Dental Students knowledge, perception and readiness towards virtual education in east Godavari district - A cross sectional study

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Abstract

Background: E-learning had become an important method in education for its efficiency in providing education at anytime and anywhere, ease of accessibility by overcoming many educational and circumstantial problems during lockdown. The aim of the study is to assess the knowledge, perception and readiness towards virtual education among dental students.

Methodology: In this cross-sectional study, a pretested close ended questionnaire with 33 questions to assess five domains was electronically distributed through Google forms through mail. The data was collected from 3 dental colleges in East Godavari District. A total of 714 respondents were grouped based on category into MDS and BDS groups. Descriptive statistics were generated using IBM SPSS Ver. 20 and Chi-square test was used for comparison between the groups. A p-value of<0.05 was considered statistically significant.

Results: The results revealed high levels of computer skills, technology access, and perceived importance of online technology with no significant difference between the groups. They also showed acceptable levels of readiness MDS (63.2%) and BDS (63.7%) to adopt to e-learning in their education with no significant difference

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between the groups. **Conclusion:** Overall, students' attitude was positive regarding virtual education. It is viewed as a supplement to their learning rather than a replacement for traditional teaching methods.

Keywords: Technology, Dental students, e-learning, Virtual education.

Introduction

During the last decade, due to widespread use of smart phones, smart devices internet and the use of social media has greatly increased gaining popularity and enhancing learning among students[1]. In 2015, it was reported that 88% of 16–24-year-olds used social media daily compared to elders[2].In the past, educators relied primarily on textbooks, hand-outs and notes during lectures. These days blending education and e-learning are gaining popularity as successful and revolutionary teaching styles[3]. E-learning had become an important method in education for its efficiency in providing education with lower costs for ease of accessibility at anytime and anywhere by overcoming many educational and circumstantial problems[4]. Several e-learning and online learning tools and methods have been explored in the literature as effective tools and methods to expand the possibilities of teaching and learning in the health profession fields including dental education which demand high-quality educational methods[5].

However, the influence of online learning methods on students' satisfaction, motivation and self-assessment is greater when it is integrated with conventional methods[6].

The sudden outbreak of a deadly disease COVID-19 shook the entire world. The WHO declared it as pandemic. This situation challenged the education system across the world and forced educators to shift to an online mode of teaching and learning overnight. Hence online learning is no more an option, it is a necessity now.

Thus, this study was conducted considering the current situation to assess the knowledge, perception and the dental student's readiness towards e-learning and to know its impact during the lockdown period.

Materials and Methods

Study design: A cross-sectional study was conducted to assess their knowledge, attitude and perception of dental students towards e-learning.

Sample: This study was carried out in 3 dental colleges located in East Godavari district which included both undergraduate and postgraduate students. Among the undergraduates only third- and fourth-year dental students were included. The first and second year undergraduate dental students were excluded because of their limited exposure to clinical teaching. Participation in the survey took place entirely online with all participants completing the survey anonymously using a smart device and browser of their choice, and at a time and place convenient for their schedules. No computer internet protocol (IP) addresses were collected. The survey anonymity assured that investigator had no way of identifying the participating students. The students were divided into 2 groups .i.e.

1. The first group included third and fourth year undergraduate dental students

2. The second group included the students pursuing post-graduation.

Questionnaire design: The survey instrument was designed to evaluate students' perceptions of influence of online applications on their perceived academic performance. A pretested questionnaire to assess 5 domains was used. The questionnaire was designed in English language and consisted of 33 questions.

1. The first domain has details of age and gender, category and their experience of e-learning.

2. The second domain confines to technology access: It was designed to assess the accessibility of the required technology for e-learning implementation including hardware, software, internet and mobile technology.

3. The third domain pertains to computer skills: It was designed to assess the participants computer skills at multiple levels such as formatting documents and managing multimedia.

4. The fourth domain questions are based on online skills: It was designed to assess the participant's perceived skills with using different online services and the ability to manage multiple tasks.

5. The fifth domain confines to Motivation: It was designed to assess the participants motivation level using web and online tools during

a) Working on long documents

b) Spending long hours for online learning

c) Impact and readiness towards e-learning.

Methods of Assessment: The questionnaire were distributed electronically through google forms via e-mail and online platforms such as WhatsApp. and the data was collected and entered in excel sheets.

Statistical Analysis: Data was analysed using the IBM Statistical Package Social Sciences (SPSS) Version. 20. Descriptive statistics were generated and Chi-square test was used for comparison between the groups. A p-value<0.05 was considered statistically significant.

Results: The survey targeted dental students of 3 dental colleges in East Godavari district. A total of 714 students completed the questionnaire. Out of 714 participants 212(29.7%) were MDS and 502(70.3%) were BDS students. Table 1 shows students e-learning past experiences. Most of the participants in BDS group i.e., 63.7% and in MDS group i.e., 28.7% had past experience with online tools and education and there is significant difference between the groups(p=0.005).

Table 1: The Distribution of student's responses regarding their experience with e-learning

		Category		Total	Chi-square value	p-value
		MDS	BDS			
Have you exposed to any form of virtual /online/e-learning in dentistry	Yes	205(28.7%)	455(63.7%)	660(92.4%)	7.831	0.005**
	No	7(1.0%)	47(6.6%)	54(7.6%)		
Which type of device do you mostly use for virtual learning?	desktop	0(0.0%)	18(2.5%)	18(2.5%)	90.027	0.000**
	laptop	166(23.2%)	222(31.1%)	388(54.3%)		
	Tablet	17(2.4%)	21(2.9%)	38(5.3%)		
	Mobile phone	29(4.1%)	241(33.8%)	270(37.8%)		
What is the frequency of classes you are attending per week?	1 class/week	65(9.1%)	124(17.4%)	189(26.5%)	20.568	0.000**
	2-3 classes/week	69(9.7%)	119(16.7%)	188(26.3%)		

4-5 classes/week	48(6.7%)	117(16.4%)	165(23.1%)		
7 classes/week	20(2.8%)	72(10.1%)	92(12.9%)		
More	10(1.4%)	70(9.8%)	80(11.2%)		

**Highly Significant level at P<0.01.

Table 2: The Distribution of study participants response for frequently used electronic resources which have enhanced academic performance

| | | Category | | Total | Chi-square value | p-value |
		MDS	BDS			
A device with advanced configuration (e.g. with high speed & large memory ,speakers ,web cam)	No access at all	28(3.9%)	64(9.0%)	92(12.9%)	8.216	0.042*
	Very difficult to get access	55(7.7%)	94(13.2%)	149(20.9%)		
	Easy	120(16.8%)	333(46.6%)	453(63.4%)		
	Very easy to get access	9(1.3%)	11(1.5%)	20(2.8%)		
A computer with adequate software (Microsoft office, adobe acrobat, real player, internet explorer)	No access at all	13(1.8%)	56(7.8%)	69(9.7%)	10.952	0.012*
	Very difficult to get access	43(6.0%)	84(11.8%)	127(17.8%)		
	Easy	121(16.9%)	312(43.7%)	433(60.6%)		
	Very easy to get access	35(4.9%)	50(7.0%)	85(11.9%)		
A fast internet connection at home	No access at all	15(2.1%)	53(7.4%)	68(9.5%)	5.959	0.114
	Very difficult to get access	53(7.4%)	90(12.6%)	143(20.0%)		
	Easy	101(14.1%)	256(35.9%)	357(50.0%)		
	Very easy to get access	4(6.0%)	103(14.4%)	146(20.4%)		
A fast internet connection at college	No access at all	14 2.0%	140 19.6%	154 21.6%	48.334	0.000**
	Very difficult to get access	70 9.8%	89 12.5%	159 22.3%		
	Easy	107 15.0%	221 31.0%	328 45.9%		
	Very easy to get	21	52	73		

	access	2.9%	7.3%	10.2%		
Any smart phone (iPhone/any brand)	No access at all	5	27	32	19.941	0.000**
		0.7%	3.8%	4.5%		
	Very difficult to get access	23	48	71		
		3.2%	6.7%	9.9%		
	Easy	144	386	530		
		20.2%	54.1%	74.2%		
	Very difficult to get access	40	41	81		
		5.6%	5.7%	11.3%		

*- Significant at P<0.05

**-Highly significant at P<0.01.

Table 3: computer application skills

		Category		Total	Chi-square value	p-value
		MDS	BDS			
Operating a computer	Never used	14	28	42	2.287	0.515
		2.0%	3.9%	5.9%		
	Not confident	46	135	181		
		6.4%	18.9%	25.4%		
	Confident	132	297	429		
		18.5%	41.6%	60.1%		
	Very confident	20	42	62		
		2.8%	5.9%	8.7%		
Installing and setting up an application or software	Never used	8	111	119	37.576	0.000**
		1.1%	15.5%	16.7%		
	Not confident	51	98	149		
		7.1%	13.7%	20.9%		
	Confident	138	253	391		
		19.3%	35.4%	54.8%		
	Very confident	15	40	55		
		2.1%	5.6%	7.7%		
Writing and editing in Microsoft word & PowerPoint	Never used	0	32	32	25.750	0.000**
		0.0%	4.5%	4.5%		
	Not confident	30	120	150		
		4.2%	16.8%	21.0%		
	Confident	147	289	436		

		20.6%	40.5%	61.1%		
	Very confident	35	61	96		
		4.9%	8.5%	13.4%		

** Highly Significant at P<0.01.

Table 4: Distribution of responses to online skills domain.

		Category		Total	Chi-square value	p-value
		MDS	BDS			
Finding information on the internet (e.g. using search engine, web surfing)	Always face a problem	9	21	30	1.266	0.737
		1.3%	2.9%	4.2%		
	Often	62	129	191		
		8.7%	18.1%	26.8%		
	Few times	112	287	399		
		15.7%	40.2%	55.9%		
	Never faced a problem	29	65	94		
		4.1%	9.1%	13.2%		
Sending and receiving emails with its file attachment	Always face a problem	17	36	53	2.489	0.477
		2.4%	5.0%	7.4%		
	Often	43	123	166		
		6.0%	17.2%	23.2%		
	Few times	91	221	312		
		12.7%	31.0%	43.7%		
	Never faced a problem	61	122	183		
		8.5%	17.1%	25.6%		
Downloading and uploading a file to /from a website	Always face a problem	27	52	79	2.127	0.547
		3.8%	7.3%	11.1%		
	Often	24	65	89		
		3.4%	9.1%	12.5%		
	Few times	111	282	393		
		15.5%	39.5%	55.0%		
	Never faced a problem	50	103	153		
		7.0%	14.4%	21.4%		
Asking questions and making comments in online discussions ,chat or blogs	Always face a problem	21	42	63	9.387	0.025*
		2.9%	5.9%	8.8%		
	Often	21	92	113		
		2.9%	12.9%	15.8%		

	Few times	105	246	351		
		14.7%	34.5%	49.2%		
	Never faced a problem	65	122	187		
		9.1%	17.1%	26.2%		
Posting study materials online such as texts or PowerPoint presentations	Always face a problem	19	50	69	11.443	0.010*
		2.7%	7.0%	9.7%		
	Often	27	98	125		
		3.8%	13.7%	17.5%		
	Few times	102	255	357		
		14.3%	35.7%	50.0%		
	Never faced a problem	64	99	163		
		9.0%	13.9%	22.8%		
Participating in an online discussions (e.g.: live chat ,instant messages ,video conferencing)	Always face a problem	22	55	77	1.766	0.622
		3.1%	7.7%	10.8%		
	Often	38	87	125		
		5.3%	12.2%	17.5%		
	Few times	106	271	377		
		14.8%	38.0%	52.8%		
	Never faced a problem	46	89	135		
		6.4%	12.5%	18.9%		
Participating in an online presentation while doing other things on my computer such as typing or reading	Always face a problem	20	52	72	2.117	0.549
		2.8%	7.3%	10.1%		
	Often	32	96	128		
		4.5%	13.4%	17.9%		
	Few times	122	275	397		
		17.1%	38.5%	55.6%		
	Never faced a problem	38	79	117		
		5.3%	11.1%	16.4%		
Communicating with people through social media	Always face a problem	15	42	57	2.431	0.488
		2.1%	5.9%	8.0%		
	Often	42	115	157		
		5.9%	16.1%	22.0%		
	Few times	97	232	329		
		13.6%	32.5%	46.1%		
	Never faced a	58	113	171		

	problem	8.1%	15.8%	23.9%		
Language is a barrier to me when participating online through emails or discussion	Always face a problem	11	45	56	4.021	0.259
		1.5%	6.3%	7.8%		
	Often	34	93	127		
		4.8%	13.0%	17.8%		
	Few times	104	228	332		
		14.6%	31.9%	46.5%		
	Never faced a problem	63	136	199		
		8.8%	19.0%	27.9%		

* Significant at P<0.05.

The rate of willingness to spend 15-20 hours each week in virtual education was reported highly in BDS group i.e., 35.5% and it is 9.7% in MDS group and the difference observed was statistically significant. (p=0.000). In this study among the total subjects of MDS group 15.1% attended online courses ,10.4% attended online exams ,3.2% attended workshops using online tools and 1.0% attended none. while in BDS group 43.7% attended online courses and equally 40.6% attended online exams ,7.7% attended workshops on using online tools and 8.0% attended none and the difference observed was statistically significant (p=0.000). In this study, the impact of e-learning on dental education was reported to be 22.2% positively among MDS group and it was 51.4% among BDS group and no significant difference observed in responses between the groups. In this study, students' readiness to adopt e-learning in their traditional learning methods was rated as 18.0% among MDS group and 45.7% among BDS group and the difference observed was statistically not significant (p=0.147). The rate of willingness to participate in virtual conference /conventions was reported highly among BDS group i.e., 48.3% and it was 17.1% among MDS students and the difference observed was statistically significant. (p=0.004). This study reported that e-learning was helpful during COVID-19 lockdown period and it was reported positively among 26.6% in MDS group and 63.2% among BDS group and the difference observed was statistically not significant. (Table 5)

Table 5: Distribution of responses to "motivation and overall readiness domain" for the two groups

		Category		Total	Chi-square value	p-value
		MDS	BDS			
I am able to remain motivated when doing a long task online individually	Neither disagree nor agree	38	59	97	15.954	0.001**
		5.3%	8.3%	13.6%		
	Strongly disagree	17	69	86		
		2.4%	9.7%	12.0%		
	Disagree	62	102	164		
		8.7%	14.3%	23.0%		

	Agree	95	272	367		
		13.3%	38.1%	51.4%		
I am able to concentrate when reading long documents online, even there are online distractions (e.g. friends sending emails or website to surf)	Neither disagree nor agree	42	50	92	33.348	0.000**
		5.9%	7.0%	12.9%		
	Strongly disagree	19	74	93		
		2.7%	10.4%	13.0%		
	Disagree	80	139	219		
		11.2%	19.5%	30.7%		
	Agree	60	226	286		
		8.4%	31.7%	40.1%		
	Strongly agree	11	13	24		
		1.5%	1.8%	3.4%		
I am able to complete an online task (such as lectures, assignments)despite any distractions around me(T.V ,children and such).	Neither disagree nor agree	10	27	37	5.058	0.281
		1.4%	3.8%	5.2%		
	Strongly disagree	42	72	114		
		5.9%	10.1%	16.0%		
	Disagree	63	135	198		
		8.8%	18.9%	27.7%		
	Agree	92	255	347		
		12.9%	35.7%	48.6%		
	Strongly agree	5	13	18		
		0.7%	1.8%	2.5%		
I am willing to spend 15-20 hrs each week for online learning	Neither disagree nor agree	23	34	57	32.801	0.000**
		3.2%	4.8%	8.0%		
	Strongly disagree	51	64	115		
		7.1%	9.0%	16.1%		
	Disagree	69	150	219		
		9.7%	21.0%	30.7%		
	Agree	57	238	295		
		8.0%	33.3%	41.3%		
	Strongly agree	12	16	28		
		1.7%	2.2%	3.9%		
Please indicate if you have participated in any of the following activities	Online courses/worksho ps	108	204	312	18.195	0.000**
		15.1%	28.6%	43.7%		

	Online exams	74	216	290		
		10.4%	30.3%	40.6%		
	Workshops on using online tools	23	32	55		
		3.2%	4.5%	7.7%		
	none	7	50	57		
		1.0%	7.0%	8.0%		
How do you think e-learning would impact your learning	Negatively	24	66	90	1.630	0.653
		3.4%	9.2%	12.6%		
	No impact	29	69	98		
		4.1%	9.7%	13.7%		
	Positively	148	350	498		
		20.7%	49.0%	69.7%		
	Very positively	11	17	28		
		1.5%	2.4%	3.9%		
Overall, on a scale from 1-5, I rate my readiness to adapt e-learning in my learning as	Not ready at all	10	32	42	5.366	0.147
		1.4%	4.5%	5.9%		
	Not sure	74	144	218		
		10.4%	20.2%	30.5%		
	Ready	119	287	406		
		16.7%	40.2%	56.9%		
	Very much ready	9	39	48		
		1.3%	5.5%	6.7%		
How do you rate the interaction between you and your faculty using e-learning as compared to classroom learning	Negatively	34	57	91	6.943	0.074
		4.8%	8.0%	12.7%		
	No impact	26	52	78		
		3.6%	7.3%	10.9%		
	Positively	120	335	455		
		16.8%	46.9%	63.7%		
	Very positively	32	58	90		
		4.5%	8.1%	12.6%		
Would you like conference /conventions to be held on virtual platforms	YES	122	345	467	8.231	0.004**
		17.1%	48.3%	65.4%		
	NO	90	157	247		
		12.6%	22.0%	34.6%		

					0.008	0.930
Is virtual learning helpful during the lock down period	YES	190	451	641		
		26.6%	63.2%	89.8%		
	NO	22	51	73		
		3.1%	7.1%	10.2%		

**Highly significant at P<0.05

Discussion

The current study assessed the knowledge, perception and readiness of dental students towards online learning in dental education. For successful implementation of e-learning the ease of access and use of online tools by students are extremely important. Further the students should have necessary technical skills and good quality of internet services to utilise efficiently the provided services.The participants in the current study reported high level of computer skills and adequate e-learning experience similar to the study done by Amal I Linjawi et al and Asiry et al[8,12]. Participants also reported an acceptable level of online skills and motivation level for using online tools for longer periods similar to the study done by Amal I Linjawi et al[12].The impact of e-learning on dental education was reported to be more than half among both MDS and BDS groups which is similar to the study done by Asiry and Alsuraini et al[8,10] and dissimilar results were observed in the study done by Amal I Linjawi et al[12].

In this study the willingness to spend 15-20 hours each week in virtual education was reported highly in BDS group than MDS group. The probable reason might be more clinical exposure and appointments in the MDS group. As MDS education is more oriented towards clinical exposure, they showed less interest in spending on e-learning. Overall positive responses were reported for their readiness to adopt to e-learning integrated with traditional learning methods by both the groups similar to Rosenberg et al and Amal I Linjawi et al[11,12].Attendance rate to online courses, online exams and workshops was more in MDS group than BDS group. The search or exploration for new knowledge, curiosity and willingness to learn might be the probable reason.

A limitation of this study is that it investigated only subjective outcome measures which limited to reflect students' perception and satisfaction with online learning and could not evaluate students' performance.The implementation of e-learning will improve the academic performance as a supplement to their learning rather than a replacement for traditional teaching methods. It was much useful in times like COVID-19. multiple studies must be done in consideration with other factors that should be recognised in order to implement e-learning successfully.

Conclusion

Overall positive responses were seen to their past experience, use of electronic resources in their learning activities, their readiness towards accepting virtual education and usability of online learning. English literacy for using online tools, social influence, and institutional support are important hidden factors in e-learning implementation in dental education. The results of this study suggest that e-learning may be used successfully in a dental school's curriculum to enhance students' learning.

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