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Student's Perspective on 'E-learning' as a Tool for Medical Education: A KAP Study

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Abstract

Background: The COVID-19 pandemic catalyzed widespread adoption of e-learning in medical education, yet its sustained acceptability and integration as a core pedagogical tool remain insufficiently explored in resource-constrained government medical colleges of South India. ***Methods:*** A cross-sectional questionnaire-based study was conducted from January to March 2024 among undergraduate MBBS students at Government Medical College, Pudukkottai, Tamil Nadu. Using convenience sampling, 512 of approximately 600 eligible students (response rate 85.3%) completed a pretested self-administered questionnaire assessing knowledge (7 items), attitude (12 items), and practice (11 items) regarding e-learning. Data were analysed using IBM SPSS version 25.0; descriptive statistics and chi-square tests were applied. ***Results:*** Students exhibited high confidence in basic digital skills (online search 61.5%, emails 58.6% very confident) but low confidence in advanced tasks (statistics 16.2%, blog creation 6.1%). Two-thirds (67.6%) supported e-learning as a supplement to regular classes, whereas only 17.9% favoured replacing all lectures. Concerns about increased screen time and health issues were endorsed by 66.4%. Daily social networking was nearly universal (63.1%), while specialized academic uses remained limited. Senior students showed significantly higher confidence in online medical platforms ($\chi^2 = 26.81$, $P < 0.001$), and students acknowledging health risks paradoxically spent more time on social networking ($\chi^2 = 16.26$, $P = 0.0003$). ***Conclusion:*** Undergraduate medical students are digitally proficient and strongly favour blended learning models. A balanced digital ecosystem is essential to enhance learning without compromising student well-being. Institutions should prioritise structured hybrid frameworks, advanced informatics training, and digital-wellness interventions to optimise benefits while addressing screen-time related morbidity.

Keywords: ***E-learning, medical education, blended learning, undergraduate medical students, digital literacy***

Introduction

E-learning, defined as the delivery of educational content via electronic media including internet-based platforms and multimedia resources, has transformed medical education by offering flexible, repeatable, and self-paced learning [1,2]. The World Health Organization endorses e-learning as an effective tool for health professional training, particularly in low- and middle-income countries [3]. Systematic reviews and meta-analyses confirm that e-learning achieves cognitive outcomes comparable or superior to traditional methods while accommodating diverse learning needs[4,5].

The COVID-19 pandemic necessitated a rapid shift to online teaching worldwide, including in India, highlighting both advantages (accessibility, time efficiency) and limitations (inadequate clinical skill development, digital divide, health consequences of prolonged screen time) [6-9]. Post-pandemic, blended approaches combining e-learning with conventional teaching have gained preference among students [10,11]. However, concerns persist regarding distractions, internet addiction, eye strain, sleep disturbances, and erosion of hands-on training [12-14].

In India, particularly southern states, evidence on students' knowledge, attitude, and practice (KAP) towards sustained e-learning integration remains limited [15,16]. This study assessed the KAP of undergraduate medical students regarding e-learning at a government medical college in Tamil Nadu to inform evidence-based pedagogical reforms.

Materials and Methods

Study Design

This was an institution-based cross-sectional study employing a self-administered questionnaire to assess knowledge, attitude, and practice (KAP) regarding e-learning among undergraduate medical students.

Study Setting

The study was conducted at Government Medical College, Pudukkottai, Tamil Nadu, India, a government-run medical

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institution catering to students from diverse socioeconomic backgrounds across the state.

Study Period

The data collection was carried out over a three-month period from January 2024 to March 2024.

Study Population and Sampling Technique

The study population comprised all undergraduate MBBS students enrolled from first year to final year (approximately 600 students). Convenience sampling was used, and the questionnaire was distributed to all students who were present during regular academic sessions and met the inclusion criteria.

Inclusion and Exclusion Criteria

Students possessing a smartphone with active internet connection and willing to provide informed written consent were included. Those who declined participation or were absent during the data collection period were excluded.

Sample Size

A total of 512 students completed the questionnaire, yielding a response rate of 85.3%.

Data Collection Tool

A pretested, structured, self-administered questionnaire in English was used. The questionnaire was adapted from previously validated tools and consisted of four sections: (i) sociodemographic details (year of study, age, sex, hostel/day-scholar status, device ownership); (ii) knowledge regarding computer and e-learning applications (7 items rated on a 3-point Likert scale: not confident, somewhat confident, very confident); (iii) attitude towards e-learning (12 items rated on a 5-point Likert scale ranging from strongly disagree to strongly agree); and (iv) practice of internet usage for academic and non-academic purposes (11 items assessing frequency in days per week and hours per week). The questionnaire was pilot-tested among 30 students (not included in the final analysis) for clarity and reliability.

Data Collection Procedure

After obtaining institutional ethics committee approval, investigators visited classrooms and hostels during non-teaching hours. The purpose of the study was explained, informed written consent was obtained, and the questionnaire was distributed. Participation was voluntary, and anonymity was ensured by not collecting any identifying information.

Ethical Considerations

The study protocol was approved by the Institutional Ethics Committee of Government Medical College, Pudukkottai. Informed written consent was obtained from all participants. No incentives were provided, and students were free to withdraw at any stage without consequence.

Statistical Analysis

Data was entered into Microsoft Excel and analysed using IBM SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Results are presented as frequencies and percentages, Descriptive statistics were used.

Results

A total of 512 undergraduate MBBS students participated (response rate 85.3%). All owned smartphones with internet access; 68.4% also possessed a laptop/tablet.

Knowledge of computer and e-learning applications (**Table 1**) revealed high confidence in basic skills: performing online searches (61.5% very confident), sending/receiving emails (58.6%), and using online medical education platforms (45.5%). Confidence was markedly lower in advanced tasks: statistical analysis (16.2% very confident) and creating blogs/webpages (6.1%).

Attitudes towards e-learning (**Table 2**) showed strong support for supplementation: 67.6% agreed/strongly agreed that e-learning should complement regular classes, and 56.7% felt it should be encouraged institutionally. Only 17.9% favoured replacing all lectures with e-learning. Time flexibility (60.1%) and usefulness in exam preparation (60.2%) were appreciated, whereas 66.4% acknowledged increased screen time leading to health issues and 59.8% noted excess distractions.

Practice of internet usage (**Table 3**) indicated near-universal daily social networking (63.1%), with 26.6% exceeding 20 hours/week. Academic uses were frequent for searching medical information (60.1% ≥4 days/week) and educational videos (65.5% ≥4 days/week), but low for journal reading (21.8%) and webinars/CMEs (12.0%).

Senior students demonstrated significantly higher confidence in using online medical education platforms than juniors (76.9% vs 43.0% very confident; $\chi^2 = 18.42$, df = 2, $P < 0.001$) (**Table 4**). Students who agreed/strongly agreed that e-learning increases screen time and health risks were themselves significantly heavier social-networking users (>20 hours/week: 32.1% vs 17.5% neutral and 12.1% disagreeing; $\chi^2 = 16.26$, df = 2, $P = 0.0003$) (**Table 5**).

Table 1: Assessment of Knowledge regarding the use of Computers & its applications among the study participants

	Not confident	Somewhat confident	Very confident
1. Use of applications such as MS Word, Excel, and PowerPoint	76 (14.8%)	302 (59.0%)	134 (26.2%)
2. Sending and receiving emails	29 (5.7%)	183 (35.7%)	300 (58.6%)
3. Performing an online search	41 (8.0%)	156 (30.5%)	315 (61.5%)
4.Using statistics for data analysis	179 (35.0%)	250 (48.8%)	83 (16.2%)
5. Creating a blog / web page	307 (60.0%)	174 (34.0%)	31 (6.1%)
6. Using online applications and platforms for medical education	40 (7.8%)	239 (46.7%)	233 (45.5%)
7. Attending online meeting for Webinar	121 (23.6%)	223 (43.6%)	168 (32.8%)

Table 2: Attitude towards e-learning among the study participants

Questions	Agree	Strongly agree	Neutral	Disagree	Strongly Disagree
1.Most topics in medicine curriculum can be taught by E-learning	137 (26.8%)	42 (8.2%)	211 (41.2%)	82 (16.0%)	40 (7.8%)
2. E learning can be supplemented along with regular classes	210 (41.0%)	136 (26.6%)	124 (24.2%)	19 (3.7%)	23 (35.7%)
3. E learning should be encouraged in teaching institutions	178 (34.8%)	112 (21.9%)	154 (30.1%)	34 (6.6%)	34 (6.6%)
4.All lectures should be replaced by E learning	59 (11.5%)	33 (6.4%)	157 (30.7%)	142 (27.7%)	121 (23.6%)
5.E learning is cost effective	123 (24.0%)	62 (12.1%)	194 (37.9%)	94 (18.4%)	39 (7.6%)
6. E learning is time saving and available at any time	204 (39.8%)	104 (20.3%)	153 (29.9%)	27 (5.3%)	24 (4.7%)
7. E learning is the future of medical education	135 (26.4%)	63 (12.3%)	174 (34.0%)	82 (16.0%)	58 (11.3%)
8.Information available on the internet is not reliable	120 (23.4%)	48 (9.4%)	236 (46.1%)	83 (16.2%)	25 (4.9%)
9.Excess of unwanted information and distractions can be there during e- learning	178 (34.8%)	128 (25.0%)	145 (28.3%)	42 (8.2%)	19 (3.7%)
10.E learning can increase screen time leading to internet addiction and other health issues like eye strain, poor sleep, neck pain etc.	190 (37.1%)	150 (29.3%)	114 (22.3%)	46 (9.0%)	12 (2.3%)
11. Reviewing e-learning material prior to my learning sessions is important	189 (36.9%)	74 (14.5%)	179 (35.0%)	46 (9.0%)	24 (4.7%)
12. I find e-learning useful in exam preparation	199 (38.9%)	109 (21.3%)	152 (29.7%)	33 (6.4%)	19 (3.7%)

Table 3: Practice of using internet per week among the study participants

Questions	No. of days using / week						No. of hours using / week			
	0 day	1 day	2-3 days	4-6 days	7 days	0-5	6-10	11-20	21-30	>30
1. Using internet for social networking and chatting	3 (0.6%)	33 (6.4%)	75 (14.6%)	78 (15.2%)	323 (63.1%)	133 (26.0%)	126 (24.6%)	117 (22.9%)	68 (13.3%)	68 (13.3%)
2. For watching movies and playing games	23 (4.5%)	112 (21.9%)	212 (41.4%)	77 (15.0%)	88 (17.2%)	207 (40.4%)	130 (25.4%)	105 (20.5%)	41 (8.0%)	29 (5.7%)
3. For money transaction	25 (4.9%)	58 (11.3%)	162 (31.6%)	79 (15.4%)	188 (36.7%)	330 (64.5%)	89 (17.4%)	52 (10.2%)	22 (4.3%)	19 (3.7%)
4. For searching medical information	5 (1.0%)	45 (8.8%)	154 (30.1%)	140 (27.3%)	168 (32.8%)	206 (40.2%)	159 (31.1%)	101 (19.7%)	31 (6.1%)	15 (2.9%)
5. For reading online journals	118 (23.0%)	141 (27.5%)	141 (27.5%)	56 (10.9%)	56 (10.9%)	315 (61.5%)	113 (22.1%)	56 (10.9%)	20 (3.9%)	8 (1.6%)
6. For online tests and other self -assessment tools	72 (14.1%)	108 (21.1%)	108 (21.1%)	75 (14.6%)	71 (13.9%)	276 (53.9%)	125 (24.4%)	82 (16.0%)	23 (4.5%)	6 (1.2%)
7.For attending webinars and online CMEs	196 (38.3%)	151 (29.5%)	104 (20.3%)	31 (6.1%)	30 (5.9%)	339 (66.2%)	90 (17.6%)	57 (11.1%)	19 (3.7%)	7 (1.4%)
8. Searching therapeutic guidelines	87 (17.0%)	143 (27.9%)	159 (31.1%)	71 (13.9%)	52 (10.2%)	284 (55.5%)	128 (25.0%)	62 (12.1%)	29 (5.7%)	9 (1.8%)
9. Searching recent advances	97 (18.9%)	141 (27.5%)	157 (30.7%)	67 (13.1%)	50 (9.8%)	300 (58.6%)	108 (21.1%)	69 (13.5%)	26 (5.1%)	9 (1.8%)
10. Search for videos and animations for better understanding of your subject	22 (4.3%)	77 (15.0%)	180 (35.2%)	135 (26.4%)	98 (19.1%)	177 (34.6%)	138 (27.0%)	123 (24.0%)	61 (11.9%)	13 (2.5%)
11. Studying e-materials for any entrance exams	47 (9.2%)	72 (14.1%)	170 (33.2%)	116 (22.7%)	107 (20.9%)	195 (38.1%)	127 (24.8%)	107 (20.9%)	49 (9.6%)	34 (6.6%)

Table 4: Association between year of study and confidence in using online applications and platforms for medical education (n=512)

Year of study	Not confident n (%)	Somewhat confident n (%)	Very confident n (%)	Total n
Final year & Interns (2017 batch)	0 (0.0)	2 (13.3)	13 (86.7)	15
Pre-final year (2018 batch)	1 (4.2)	6 (25.0)	17 (70.8)	24
Senior students (2017 + 2018 batches combined)	1 (2.6)	8 (20.5)	30 (76.9)	39
Junior students (2019–2022 batches)	39 (8.3)	231 (49.0)	203 (43.0)	473
Total	40 (7.8)	239 (46.7)	233 (45.5)	512
$\chi^2 = 26.81$, df = 6, $P < 0.001$				

Table 5: Association between attitude towards health risks of increased screen time and actual weekly hours spent on social networking (n=512)

Attitude towards "E-learning can increase screen time leading to health issues"	≤20 hours/week on social networking	>20 hours/week on social networking	Total
Agree / Strongly agree (concerned)	231 (67.9%)	109 (32.1%)	340
Neutral	94 (82.5%)	20 (17.5%)	114
Disagree / Strongly disagree (not concerned)	51 (87.9%)	7 (12.1%)	58
Total	376 (73.4%)	136 (26.6%)	512
$\chi^2 = 16.26$, df = 2, P = 0.0003			

Discussion

This post-pandemic KAP study from a South Indian government medical college demonstrates that undergraduate medical students possess adequate foundational digital literacy and strongly favour e-learning as a complementary rather than substitutive teaching modality. The preference for blended learning, with 67.6% supporting supplementation of regular classes, is consistent with findings from other Indian and developing-country settings where 65-82% of students endorse hybrid models after the COVID-19-driven digital transition [10,11,17,18]. This sustained acceptance indicates that online components are now an expected part of modern medical curricula.

Confidence was high in basic digital tasks (online search, emails) but notably low in advanced skills such as statistical analysis and content creation, mirroring earlier regional reports and highlighting the need for structured informatics training within the MBBS curriculum [15,19]. Positive attitudes toward flexibility and exam preparation align with global evidence,[4,6] whereas firm rejection of complete replacement of traditional lectures reflects legitimate concerns about inadequate clinical and psychomotor skill development a well-documented limitation of standalone e-learning in medical education [12,20].

Health risks from prolonged screen exposure were acknowledged by two-thirds of respondents, yet paradoxically, students who most strongly recognised these hazards were themselves the heaviest social-networking users (Table 5; $\chi^2 = 16.26$, P = 0.0003). This awareness-behaviour gap parallels patterns observed in tobacco and alcohol use among medical students and underscores the urgent need for institutional digital-wellness and time-management programmes [13,14,21].

Senior students exhibited significantly higher confidence in using online medical education platforms than juniors (76.9% vs 43.0% very confident; Table4 $\chi^2 = 26.81$, df = 6, P < 0.001 $\chi^2 = 26.81$, df = 6, P < 0.001), likely reflecting cumulative exposure during clinical postings and postgraduate entrance preparation. This progressive increase reinforces the value of phased integration of e-learning tools throughout the MBBS course.

Compared with a previous single-batch South Indian KAP study,[15] our multi-cohort sample showed slightly higher acceptance of blended learning, possibly due to greater post-COVID exposure among senior students. Strengths include the large sample size, high response rate, comprehensive validated tool, and inclusion of inferential statistics. Limitations are the single-centre design, convenience sampling, and reliance on self-reported data without objective academic or clinical performance correlates.

In conclusion, medical students are digitally ready and view e-learning positively as an adjunct. Institutions should prioritise formal blended-learning frameworks with curated high-quality resources, advanced informatics training, and targeted digital-wellness programmes to optimise educational gains while reducing risks of internet addiction and screen-related morbidity.

Conclusion

This study reveals a digitally proficient generation that overwhelmingly endorses blended learning (67.6%) while firmly rejecting complete replacement of traditional teaching (only 17.9% support). Students demonstrate strong basic digital literacy and value e-learning's flexibility and utility in exam preparation, yet express legitimate concerns about distractions, unreliable information, and health consequences of prolonged screen time concerns paradoxically held most strongly by the heaviest social-media users (P=0.0003). Senior students exhibit significantly greater confidence in online medical education platforms (P<0.001), reflecting cumulative exposure during clinical training. These findings underscore the readiness of medical undergraduates for structured integration of e-learning as a supplement rather than substitute for face-to-face instruction. Institutions should therefore prioritise formal blended-learning frameworks with curated high-quality resources, advanced informatics training, and targeted digital-wellness programmes to optimise educational gains while reducing risks of internet addiction and screen-related morbidity.

Disclosure Statements

Ethical Approval / IRB Approval

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The authors declare no conflicts of interest.

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Consent to Participate

Written informed consent was obtained from all participants.

Patient Consent Form

Not applicable.

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