174 (29.54%)	309 (52.46%)	86 (14.60%)	12 (2.04%)	8 (1.36%)
Some countries do not recognise certificates of online learning	144 (24.45%)	401 (68.08%)	22 (3.74%)	13 (2.21%)	9 (1.53%0)
Chat sessions and other distractions	187 (31.75%)	209 (35.48%)	97 (16.47%)	54 (9.17%)	42 (7.13%)
Exchanging IDs and passwords for assignments	122 (20.71%)	114 (19.35%)	44 (7.47%)	125 (21.22%)	184 (31.24%)
Risk of cybercrime	154 (26.15%)	303 (51.44%)	122 (20.71%)	6 (1.02%)	4 (0.68%)
May affect overall health	206 (34.97%)	174 (29.54%)	143 (24.28%)	39 (6.62%)	27 (4.58%)

[Table/Fig-5]: Threats.

DISCUSSION

In the present study, the major strength reported was the reduced cost of commuting/transportation, with 565 (95.93%) students acknowledging this advantage. Slow and poor quality of internet connection was reported as the weakness of online classes by 492 (83.53%) students. However, for 462 (78.43%) students, online classes were seen as an opportunity to learn from distant places during the lockdown period. They also agreed that the online platform offered opportunities for conducting examinations, interviews, job postings, and webinars. On the other hand, 483 (82%) of the students expressed concern about the high cost of online learning, considering it a potential threat.

Strengths

Regarding the strengths of the present SWOT analysis study, 479 (81.32%) students believed that online classes overcome the restrictions of time and place, and it reduces the cost of commuting/transportation by 565 (95.93%). Students' convenience and flexibility in using the program were reported by 502 (85.23%) students, and the spread of education on a larger scale was acknowledged by 461 (78.27%) students. The ease of conducting webinars, scientific sessions, and CME programs was agreed upon by 457 (77.59%) students. A study conducted by Gupta RM and Sharma P stated that 58.65% of students agreed that online classes have the strengths of accessing classes anywhere, anytime from their own places. The study also reported that 50.81% saved time, 64.86% saved money, and 85.68% of students agreed that online classes reduced the cost of commuting/transportation [10].

Online learning has the benefit of attending classes from anywhere at any time, providing convenience and flexibility for students. With the economic downturn caused by job losses and shutdowns, people were unable to spend money on their routine lives. Online learning became a tool to streamline students' access to teachers and allowed educational institutions to reach a wider network of students beyond geographical boundaries. By utilising online resources such as videos, Portable Document Files (PDFs), and podcasts, teachers can enhance their instruction methods. Additionally, the availability of study materials online contributes to a paperless learning system, which has a positive impact on environmental safety. Online classes decrease the chances of students missing classes and can be attended from home, reducing attendance shortages. The cost of transportation, mess fees, hostel stays, and time spent commuting

to colleges is reduced with online classes. Lectures can be recorded, archived, and shared for future reference, allowing students to access learning materials at their convenience. This frees up time for other activities such as extracurricular activities, spending time with family, and socialising [10].

Weaknesses

In the present study, 492 (83.53%) students reported the slow and poor quality of internet connection. Additionally, 352 (59.76%) students indicated that they were engaged with other websites during lectures, 263 (44.65%) students mentioned a lack of internet at home, and 369 (62.65%) students expressed difficulty in monitoring students during online classes. Furthermore, 265 (44.99%) students felt that teachers lacked skills and did not interact with students, and 144 (24.45%) students perceived that online classes reduced the role of teachers in the educational process. A similar study conducted by Bhati S et al., showed that 51.62% of students may not be attentive, and 67.03% of students fully agreed that teachers were unable to check on every student, making online learning less feasible. Additionally, 48.92% of students felt that learning in large groups online created chaos, as some students engaged in playing pranks and harassing teachers, as they were difficult to identify during online classes [12].

One of the greatest challenges of online learning was sitting in one place and concentrating on the screen for a long period, with a higher chance of getting distracted by social media or other websites. Therefore, it was vital for teachers to keep their online classes attractive, appealing, and interactive to help students stay attentive during the session. The main drawback of online classes was the need for uninterrupted internet connection. Online classes had limited interactions between students and teachers, resulting in a poorer understanding of the subject. Many parents were worried about the health risks for children who spent a significant amount of time in front of the screen with poor posture [10].

Opportunities

In the present study, 457 (78%) of students agreed that the online teaching method acts as a single platform for teachers and students to learn from distant places during the lockdown period. Additionally, 462 (78.43%) students agreed that the online platform offers the ability to conduct examinations, interviews, job postings, and webinars. A similar study conducted by Gupta RM and Sharma P found that online learning provided more opportunities as perceived by university students, with 457 (78%) students agreeing that it enables students and teachers from faraway places to join on one platform [10]. Favale T et al., reported that online learning provides the opportunity for remote working and collaborations during the outbreak of the COVID-19 pandemic [13]. Swan K stated in their study that blended learning provides more opportunities for student engagement and active learning [14].

Threats

Inadequate planning of curriculum and activities can result in poor learning outcomes. In the present study, 483 (82%) of students reported that the cost of online learning is high. Additionally, 396 (67.23%) students agreed that online learning had a chance of distraction, and 380 (64.51%) of students stated that online learning increases the risk of cybercrime. Furthermore, 457 (57.59%) students expressed concerns about the impact of cybercrime, and 380 (64.51%) students believed that online learning affects health. A study conducted by Graf F mentioned that online learning can increase cybercrime, such as identity theft, impersonation, inadequate authentication, and age-inappropriate content viewing on websites [15].

While online learning allows for attending classes from anywhere with convenience and flexibility, it is important to note that having

an uninterrupted internet connection is a major drawback. Although cybercrime poses a significant threat, the online learning system still allows individuals to gain knowledge through free online resources.

Limitation(s)

The present cross-sectional survey provides a snapshot of the situation at a single point in time. It does not capture changes or trends over time, and it may not reveal causal relationships between variables. Depending on the timing of the survey, student responses may vary based on their experiences during different phases of the pandemic. Early responses may differ from later ones as institutions adapt and improve online teaching methods.

CONCLUSION(S)

The reduced cost of commuting/transportation was the major strength of online learning, while the slow and poor quality of internet connection was identified as a weakness. The opportunity presented by online learning was the ability to learn from distant places during the lockdown period and to conduct examinations, interviews, job postings, and webinars. The high cost of online learning was reported as the most common threat. There is an urgent need to focus on connectivity, content, and capacity to ensure access to quality education for all. The current pandemic has pushed India to escalate its education sector towards blended learning. Although online learning has its pros and cons, it is up to individuals to use it wisely for their benefit and to avoid falling prey to its harmful consequences.

Acknowledgement

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