Original Research Article

Knowledge and perception of massive open online courses among medical students of Perambalur district, Tamilnadu, India

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ABSTRACT

Background: Coronavirus outbreak has forced a prolonged closure of educational institutes all over world including India which have affected the regular classroom studies and skill acquisition by students. The aim of the study was to assess the knowledge and perception regarding mass open online courses (MOOC) among medical students.
Methods: A web-based cross-sectional study using google form survey tool was conducted among undergraduate medical students. Questions were asked on demographic information, use and accessibility of information technologies, awareness and utilization of MOOC and barriers and motivations for course enrollment and completion.
Results: Overall 224(54.9%) of medical students had ever heard about MOOC. Out of them, only 31.6% students had actually enrolled for any online course. Further, course completetion rate was only 11.6%. Age and year of study was significantly associated with enrolment to MOOC. Important motivation for enrolment were learning new thing, learning medicine and for better career prospects while common barriers were low internet speed and lack of time. Among those who completed the course, most of them had a satisfactory or very satisfactory level of satisfaction with regard to overall experience, quality of presented material, technology used, and video lectures.
Conclusions: There is poor awareness and utilization of MOOC among medical students which can hamper their learning particularly in absence on regular classroom teaching. There is need of blended curriculum harnessing the advantages of MOOC platform which will aid students continue learning in difficult times.

Keywords: Online, Learning, Education, Medical, Open, MOOC

INTRODUCTION

Due to coronavirus outbreak there has been a prolonged closure of educational institutes all over world including India which have affected the regular classroom studies and skill acquisition by students. Owing to pandemic there has been a tectonic shift in the way learning is happening. Restrictions on travel and physical distancing across the globe have meant that traditional means of transferring knowledge from experts to learners are challenged and online learning has taken the front seat.[1]

Online learning or e-learning complements the traditional face-to-face classroom learning system, has a potential of

wide reach and can be rapidly scaled-up. It is far more adaptive and provides personalized learning experience to help the students to become an independent life-long learner. Online learning can provide greater educational opportunities for students and can simultaneously enhance faculty efficiency. However, online learning requires substantial investment in human and infrastructural resources by the institute which is not always present in developing countries.[2]

In recent times, several massive open online courses (MOOC) are available both free and paid which may be useful if it is blended with traditional education methods. MOOCs are online leaning platforms and are increasingly available in the area of health and medicine. When offered

through reputable institutions, they can provide valuable access to reliable information without tempo-spatial constraints.[3] It offers open access and unlimited student participation. Learners have lot of autonomy to select learning resources and level of participation.[4] It can reach large number of students, is self-paced, promotes collaboration and interaction, includes assessments like peer assessment, and sometimes also provides options for certificates.[4]

In medical education also, the number of MOOCs is steadily increasing.[5] Indian medical education is moving toward competency based medical education (CBME). CBME has allocated substantial hours of 'Self-directed learning' (SDL) for medical students in each professional year aiming to produce lifelong learners.[6] Possibility of incorporating online learning including MOOC in undergraduate curriculum can help students in SDL.

Government of India had taken several decisions on promoting online education through NPTEL. NPTEL was launched in 2017 with an objective to supplement online lectures provided by some of the experienced teachers from renowned academic institutions which are available through free direct to home (DTH) channels (eg. swayam prabha TV) and youtube channel. Recently, NPTEL has also adopted the MOOC model with proctored examinations. Content based on undergraduate medical curriculum are available as freely downloadable video for interested learners throughout the world.[7]

However, information about awareness and perception level of medical students about massive online courses is very limited in India. With this background, we are conducting this study to assess the knowledge and perception regarding MOOC among medical students of Perambalur district during covid lockdown period.

Objective

Objective of the study was to assess the knowledge and perception regarding MOOC among medical students of Perambalur district college during covid lockdown period.

METHODS

Study design

A cross-sectional study using a structured, web-based, pilot-tested and self-administered questionnaire.

Study population and setting

All medical undergraduates currently studying at a medical college in Perambalur, Tamilnadu, India were included in this study. Medical college is located at Perambalur, a small district with nearly 5 lakhs population 250 km south of Chennai. It enrolls students mainly from Tamilnadu and other southern states of India. The college has been closed for over four continuous months due to corona pandemic

since 20th March 2020 and has not yet opened at the time of conducting this study. Students enrolled during academic years 2015 to 2019 were invited to participate in the study.

Students are enrolled in 5 and 1/2 years MBBS program which includes one-year compulsory internship. The course has been divided in three phases: first phase is called I MBBS is of one-year duration and includes pre-clinical subjects of anatomy, physiology and biochemistry. Second phase, II MBBS covers para-clinical subjects like pharmacology, microbiology, pathology and forensic medicine and last phase (III MBBS) includes clinical subjects and is divided into two parts of one year each.

Sample size and sampling technique

Sample size was calculated to achieve 95% confidence interval assuming the prevalence of awareness of MOOC as 50% and allowable error as 5%. The estimated sample size was 400 students to represent the study population. Invitation was sent to all students studying currently enrolled MBBS course and those undergoing internships. Out of total 750 students 425 responded to the web based self-administered questionnaire. Thus, overall response rate was 56.6%. Those giving informed consent were included in the study.

Questionnaire development and data collection

We used a free online survey tool, google form to administer the questionnaire (google form, google LLC, California, USA). A pilot study was conducted by administering the survey questionnaire form to 15 randomly selected participants. The questions were suitably modified based on the responses and feedback from the participants. Pre-tested survey questionnaire consisted of four sections: demographic information; use and accessibility of information technologies; awareness and utilization of MOOC and finally a section on barriers and motivations for course enrollment and completion. Students were asked to first enter a valid email id which was also used as a unique identifier of participants. Thereafter, demographic information such as age, sex, year of study of the participants was collected. Second section included seven questions about accessibility and use of Smartphone, laptop, tablet, computer etc, and internet use access. Third section was on questions about the awareness and utilization of free online courses and video series. Fourth section consisted question about motivation, barriers and satisfaction to course enrollment, course completion and certification. Grading of motivation, barriers and satisfaction level was done using likart scale on five-point scale (eg. strongly agree, agree neutral, disagree, strongly disagree). Survey form was validated by experts in research methodology before actual data collection.

All eligible study subjects were invited by using instant messaging platforms and social networking groups to

participate in our survey during the period of July 2020. Three tutors working with investigator were assigned the task of approaching and contacting the students. They obtained the student lists of currently enrolled students from administrative office. Each class has a whatsapp group and facebook group for facilitation of any study-related discussions. A covering message with the study's aims and a link to the online questionnaire was circulated among all the students through these social networking and messaging groups. The students were to first fill out a voluntary consent form after reading the study aims and instructions followed by completing the actual survey question. We sent up to three reminder messages to participants, prompting them to complete the survey. If we did not get a response within three-day, non-responders were approached two more time in a span of one week. The survey questionnaire consisted of total 25 questions and took on an average 10 minutes.

Analysis

The responses on google form was downloaded as excel sheet. The questions in excel sheets were transformed into variable of suitable length and imported into SPSS version 20. The imported data was cleaned by looking for any missing values, duplicate records and outliers which were suitably handled either by deleting such cases or by reconfirmation of the response through email. In final analysis, we included 408 cases after removing duplicate cases. Final data was analyzed with SPSS statistical package. Analysis was performed by cross-tabulation of the categorical variables with sex and enrollment status.

Chi-square test was performed to assess any significant difference between comparison groups. For continuous variables mean was compared between comparison groups using independent t test. P value of less than 0.05 was considered as significant.

RESULTS

Socio-demographic profile and use of information technology by medical students

Among the study participants 257(65%) were female and 151(35%) were male. Mean age of study participants was 20.6 years. Most of the study respondents were from II MBBS (25%) followed by interns (22.5%), III MBBS (part I) (21.6%), I MBBS (19.6) and III MBBS (part II) (11.3%). Almost all the students were using smartphone (99.8%). Average hours of devise use per week were 46 hours and for internet use was 43 hours by medical students. Average monthly expenditure on internet was 347 Rupees. Most of the students used the digital devise for entertainment (88.2%), study (80.4%), phone calls (69.9%), social networking (67.6%) and browsing websites (64.5%) and gaming (36.8%). A significantly higher proportion of males used digital devise for browsing websites (p value=0.038) and playing games (p value=0.001) as compared to females. Internet was used mainly for entertainment (86.5%), study (62.3%) and for social networking purpose (59.1%). Internet usage was significantly higher among males for browsing websites (p=0.001), study (p=0.01) and for playing games (p=0.001) (Table 1).

Table 1: Socio-demographic profile and usage pattern of information technology among study participant.

	Sex N (%)			
	Male (n=151)	**Female (n=257)**	**Total**	**P value**
Age(years) (mean±SE)	20.66±0.12	20.54±0.10	20.58±0.08	0.42
Year of study				
I MBBS	31 (20.5)	49 (19.1)	80 (19.6)	0.93
II MBBS	36 (23.8)	66 (25.7)	102 (25.0)	
III MBBS (part 1)	31 (20.5)	57 (22.2)	88 (21.6)	
III MBBS (part 2)	16 (10.6)	30 (11.7)	46 (11.3)	
Internship	37 (24.5)	55 (21.5)	92 (22.5)	
Type of digital devise used				
Smartphone	150 (99.3)	257 (100)	407 (99.8)	0.20
Laptop	68 (40.7)	99 (59.3)	167 (40.9)	0.20
Tablet/ipad	24 (42.9)	32 (57.1)	56 (13.7)	0.33
Desktop computer/smart tv	21 (47.7)	23 (52.3)	44 (10.8)	0.12
Hours of device use per week (mean±SD)	42.70±1.83	48.03±5.31	46.05±3.41	0.45
Purpose of device use				
Entertainment	137 (90.7)	223 (86.8)	360 (88.2)	0.23
Browse internet	107 (70.9)	156 (60.7)	263 (64.5)	0.038
Study	126 (83.4)	202 (78.6)	328 (80.4)	0.23
Phone	108 (37.9)	177 (68.9)	285 (69.9)	0.57
Social networking	105 (69.5)	171 (66.5)	276 (67.6)	0.53
Gaming	73 (48.3)	77 (30.0)	150 (36.8)	0.001
Internet use				

Continued.

	Sex N (%)			
	Male (n=151)	Female (n=257)	Total	P value
Yes	149 (98.7)	257 (100)	406 (99.5)	0.13
No	2 (1.3)	0 (0)	2 (0.5)	
Type of internet connectivity				
Mobile internet	123 (81.5)	217 (84.4)	340 (83.3)	
Landline broadband	9 (6.0)	6 (2.3)	15 (3.7)	
Both	19 (12.6)	34 (13.2)	53 (13.0)	
Hours of internet use per week (mean±SE)	39.26±1.79	45.31±5.27	43.07±3.39	0.39
Purpose of internet use				
Entertainment	132 (87.4)	221 (86.0)	353 (86.5)	0.68
Browsing websites	67 (44.4)	68 (26.5)	135 (33.1)	0.001
Social networking site	96 (63.6)	152 (59.1)	248 (60.8)	0.38
Study	112 (74.2)	160 (62.3)	272 (66.7)	0.014
Gaming	74 (49.0)	75 (29.2)	149 (36.5)	0.001
Monthly expenditure on internet in Indian rupees (mean ±SE)	378±35	329±19	347±18	0.21

Awareness and utilization of MOOC

Overall 224 (54.9%) of medical students had ever heard about MOOC. Awareness among female (60.7%) was significantly higher than male students (45.0%). When asked about "whether you are interested to participate in any online course" 77 students (18.9%) responded in negative while another 107 students (26.7%) couldn't decide on online course. A total of 129 (31.6%) students had actually enrolled for any online course. Of those who enrolled for online course only 15 students (11.6%) completed the course. Among those who completed only 3 students (20%) got certificates (Figure 1 and Table 2).
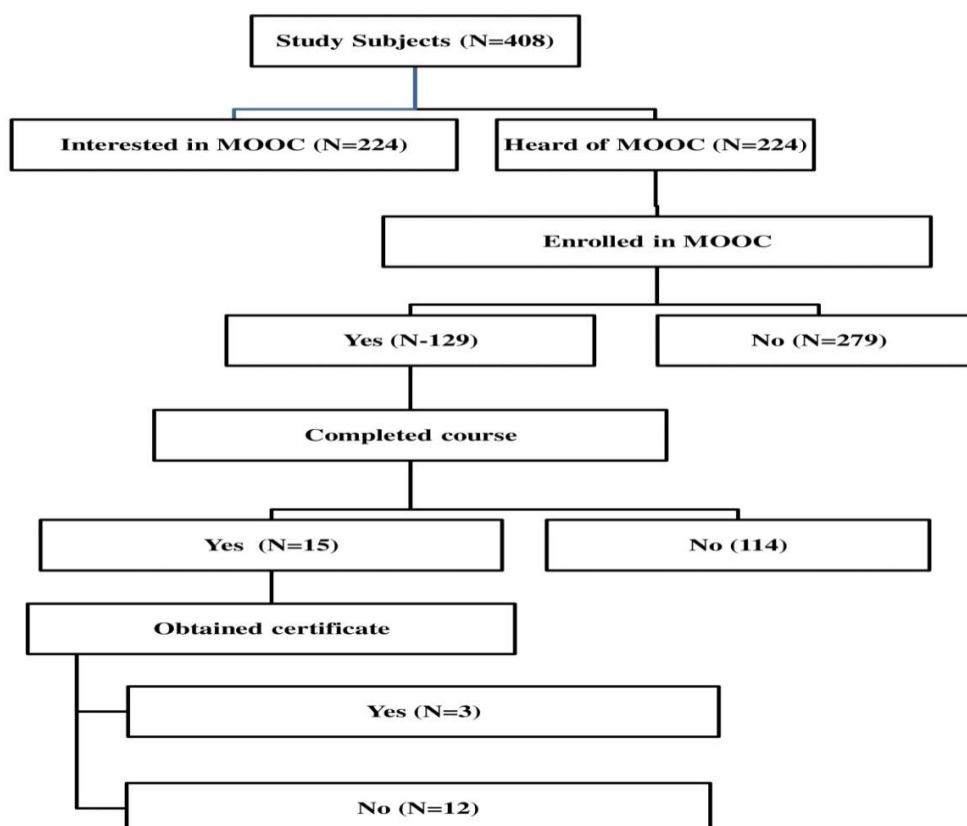

Figure 1: Awareness, intent, enrolment, completion to online courses among medical students.

Table 2: Knowledge, attitude, enrolment, completion and certification to MOOCs.

	Sex			
	Male N (%)	Female N (%)	Total	P value
Heard of any MOOC			-	
Yes	68 (45.0)	156 (60.7)	224 (54.9)	0.002
No	83 (55.0)	101 (39.3)	184 (45.1)	
Interested to participate in MOOC				
Yes	87 (57.6)	137 (53.3)	224 (54.9)	0.426
No	30 (19.9)	47 (18.3)	77 (18.9)	
Don't know	34 (22.5)	73 (28.4)	107 (26.2)	
Enrolled to MOOC				
Yes	52 (34.4)	77 (30.0)	129 (31.6)	0.34
No	99 (65.6)	180 (70.6)	279 (68.4)	
Completed enrolled course*				
Yes	7 (13.5)	8 (10.4)	15 (11.6)	0.59
No	45 (86.5)	69 (89.6)	114 (88.4)	
Obtained certificate for completed course#				
Yes	1 (14.3)	2 (25.0)	3 (20.0)	1.00
No	6 (85.7)	6 (75.0)	12 (80.0)	

*Only asked to those enrolled who were enrolled for any online course. #Only asked to those who completed any online course.

Determinants of enrolment to MOOC among medical students

Age and year of study was significantly associated with enrolment to MOOC. Mean age of enrolled students (20.8 years) was significantly higher compared to those not enrolled (20.47 years). Similarly, enrolment rate was significantly higher among interns and I MBBS students. A 32.6% of enrolled students were interns compared to 17.9% of non-enrolled students who were interns. Similarly, 21.7% of enrolled students were from I MBBS as against 18.6% non-enrolled who were from I MBBS. There was no significant association of enrolment rate with device and internet usage (Table 3).

Table 3: Determinants of enrolment to MOOC among medical students.

	Enrolment			
	Yes, N (%)	No, N (%)	Total	P value
Age (years) (mean±SE)	20.84±0.15	20.47±0.09	20.58±0.08	0.032
Year of study				
I MBBS	28 (21.7)	52 (18.6)	80 (19.6)	<0.001
II MBBS	15 (11.6)	87 (31.2)	102 (25.0)	
III MBBS (part 1)	29 (22.5)	59 (21.1)	88 (21.6)	
III MBBS (part 2)	15 (11.6)	31 (11.1)	46 (11.3)	
Internship	42 (32.6)	50 (17.9)	92 (22.5)	
Type of digital devise used				
Smartphone	129 (100)	278 (99.6)	407 (99.9)	1.00
Laptop	59 (45.7)	108 (38.7)	167 (40.9)	0.18
Tablet/ipad	23 (17.8)	33 (11.8)	56 (13.7)	0.10
Desktop computer/smart tv	13 (10.1)	31 (11.1)	44 (10.8)	0.75
Hours of device use per week (mean±SD)	53.98±10.32	42.39±1.45	46.05±3.41	0.11
Purpose of device use				
Entertainment	112 (86.8)	248 (88.9)	360 (88.2)	0.55
Browse internet	85 (65.9)	178 (63.8)	263 (64.5)	0.68
Study	104 (80.6)	224 (80.3)	328 (80.4)	0.94
Phone calls	89 (69.0)	196 (70.3)	285 (69.9)	0.80
Social networking	85 (65.9)	191 (68.5)	276 (67.6)	0.61
Gaming	52 (40.3)	98 (35.1)	150 (36.8)	0.31
Internet use				
Yes	278 (99.6)	278 (99.6)	406 (99.5)	0.53
No	1 (0.4)	1 (0.8)	2 (0.5)	
Type of internet connectivity				

Continued.

	Enrolment			
	Yes, N (%)	No, N (%)	Total	P value
Mobile internet	104 (80.6)	236 (84.6)	340 (83.3)	0.38
Landline Broadband	4 (3.1)	11 (3.9)	15 (3.7)	
Both	21 (16.3)	32 (11.5)	53 (13.0)	
Hours of internet use per week (mean ±SE)	49.42±10.31	40.13±1.36	43.07±3.39	0.20
Purpose of internet use				
Entertainment	109 (84.5)	244 (87.5)	353 (86.5)	0.42
Browsing websites	44 (34.1)	91 (32.6)	135 (33.1)	0.77
Social networking site (facebook, instagram, whattsapp, twitter, etc)	77 (59.7)	171 (61.3)	248 (60.8)	0.76
Study	92 (71.5)	180 (64.5)	272 (66.7)	0.17
Gaming	51 (39.5)	98 (35.1)	149 (36.5)	0.39
Monthly expenditure on internet (mean ±SE)	337±22.8	351±23.5	347±18	0.72

Motivation and barriers of enrolment to MOOC

Important motivation for enrolment was learning new thing (86.8%), learning medicine (87.6%) and for better career prospects (83%). Most common barriers for enrolment agreed or strongly agreed was low internet (42.7%) and lack of time (41.3).

Most of them disagreed on lack of access to technology (64.6%), difficulty in language of course (74.9%), lack of computer skills (65.3%) as the barriers to enrolment to online course (Table 4).

Table 4: Motivation and barriers for enrolment to MOOC, N (%).

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Motivations for enrolment (n=129)					
Learning new things	52 (40.3)	60 (46.5)	17 (13.2)	0 (0)	0 (0)
It helps in learning medicine	57 (44.2)	56 (43.4)	14 (10.9)	2 (1.6)	0 (0)
For obtaining a certificate	18 (14.0)	32 (24.8)	43 (33.3)	24 (18.6)	12 (9.3)
For better career prospects	50 (38.8)	57 (44.2)	20 (15.5)	2 (1.6)	0 (0)
For communicating with peers	20 (15.5)	34 (26.4)	47 (36.4)	17 (13.2)	11 (8.5)
Barriers for enrolment (n=279)					
Lack of time	45 (16.2)	70 (25.1)	80 (28.7)	49 (17.6)	35 (12.5)
Low internet speed	46 (16.5)	73 (26.2)	61 (21.9)	56 (20.1)	43 (15.4)
Lack of computer knowledge/skills	18 (6.4)	28 (10.0)	51 (18.3)	93 (33.0)	90 (32.3)
Difficulty in language of course	10 (3.5)	16 (5.7)	44 (15.8)	109 (39.1)	100 (35.8)
Lack of access to technology	15 (5.3)	24 (8.6)	60 (21.5)	95 (34.1)	85 (30.5)

Table 5: Level of satisfaction with completed and certified course, N (%).

Parameters	Very satisfactory	Satisfactory	Neutral	Disappointed	Very disappointed
Overall experience	3 (20.0)	10 (66.7)	2 (13.3)	0 (0)	0 (0)
Quality of presented material	4 (26.7)	10 (66.7)	1 (6.7)	0 (0)	0 (0)
Technology used	3 (20.0)	10 (66.7)	2 (13.3)	0 (0)	0 (0)
Video lectures	2 (13.3)	11 (73.3)	2 (13.3)	0 (0)	0 (0)
Exams and assignment	2 (13.3)	6 (40.0)	7 (46.7)	0 (0)	0 (0)
Student-instructor interaction	3 (20.0)	5 (33.3)	7 (46.7)	0 (0)	0 (0)
Student-student interaction	2 (13.3)	2 (13.3)	6 (40.0)	3 (20.0)	2 (13.3)

Level of satisfaction with completed and certified course

Among those who completed the course, most of them had a satisfactory or very satisfactory level of satisfaction with regard to overall experience (88.7%), quality of presented material (95.4%), technology used (88.7%), and video lectures (86.6 %).

However, lower proportion of students reported satisfaction for parameters such as exams and assignments (53.3%), student-instructor interaction (53.3%) and student- student interaction (26.6%) (Table 5).

DISCUSSION

The present study was done to assess the prevalence of awareness and perception among medical students regarding massive open online courses. We found that an over fifty percent of students had ever heard of MOOC. This is in contrast to study from Egypt where awareness prevalence was only around 22%.[5] This could be due to lockdown following the corona pandemic which forced the student to lookout for alternative sources of leaning. Although 54.4% were interested to participate in online course, there is a wide gap in intent and actual enrolment (31.6%) to any online course. Further, completion rate (11.6%) of these enrolled courses is extremely low. Similar funnel shaped participation pattern was observed in Egyptian study.[5]

Our study observed a significantly higher awareness about among female students as compared to male students. This finding is in contrast to developed countries where males have higher awareness, enrolment and completion rate of MOOC, however same study also found a less gender difference in developing countries.[8] This finding is encouraging and indicative of benefits of national policy to reduce gender inequality.

The present study observed that older students are significantly more likely to be enrolled for online courses. The reason for this is not clear. Further studies are needed to search for reason for this finding. Also confounding effect of year of study can't be ruled out. Enrolment to courses was higher either during first year of MBBS course or after passing the final MBBS i.e. during internship stage. Possible reason could be that during first year student are still motivated and are enthusiastic to learn new thing carrying the momentum of rigorous hard work for succeeding in getting admission to MBBS course. As students move to subsequent years, they experience high stress and pressures in adapting to medical curriculum with little time to leisure activities. While higher enrolment for interns could be due to more concern for getting admission to postgraduate courses.

There was no significant association of enrolment rate with device and internet usage. Thus, access to digital devise or internet access is not preventing them from enrolment to MOOC.

MOOC represents a popular mechanism for professionals to address both current and future learning needs. The present study found that important motivators for enrolment to online were learning new thing, learning medicine and for better career prospects while common barriers were low internet speed and lack of time. Similar results were observed in study by Collin Milligan who found that professionals were primarily motivated by current needs, broaden their skill set to increase their effectiveness at work, or enable them to innovate.[9]

There are various specific learner-level and course-level factors that predict MOOC learner satisfaction.[9] The present study shows low satisfaction level of students with regard to evaluation process and interaction with instructor and peer students.

Limitations

It is one of few studies to assess the knowledge and perception of MOOC among medical students. This may serve as foundation step for introduction of MOOC in medical curriculum.

Samples of this study are selected from single institute which may limits the generalization of study finding to other setting. Secondly, online survey tool has its own limitation in terms of low response rate, level of engagement with survey, difficult reaching certain participants etc.

CONCLUSION

There is poor awareness and utilization of MOOC among medical students which can hamper their learning particularly in absence on regular classroom teaching. There is need of blended curriculum harnessing the advantages of MOOC platform which will aid students continue learning in difficult times.

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