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Research Article

Device Influence in Public and Private Medical Colleges of Pakistan

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Abstract

Objective: To determine the influence of different devices and E-learning resources used by medical students of public and private medical colleges for their online education.

Materials and Methods: A descriptive cross sectional study was carried out on 7277 medical students of multiple private and public medical colleges all across Pakistan and by using random convenient sampling. Data was obtained through online questionnaire forms and analysed using spss v25.0.

Results: Out of the total medical students involved in this research, 51% were from public medical colleges whereas 49% were from private medical colleges. Out of 85.6% students who used smartphones,43.4% and 41.6% are public and private medical students respectively. 63.4% Medical students use their personal laptops out of which 30.0% and 33.1% are public and private Medical Colleges' Students respectively. 42.8% of Medical Students own a home based internet service and 30% relied on Mobile Data. 89.2%, 52.7%, 23.0%, 21.2% and 10.10% of Medical students use Youtube, Wikipedia, Medscape, Osmosis and Pharmapedia respectively as online educational resources. Youtube is popular among public medical college students, whereas Medscape is more used among private medical colleges' students.

Conclusion: Laptops are more popular among the medical students of Private Colleges whereas the Smartphones are commonly used for E-learning by Public medical College students. Majority of the Students have accessibility to home based internet facilities and a good number have mobile data available in their smartphones, Medical students commonly use these gadgets for social networking primarily and receive education online. Students of private medical colleges however show more inclination on using these gadgets for educational purposes whereas those from public medical colleges use smartphones and laptops to connect to their social media accounts. The most popular E-learning resource among medical students of both public and private colleges is youtube, followed by wikipedia, medscape, osmosis and pharmapedia.

Keywords: Smartphone; Laptop; Online; Youtube; Medscape; elearning; Wikipedia; Osmosis; Pharmapedia; emedical; Covid19; Pandemic; Medical Colleges; Pakistan; Medical Students; Doctors; Social Media; e Gaming; Education; Digital Health

Introduction

We are living in an era where technology is strongly impacting different areas of education and learning [1]. Education system has evolved and adopted technology as a solution to different learning problems [2]. This internet technology is used in different forms in Medical Education i.e. as a supplement to traditional learning, asynchronous distant learning, learning management systems [3], blended learning [4] and virtual teaching classes [5]. Students and Instructors use different devices to access internet technology. Medical students from any part of Pakistan, from any

public or private Medical University, whether they're from the dry mountainous lands of Balochistan, the barren deserts of Sindh or the beautiful green valleys of Kashmir, are accustomed to the use of smartphones, laptops, tablets, iPads and other electronic devices [6] and fairly use it for E-learning. According to Derek Stockley. "E-learning involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material" [7].

Smartphones are particularly common among medical students as it offers flexibility to access information and knowledge from the internet, independent of time and space, whether in classrooms, hospitals or at home [8]. Medical Students spend a significant time online on smartphones and prefer them over any other gadget [9]. Students use their smartphones for socialising and networking, academic purposes and for entertainment and enjoyment [10]. Today's younger generations are 'growing up' using social media, which has become an unavoidable influence in modern life [11].

Medical students and postgraduate trainees, based on their experience, have acknowledged the power of online learning in addition to traditional forms of knowledge transfer [12].

Considering the unlimited boundaries of the Medical field, Medical students are compelled to use all the available resources for their concept building and education. Online educational audios and videos enhance learning and deliver rich content in a short time period while also maintaining the interest of the students [13]. Youtube permits access to worldwide high quality videos [14] such as from Dr najeeb, Osmosis, Khan academy and Kenhub. As we analyze the impact of various devices on online education of Medical students of Pakistan, it is essential to consider factors such as internet connectivity and load-shedding crisis. While technologically advanced countries have systems in place for e-learning and online medical education. This is not the case with most of the low-income countries like Pakistan [15]. In Pakistan, students do face issues of limited and poor internet connections, internet disconnectivity during class meetings, unexpected load shedding and no electricity to charge their devices on time.

This study has several theoretical and practical contributions since online education has become a necessity during COVID-19 Pandemic. Very little research has been done on this topic in Pakistan. This study will assess the use of different devices to pursue medical education online, address the internet network concerns and analyze the different platforms and resources medical students use to continue education.

Materials and Methods

This Descriptive Cross Sectional Study, spread over a period of two months was conducted by 6 medical students studying in different medical Universities of Pakistan. On receiving the ethical approval from the Isra university institutional Review Board Committee, the study began in July 2020 and was completed by Aug 2020. The study included Medical students from all the major public and private Medical and Dental colleges and Universities of Pakistan. Data was collected from 7277 medical students via an online close ended questionnaire form, through random convenient sampling technique. Around 200 participants were selected all over Pakistan, who randomly distributed the questionnaires forms among MBBS, BDS and DPT students. The questionnaire was divided into parts, encompassing the students' demographic data, choice of gadgets used and their perception of online education. The obtained data was eventually analysed using spss v25.0.

Results

Figure 1 shows a comparison between public and private medical colleges' students for their choice and preference of the gadgets and devices used in helping them receive medical education online. Out of the total 7277 medical students, 85.60% are using smartphones out of which 43.4% and 41.6% are public and private medical students respectively. 63.4% Medical students use their personal laptops out of which 30.0% and 33.1% are public and private Medical Colleges' Students respectively. Only 4.70% use their Desktops and 3.30% need to borrow laptops to receive online education.

	Count	Table Total N %	Mean	Std D.
Own Laptop	4649	63.40%	1.37	0.482
Own Desktop	342	4.70%	1.95	0.211
Borrow Laptop	243	3.30%	1.97	0.179
Use of Smart Phone	6270	85.60%	1.14	0.35
Home Based Internet	3139	42.80%	1.57	0.495
Shared Internet	404	5.50%	1.94	0.228
Mobile Data	2200	30.00%	1.7	0.458

Table 1: Popular device used and internet connectivity for online education.

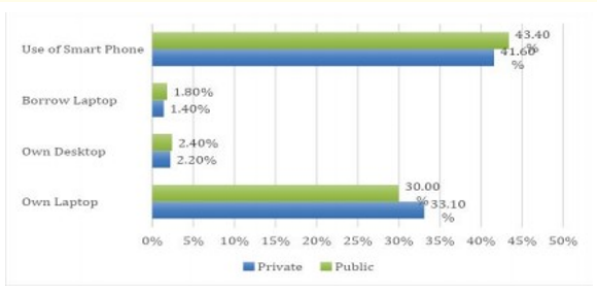

Figure 1: Comparison of device use for online education between public and private college medical students.

As evident from table 1, 42.8% of Medical Students own a home based internet service out of which 23.4% and 19.3% are public and private medical college students respectively. Moreover, 30% use Mobile Data for online classes, out of which 15.6% and 14.2% are public and private medical colleges' students respectively.

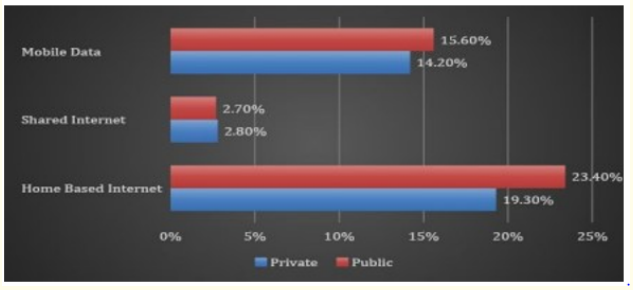

Figure 2: Comparisons of internet network accessibility between public and private college's students.

81.40% of medical students admit to using the internet on their gadgets for social media 79.20% use it for educational purposes, 49.4% for watching movies and videos, 24.3% for video calling and 15.2% doe E-gaming. However, while 41.62% compared to 39.42% medical students from public medical colleges use their Devices for social media, 39.5% compared to 39.23% are private Medical College's students who use gadgets for Education and E-learning.

The table 3 indicates that youtube is popular among 89.2% of medical students, Wikipedia among 52.7%, Medscape among 23.0%, Osmosis among 21.2% and Pharmapedia among 10.10% students.

	Count	Table Total N %	Mean	Std D.
Social Media	5969	81.40%	1.19	0.389
E-Gaming	1113	15.20%	1.85	0.359
Movies/Videos	3623	49.40%	1.51	0.5
Educational	5808	79.20%	1.21	0.406
Video Calling	1782	24.30%	1.76	0.429

Table 2: The purpose of different device used among medical students.

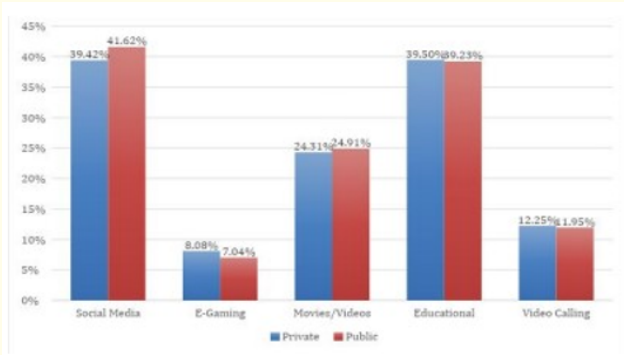

Figure 3: Comparison of objective of device used between students of private and public medical colleges.

	Count	Table Total N %	Mean	Std D.
Wikipedia	3859	52.70%	1.47	0.499
Medscape	1683	23.00%	1.77	0.421
Youtube	6540	89.20%	1.11	0.31
Osmosis	1555	21.20%	1.79	0.409
Pharmapedia	743	10.10%	1.9	0.302

Table 3: Popular source of education among medical students.

With youtube being slightly popular among students from public medical colleges i.e. 45.11% vs 43.55%; Medscape is more used by students of private medical colleges with results of 27.23% vs 25.11% (Figure 4).

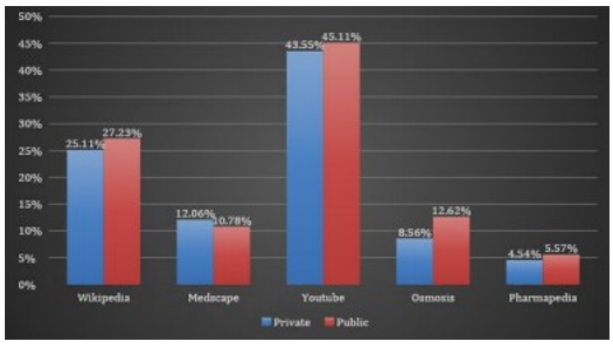

Figure 4: Comparison of popular source of education between private and public medical college's students.

Discussion

Among the various gadgets used by the medical students, laptops are particularly popular among the medical students of the private university. Students from private universities are paying their fees in six digit amounts per annum compared to the ones studying in public colleges where most of the expenses are on the government. It would make complete sense for students studying in private colleges to own their own laptops or maybe multiple gadgets than one or two. Pakistan is a developing country and people of every socio-economic class live in this state. Therefore, a variety of different students from different socio economic backgrounds can be seen studying in public medical colleges. Some do not own their own laptops and have to borrow it from their family members which is why more medical students from government colleges use smartphones compared to laptops.

Medical students from both the government and private medical colleges have the facility of having mobile data in their cell phones where Wifi connections are unavailable. However the public medical college students are found to use mobile data more, probably because the private medical colleges provide their students with College wifi facilities. Moreover, an unnoticeable number of students use shared internet such as that provided by universities and libraries since the connectivity is generally poor due to infrastructure of universities in developing countries [16].

More than three quarters of students are using the internet for educational purposes and it seems like the internet rather than the library is now the usual source of knowledge [17]. One simply cannot underestimate the convenience of having an unlimited access to medical knowledge, anywhere and anytime, irrespective of geographical boundaries, just a touch away, provided a medical student is privileged to have their own mobile data on their cell phones. It is noticeable that a greater majority do have home based internet service available to them which for sure contributes towards enhanced E-learning especially in the times of COViD-19 pandemic, since this have become a necessary way to continue medical education [18].

For a majority of the cases the students use the internet to connect and socialize on their social media accounts. Social media has the ability of bringing together many like-minded people to engage in on-line dialogue on subjects of their study. As per a study carried out in East-India by Lahiry S., *et al*. of the 88.58% undergraduates who used social Media, 82.73% used it for academic purposes [19]. If instructors and facilitators do consider the power of social media accounts on the minds of the young students, they can use them smartly to build their students' interest in their field of study, connect with them for various conferences and workshops and share along every accomplished milestones of their journeys with their juniors.

According to our results, youtube is very popular among medical students for enhancing their knowledge and improving their concepts. This could be because according to the cognitive theory of multimedia learning, videos enhance learning by activating visual and auditory pathways and presenting words and pictures in a congruent manner [20,21] which can help students more efficiently consolidate medicine's vast body of knowledge. Youtube provides the medical students with access to free videos from various professionals and channels, most popular being Dr Najeeb and Armando Hasudangan, as well as videos from Osmosis, Kenhub, and Khan Academy. Second to Youtube, half of the medical students strongly rely on Wikipedia for their reference study. While wikipedia is supported by references, according to a study conducted by Daniel A London., *et al*. in 2019, entries on Wikipedia are imperfect; they have inaccurate and missing information [22]. It is unfortunate to see half of the medical students relying on wikipedia when there are better, authentic resources of medical education available online. It is interesting to notice that while medscape is more popular among students of private medical colleges, medical students from government medical colleges use more osmosis and youtube.

Conclusion

Laptops are more popular among the medical students of Private Colleges whereas the Smartphones are commonly used for E-learning by Public medical College students. Majority of the Students have accessibility to home based internet facilities and a good number have mobile data available in their smartphones, Medical students commonly use these gadgets for social networking primarily and receive education online. Students of private medical colleges however show more inclination on using these gadgets for educational purposes whereas those from public medical colleges use smartphones and laptops to connect to their social media accounts. The most popular E-learning resource among medical students of both public and private colleges is youtube, followed by wikipedia, medscape, osmosis and pharmapedia.

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