Undergraduate students' perception and satisfaction regarding online learning system amidst Covid-19 pandemic

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Abstract
Background: During COVID-19 pandemic, to forestall the outspread of contagion, all academic activities where physical presence was mandatory were halted. This prompted the shifting of educational activities to the online learning system. Current investigation aimed to determine the perception of undergraduate students of various disciplines about online learning which has been implemented Government Medical College, Solapur in the wake of COVID-19 lockdown.
Methods: A cross-sectional descriptive study was conducted and data was collected from medical students studying in Government Medical College, Solapur. Utilizing Openepi, the calculated data sample size was 600. Students were asked 23 different questions including a validated and reliable scale (α=0.952) composed of 14 questions to determine the satisfaction level of students from e-learning. Descriptive statistics, independent sample t-test, ANOVA and chi-square test were used to analyse data through SPSS.
Results: The most broadly embraced teaching methodology was online classes through Zoom Application. According to the developed scale, overall, 78% of students were dissatisfied from online learning. Students also raised concerns over assessment methods, student-instructor communication, fairness of examination and difficulty in understanding concepts. Majority of students preferred classroom teaching and 81% of respondents didn't want to continue with e-learning.
Conclusion: Results have depicted that students are not satisfied with e-learning and they pointed out some critical defects in the system. Authorities should treat this issue as top-priority for provision of good quality education and to save the future of undergraduate students.

Keywords: COVID-19; education; e- learning; perceptions

Introduction

COVID-19 is the severe pandemic of the twenty- first-century which took the entire world by surprise. On December 31st, the World Health Organization reported a cluster of instances of novel corona virus (COVID-19) in Wuhan city, China. [1] Due to high contagiousness, the virus spread in the world rapidly and became a global health challenge in no time. On March 11th, 2020 COVID-19 was proclaimed as a pandemic by the WHO. [2] This pandemic has prompted tremendous civil public health and monetary challenges worldwide and has influenced the daily life of millions of individuals either by the effect of the infection itself or by the dread of national and international restrictions. [3] In India, the principal instance of COVID-19 was detected on 27th, January 2020 in the state of Kerala. In a matter of few weeks, the tally of COVID-19 patients reached to 4601 with 66 demises. (April 10, 2020). [4] The rapid and successive spread of virus alarms the country of decimating forthcoming. Just after two days of declaration of COVID-19 Pandemic, Ministry of Education, India ordered the suspension of academic operations among all schools, colleges and universities. [5]

Due to the global threat of novel corona virus, unprecedented situation prevailed throughout the country. The ongoing educational activities were abruptly halted having devastating impact on all education delivery systems with eventful outcomes for the students. Therefore, most of the universities shifted to online conveyance mode. Many universities started their systems of online education as per their feasibility yet it was difficult to grasp on the new system by non-techno savvy students and educators. [6]

Online education is certainly not a new concept and numerous universities around the globe award accredited degrees on the premise of an online learning curriculum. [7] Studies have indicated that E- learning is one of the strategy that address the training challenges encountered in developing nations by supporting efficient content conveyance, expanding access and diminishing expenses. [8] In modern era, we cannot invalidate the magnanimity of digital technology's impact on our daily life. [9] The prospering creative advancements and learning frameworks both for educating and appraisal gives an utilizable answer to instructors and permit strategy builders a chance to actualize the utilization of latest digital technology during the days of lockdown for provision of quality education. [10]

Despite the phenomenal unwavering quality, proficiency and attainability of online learning methodologies and their appreciation and implementation in prestigious institutions worldwide. [11] Shockingly in India, these latest and innovative technologies were not encouraged by universities as a formal model of education. [12] According to various studies reasons behind non- acceptability of online learning can be concluded as lack of access to high-quality internet, interaction gap between tutor and students, non-compliance with technical gadgets. [13, 14] However, the current pandemic turned the tides and almost every university is compelled to shift their services on online learning mechanism. Medical education which requires a ton of clinical work and observations is also been transferred to the online learning framework. [15] Due to the rapid shift of all academic activities from conventional classroom teaching to digitalized learning environments, the absence of Information Technology (IT) knowledge and training, made it difficult for learners and educators to get acclimatized to new learning processes. [16]

It is imperative to determine the students' perception about online system, their satisfaction regarding teaching methodologies and assessment methods. It is essential to dig out the quality of education system and to uncover that whether students want to proceed with it or not. It is also important to find out whether students are satisfied with the online learning and assessment approaches. To evaluate the quality of the virtual learning environment, it is necessary to be familiar with the perception of students, the main stake holders of academic learning. For the development, betterment, progression, continuation and dispersion of cost- friendly high-quality online education in future is strongly based on the prevailing global circumstances pertaining to the pandemic. In this study, we aimed to access the above-mentioned issues and satisfaction regarding online learning amidst of this pandemic from undergraduate students' perspectives.

Material and Methods

A cross-sectional descriptive study was conducted during the months of May and June 2020 after the students had at least two to three months of experience with online learning. Data was collected from Government Medical College, Solapur. Ethical approval was granted by Ethical Committee of the college. Openepi software was used to calculate the sample size. Keeping margin of error at 4% and design effect 1 (at 95% confidence level), the calculated sample was 600. [17] (200 students from 1st year MBBS, 200 from 2nd year MBBS and 200 from 3rd year MBBS) Convenience sampling technique was utilized for data collection. Participants were provided with a 27-item containing questionnaire including open and close-ended questions. It consisted of demographic characteristics of student participants, certain baseline information about online learning and a 14-item scale exhibiting students' satisfaction with their online teaching environments. Likert scale was used for scoring the satisfaction scale with five points (1- Highly satisfied, 2- satisfied, 3- neither satisfied or dissatisfied, 4-dissatisfied, and 5-highly dissatisfied). The questions were intended to cover almost every important aspect of online learning which are essential for student satisfaction. The Cronbach's Alpha score of the questionnaire was found to be 0.952 which shows that the internal consistency of the questionnaire is excellent and is profoundly reliable. The maximum possible score was 70 and minimum 14. The higher the score, the higher the dissatisfaction of students with online learning was assumed. The highest possible score of scale was 70 and lowest 14; the cut-off point was set to be 35. Student scored 35 or less was classified as a satisfied student while whoever scored higher was placed in the category of dissatisfied students. All 14 questions were retrieved from previous authentic studies [18, 19] and Online Student Satisfaction Survey *Proforma* of Brockport College, New York [20].

The fourteen questions-based scale incorporated fundamental and significant items in terms of learning environment and interactions, assessment methods, technical and administrative support, necessary for high-quality education. Perception of students about those prime factors can assist in uncovering the quality of education. A pilot study was also conducted and the questionnaire was modified according to results and recommendations of respondents. Other questions aimed to determine demographics, the mode of teaching method being used, perception of students about the fairness of the exam and how they rate online education.

As our data collection timeline fell into COVID-19 pandemic when an unpredictable lockdown was ensued, with all educational institutions closed down for an indefinite time, we had to rely on online data collection. Subsequently, google form was utilized with clear instructions regarding consent, confidentiality and objective of the study. The link of google form was distributed among students through various academic Whatsapp groups and also sent to the emails provided by class representatives (previously contacted for this purpose) of each year. Undergraduate students who were taking online classes and were willing to participate by accepting the consent form were included in this study.

Data was extracted from google forms by creating a spread sheet, and through comma separated file (CSV) responses were imported on SPSS Version 16.0 IBM INC. Chicago, USA. The variables were adjusted, based on numeric and string properties, for execution of proper statistical tests. Frequencies, means and standard deviations were calculated through descriptive statistics. Differences in mean scores of student groups (institutional setting, gender) were analysed and compared through independent sample t-test and one-way Analysis of Variance (for field and year of study). Student satisfaction and dissatisfaction with online learning was also cross tabulated with their demographic characteristics using Chi-square test. *P*-value (set at 0.05) and 95% confidence intervals were reported.

Results

The 600 participants, selected for this study, the mean age of students was 21.5±1.8. Gender wise, overall, 52.7% males and 47.3% female students participated in the study. Majority of the participants had good experience and knowledge of using internet, computers and other latest gadgets. Table-1 shows demographics and student's distribution frequencies of most commonly used teaching methodologies.

The mean score of students, denoting their satisfaction level with online learning, calculated was 47.39±14.130 (out of maximum possible score of 70 on five-point Likert Scale), with minimum score of

14 and maximum 70. The satisfaction level of different student groups was also compared using independent-sample t-test and one-way analysis of variance (ANOVA). The results showed that male students were more likely to be dissatisfied with online learning compared to female students ($p=0.009$).

Moreover, Students who scored 35 or less were categorized as satisfied students while who scored above 35 were viewed as dissatisfied students. Majority of the students showed higher dissatisfaction with online learning (78%). The overall satisfaction scores across different disciplines are illustrated in the Figure-1. Additionally, individual items on satisfaction scale were analysed to identify the main enablers and disablers of online learning based on students' perceptions. The top three enablers and disablers of online learning are shown in Table-3. The cross-tabulation results showed higher satisfaction with online learning in 1st year medical students compared to final year medical students. (p-value = <0.001) Table-4.

Students were also asked to rate the satisfaction level from online classes on a scale of 1–10. The mean score of all students was found to be 4.34±2.46. Among medical students the mean score observed was 4±1.2. Asking about readiness of students to take online classes in future, only 18.8% of students want to take online classes in future. Field wise the percentage of students who do not want to take online classes in future were 75% medical students.

Additionally, students were also inquired about the fairness of online examination system. Only 5% of students strongly agreed that online exams are fair, 9% of students agreed with this statement while 10% of students neither agreed nor disagreed. 23% of students disagreed and 53% of students strongly disagreed from the above statement. Answering the question that online classes are good alternative to conventional classes, 45% students strongly disagreed, 25.2% disagreed, 13% neither agree or disagree while students who agree and strong strongly were 10.7% and 5.8% respectively.

Table 1: Basic characteristics of student participants

	Overall	1st year	2nd year	Final year
Age Distribution (years)	21.5±1.8	21.3±1.9	21.82±1.7	21.4±1.9
Gender Distribution				
Male	52.7%	33.5%	65%	43.5%
Female	47.5%	66.5%	35%	56.5%
Most common Teaching Methodology				
Online classes on Zoom Application	50.7%	47%	67.5%	37.5%
WhatsApp Groups	14.2%	6.5%	4.5%	31.5%
University's own portal	12.2%	10%	13.5%	13%
Daily Quizzes	7.7%	22%	Nil	Nil
Assignments on weekly basis	6.7%	5.5%	4%	11%
Teams and Google classroom	5.3%	4%	9%	3%
Other methods (ppts, pdf, audio etc.)	3.2%	5%	1.5%	4%

Table 2: Comparison of satisfaction level of different student groups with online learning

Characteristic	Mean (SD)	p-value	*95% CI
All Students	47.39 (14.130)		
Gender			
Male (N=284)	48.98 (14.586)	0.009	
Female (N=316)	45.97 (13.573)		
Academic Year			
1st Year (N=96)	44.92 (14.941)		41.89 – 47.94
2nd Year (N=104)	47.38 (13.327)	0.296	44.79 – 49.98
3rd Year (N=218)	47.86 (14.394)		45.94 – 49.78
4th Year (N=182)	48.15 (13.785)		46.13 – 50.16

*95% CI: 95% Confidence Interval

**Table 3:** Top three enablers and disablers towards online learning based on students' perception

Items	Mean (SD)
Top three enablers of online learning Availability of course materials Instructors' use of technology	2.977±1.30
Availability of information about course requirements	2.977±1.21

Top three disablers of online learning	3.038±1.30
I can more easily monitor my academic progress in online courses Assessment of my academic	3.672±1.22
progress is more accurate in online courses I am more likely to ask questions in an online course	3.658±1.27
	3.630±1.25

Table 4: Cross tabulation of satisfied and dissatisfied students with demographics

Characteristic	Satisfied Students	Dissatisfied Students	χ* and *p*-value
Gender of students			
Male (N=284)	N=131 54 (19%)	N=469 230 (81%)	2.51
Female (N= 316)	77 (25%)	239 (75%)	0.11
Year Wise Students			
1st year (N=200)	N=131 61 (30%)	N=469 139 (70%)	17.9
2nd year (N=200)	26 (13%)	174 (87%)	<0.001
3rd year (N=200)	44 (22%)	126(78%)	

* χ = Pearson's Chi-square value
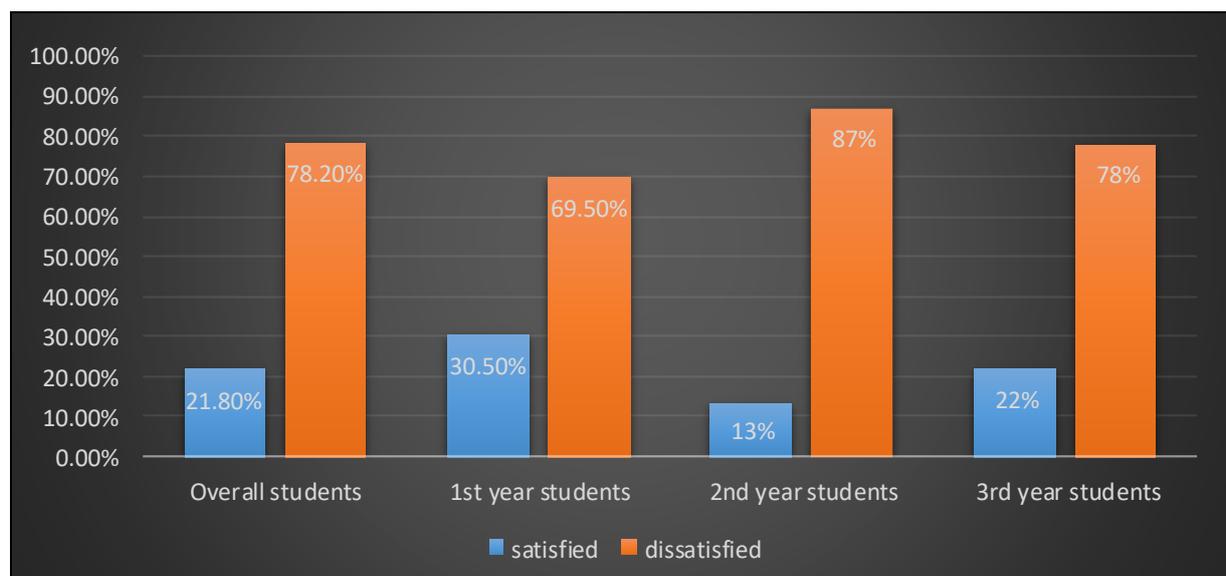
Fig 1: Year-wise Students satisfaction with online education

Discussion

Our study highlighted that overall, 78% of the students are not satisfied with their current learning systems. Male students were more dissatisfied with their online learning experiences. They are facing difficulty in engagement with the instructor in a meaningful manner, understanding complex concepts and assessment methods. Another study carried out in a medical college in Pakistan also suggests the same results, they reported that 77% of students have negative perceptions about online learning [21] while most students (84%) reported communication gap between educator and learner as a major obstacle while current investigation reported 72%, another investigation additionally bolsters our evidence by demonstrating that 78% of their study sample reported the same [16]. A review article by Kauffman, published in Research in Learning Technology in 2015, highlighted the fact that certain characteristics of students might contribute towards achieving success and positive learning outcomes with online learning. The review also reported that online learning may not be an appropriate medium of learning for all students. [22] It concluded that understanding the particular students' attributes are important to assist in designing responsive and quality online courses to fulfil their specific learning needs. Stemming from the same, we identified certain enablers and disablers of effective online learning. The enablers were; convenient availability of course materials, effective use of technology and easily available information about course requirements. This shows that given easy access to the required learning needs, students can excel in their online learning experiences. Institutional support and administrative facilitation in terms of technology and information resources is of fundamental importance for positive learning outcomes of the students. On the contrary, certain disablers (barriers towards online learning) were also identified; these were, difficulty on part of students with monitoring of their academic progress with online courses, perceived in accuracies in assessment methods and students' reported inability to ask questions from instructors in their online courses. A study by Bolliger and Wasilik published in 2009 in the USA also reported three important factors that affect students' success in online learning, namely, student- related, faculty-related and institutional-related factors. [23] This shows that both students and instructors' motivation is important for a successful online program as time and resources constraints play an immense role in steering an otherwise complex online teaching environment. With a more collaborative and facilitating learning and the administration on board, these issue of dissatisfaction with

tracking of academic progress and assessment issues with online teaching can be successfully mitigated. Another study by Guan-Yu Lin and Laffey in 2008 highlighted the importance of more self-efficacy and enhanced social skills of students to anticipate greater success with online learning experiences. [24] Yet another study by Dziuban *et al* in Florida termed online learning to be a psychological contract between students, instructors and institutions for greater satisfaction with online learning. [19]

In current study, more than 70% students were of opinion that classroom teaching was superior than online classes, supported by two other national studies which represented 75% [21] and 71% [16] of their sample with the same sentiment. The fairness of examination framework and grading scheme are considered as a spine of any education system. A fair and clear exam is vital for deserving students which enhances the confidence and trust of learners. Tragically this study reports that 76% of respondents have severe objections on the justness of online assessment strategies which is horrifying. This shows that the majority of students have objections on the fairness of online exams which puts a question to merit. However, a recent Turkish study led by H.Ilgaz *et al* demonstrated the candidates' perception that online exams are fair, reliable and meritorious. [25] The conceivable reason behind this might be the un- organized execution of web based learning framework having technical loop holes and bugs with inexperienced staff. Furthermore, our investigation additionally exhibits that only 18.8% of students want to continue online learning in future, this statement clearly shows the degree of satisfaction from online education.

Tragically amid COVID-19 crises, the rapid transformation of classroom education into online education brought many discrepancies and hurdles for undergraduate students in Solapur. Most of the surveyed undergraduate students have dubitation about online learning methodologies. Non-accessibility to high-speed internet, absence of legitimate cooperation and contact between learners and educators and inadequate training about information technology are significant obstacles faced by undergraduate students [16]. Students who are proficient in manoeuvring computers and other contemporary digital gadget and have access to top-internet also seems to be disconsolate. [26] Various universities are utilizing diverse kind of online software and applications for continuation of academic activities. Our study demonstrated that the most broadly utilized teaching mechanism adopted by universities is online teaching through Zoom Application (50%). This was also reported by a study carried out at Harvard Medical school. [27] Another study from a neighbouring country revealed that 45% of the teachers were using Zoom for academic purposes. [28] Second, most widely teaching approach was the distribution of teaching content and discussions about topics through WhatsApp groups (14%), 12% of students reported that they are being taught by the Learning Management System (LMS) portal. Whereas strategies like daily and weekly assignments and quizzes, audio lectures are PowerPoint presentations were likewise effectuated by some teaching departments. A study from Mizoram University also showed that WhatsApp, LMS portal, YouTube videos and softwares like Zoom and google meets were mostly embraced as teaching modes. [28]

Teaching methodology and environment always determine the outcome; it reflects what students have learnt and where they stand. It also has a strong impact on enthusiasm, professionalism and skills of learners which eventually results in achievements and success of students. So, evaluation of learning methodologies and supporting features is very crucial in any education system. To evaluate the learning methodologies which reflect quality of education is pivotal. However, students' perception about their learning can give experts a very good insight into a system. [29]

In this front-line period, to produce qualified doctors for today's environment which runs on advanced information technology principals there is need to reconsider the current implemented teaching methods which are educating and training medical school students. The classroom teaching was intended for the pre-internet era when the world was not digitalized. Electronic learning also known as virtual learning does not have the time and space limitations, and therefore, makes teaching and learning more convenient and effective via latest web-based software that can be accessed easily by smart phones or laptops. This modern communication system is an enormous need for today's education conveyance system. [30] The online teaching framework is being perceived by some global institutions, as hundreds of new online courses are added to the web each year and even degree programs are now taught online. [31]

However, still, the evaluation of online education is the significant challenge which makes it difficult to pick among conventional and online education methodologies. [32] Medical education and public health experts are taking a shot at it to arrive at a resolution. As if the latest mode of teaching proves to be more efficient and more constructive then it can be a major game- changer for accomplishing the goal "Health and Education for all" because education revamps Public Health and assists in Health egalitarianism. [33]

Limitation

In this study, limited number of students were selected, and also the perception of teachers was not considered. A larger sample with respondents from every university including both students and teachers can produce results which can be generalized. Moreover, we used a non- random sampling technique limiting our ability to generalize the findings.

Conclusion

Online teaching albeit with an added advantage of novel learning experiences is still faced with numerous challenges. Majority of students have raised some genuine objections which are non- avoidable obstacles in the

provision of quality education. In this era of Information Technology (IT), students still preferred classroom teaching over e-learning and pointed out few loop holes in teaching methodologies and also expressed concerns regarding injustice in evaluation methods. Despite worldwide acceptability and credibility of online education, the negative perception of students is quite mystifying and reflects that online education is not due to non-organized implementation of courses and absence of Information Technology training for both faculty and students. We that the universities should pay special attention to this matter and student-amicable e-learning system should be developed. It will not only provide quality education to students during this pandemic but will pave the way for permanent implementation of e-learning for students in distant and rural areas who cannot afford to attend universities in metropolitan cities. We recommend that a proper surveillance system for both students and teachers so that provision of high quality and student-friendly education could not be deterred. Besides that, it is very critical to determine the perception of the faculty regarding online learning because it will assist in the resolution of flaws in the system. We urge that this deplorable time in the midst of COVID-19 pandemic ought to be used to test and improve our virtual training framework.

Author's Contribution
FA: Conceptualizing of study, Manuscript writing, proof reading, Data collection, analysis and interpretation. **AK:** Statistical Analysis, Results write up, manuscript editing, proof reading and revision. WA: Supervision and Conceptualization. HN and SZ: Data collection, Data entry and proof reading.

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