RESEARCH ARTICLE

E-BOOK OR PRINTED TEXTBOOK? PERCEPTIONS OF DENTAL STUDENTS AND COMPARISON OF PERCEPTIONS BETWEEN UNDERGRADUATES AND POST GRADUATES

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ARTICLE INFO	ABSTRACT
	Introduction: Technology has changed the way student's access information. As the members of the millennial generation, current dental students are more technology–savvy and connected than the previous generation. Many books are now available in electronic formats and electronic publishing is rapidly replacing printed materials. **Objectives:** To assess the perceptions of students regarding the internet, e-textbooks, and printed textbooks. **Methodology:** A cross-sectional study was conducted in 5 dental colleges in and around Hyderabad city on 864 dental students using a self-administered questionnaire which was given to the students from 2nd year B.D.S to final year M.D.S to know the perceptions of e-book learning and printed textbook learning. **Results:** Of the 864 students, 83% of them agreed that e- books offer more updated information over printed textbook and, 82% agreed that e- books are easy in carrying and storage but majority of them also agreed that reading e- books is more strenuous, and knowledge gained from reading a printed copy is retained for a longer period of time. **Conclusion:** Despite advancements in the internet, learning technologies and provision of updated information from e- books, dental students still prefer to buy, understand and learn from a printed textbook.

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INTRODUCTION

Students of the present generation are a part of the net Generation who have been raised in an era of instant access. Their communication and learning are complemented by the internet, a major influence on this cohort. Learning methods for these net Generation students are supplemented with internet tools such as web-CT, blackboard, online courses and online journals (Nicholas, 2009). As the members of the millennial generation, current dental students are more technology–savvy and connected than the previous generations (Brunet, 2011). With the advent of new information technology, the idea of e-books originated and has brought changes to the traditional educational environment. Many books are now available in electronic formats. The vision for the electronic textbook represents a significant paradigm shift in how students read and learn subject matter (Matthew, 2009). With the growth of internet and improvements in computer

technology, many people have predicted the demise of printed textbooks (Allen, 2008). e-books have several important advantages over their print counterparts. They are lighter, less bulky, and environmentally friendly, ability to cut sections of the text and paste them into other documents (James, 2008). Most important is the off-campus, 24 X 7 availability of e-books. This is the single most distinct advantage e-books have over print textbooks. "Digital text can be enlarged, read via specialized devices. Another advantage over print is the searching capabilities provided by e-books (Nicholas, 2009). Therefore, students are more likely to get a textbook with the most current theory and application (Matthew *et al*., 2009). At present, the future of e-books is at a crossroads. Although the switch over from printed textbooks to e-textbooks has long been predicted, it is yet to occur (Nicholas, 2009). e-textbooks do have some disadvantages. e-books are expensive, difficult and costly to print. To use an electronic textbook student has to own a laptop or have access to a computer. Many students complain that reading from a computer text feels disjointed (Ziming, 2012). In a study done by Rho & Gedeon, readers reported that they tend to skim electronic text material, but if

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they plan to read the material in its entirety, they prefer a print version (James, 2008). A study by McGowan *et al* found that "students of all ages and experience levels overwhelmingly prefer paper textbooks to electronic textbooks." In a recent study about dental students' attitudes and study habits, Ditmyer *et al* found 25% students purchased a traditional textbook even when an e-textbook was provided and more than 33% of students printed out information from the e-textbooks for reading. A report published in New York Times (October 20, 2010) also reveals that students still cling to traditional paper textbooks in the digital age (Ziming, 2012). McFall found that students didn't utilize many of the e-text features designed to make them more active readers. The author explains this by stating, "students have developed reading habits, and changing those habits takes more time and attention than can be given in a single semester course" (Matthew, 2009). It is important to evaluate electronic texts as learning tools before recommending or requiring their use as a substitute for print textbooks. Although e-books tend to mimic their print counterparts, students may not read e-books the same way as they do textbooks (Woody, 2010). While coming into practice, the postgraduates will be using more of internet sources for their academic material. Because of ease towards internet facilities, even the undergraduate students are relying more on internet sources. So the present study has been undertaken to explore student perceptions of electronic textbooks and printed textbooks, differences in student perceptions regarding e-book learning and printed textbook learning among undergraduates and postgraduates.

MATERIALS AND METHODS

A cross-sectional study was conducted among undergraduate and postgraduate students in dental colleges in and around Hyderabad city. Out of the 7 dental colleges located in and around Hyderabad, 5 colleges gave permission to conduct the study. A closed-ended self-administered questionnaire was designed with 15 questions which were divided into 3 categories:

- Students perceptions on the internet [4]
- Perceptions on e-books [7]
- Perceptions on printed textbook [4]

 And three demographic indicators (age, gender, year of studying). The answers were offered on a four-point Likert scale where '4' indicated strongly agree, '3' agree, '2' disagree, '1' strongly disagree for positive questions and a reverse scoring is done for negative questions.

The self-administered questionnaire was pretested in a pilot study on 30 dental students where the internal consistency was found to be Cronbach α= 0.75, content validity ratio (CVR=1) and final sample size was estimated to be 864. The study was conducted over a period of 2 months from July- August 2015. A list of students was obtained from each college and the students were selected by simple random sampling. 2nd year B.D.S to 4th year B.D.S, interns and postgraduates students who were present on the day of the study and who are willing to participate were included in the study. Students from 1st B.D.S were excluded from the study as they were new to the course and curriculum. A questionnaire was distributed to the students who were present on the day of study and they were collected back on the same day after giving them sufficient time to complete it.

Statistical analysis

Descriptive statistics was done and statistical analysis was performed using SPSS version 20.0. Independent t-test was used to compare perceptions between undergraduates and postgraduates and to compare the perceptions of male and female students.

RESULTS

About 864 dental students participated in the study. Out of them 232 (27%) were males and 632 (73%) were females. Among them 701 (82%) were undergraduates, and 163(18%) were postgraduates. For the purpose of reporting results from the study clearly, strongly agree and agree were combined, as were strongly disagree and disagree.

Table 1. Perceptions of students on e-books and printed textbooks learning

Perceptions	Agree	Disagree
Education inconceivable without the internet	87%	13%
Internet usage for education	92%	8%
Clarifying subject with lecturers through emails	62%	38%
Navigating internet to understand subject	93%	7%
e-books easy in carrying and storage	83%	17%
e-books offer more updated information	83%	17%
Distraction while reading e-book	78%	22%
Short licensing period of e-books	91%	9%
Highlighting points in e-books	84%	16%
Reading e-books more strenuous	82%	18%
Access to e-books	75%	25%
Cost factor for preferring printed text over e-book	74%	26%
Preferring printed over e-book even though available free online	80%	20%
Printed textbook more retentive than e-book	81%	19%
Preferring e-book if it can be printed	87%	13%

Table 2. Comparison between undergraduates and postgraduates

Perceptions	Year of study		P value
	Undergraduate	Postgraduate	
Education inconceivable without internet	3.20±.79	3.44±.630	0.000*
Internet usage for education	3.20±.595	3.31±.602	0.048*
Clarifying subject with lecturers through emails	2.74±.772	2.87±.795	0.050*
Navigating internet to understand subject	3.22±.654	3.34±.549	0.031*
e-books easy in carrying and storage	3.06±.765	3.39±.642	0.000*
e-books offer more updated information	3.13±.722	3.09±.735	0.595
Distraction while reading e-book	1.97±.771	1.75±.754	0.001*
Short licensing period of e-books	1.88±.698	1.64±.541	0.000*
Highlighting points in e-books	1.84±.778	1.73±.839	0.096
Reading e-books more strenuous	1.90±.719	1.69±.731	0.001*
Access to e-books is difficult	2.04±.752	2.03±.773	0.871
Cost factor for preferring printed text/e-book	2.12±.799	2.03±.820	0.195
Preferring printed textbook even e-book is available for free online	1.92±.763	1.83±.748	0.21
Printed textbook more retentive over e-book	1.85±.739	1.83±.803	0.842
Preferring e-book if it can be printed	3.19±.706	3.37±.608	0.003*

P<0.05*, independent t-test

The majority of the postgraduates reported that modern day education is inconceivable without the internet, navigating internet avails a better grip on the subject and also helps in exploring the new concepts when compared to undergraduates. Postgraduates have more positive perceptions on e-books as they are easy in carrying and storage when compared to undergraduates.

the study done by Brumini *et al.* (Brumini, 2014) on dental students at the universities in Croatia where they reported that internet usage in education was a positive variable towards e-learning. As there is a wider scope to explore many things through the internet, in the present study 93% of the dental students agreed that navigating through the internet makes you understand the subject and know new concepts.

Table 3. Comparison of perceptions between male and female students

Perceptions	GENDER		P value
	Male	Female	
Education inconceivable without internet	3.21±.791	3.26±.664	0.000*
Internet usage for education	3.18±.664	3.24±.571	0.162
Clarifying subject with lecturers through emails	2.77±.770	2.76±.781	0.147
Navigating internet to understand subject	3.14±.665	3.28±.623	0.108
e-books easy in carrying and storage	3.28±.705	3.06±.764	0.374
e-books offer more updated information	3.13±.667	3.11±.745	0.242
Distraction while reading e-book	1.98±.738	1.91±.784	0.012*
Short licensing period of e-books	1.85±.730	1.83±.658	0.135
Highlighting points in e-books	1.92±.884	1.79±.751	0.672
Reading e-books more strenuous	1.83±.704	1.87±.734	0.682
Access to e-books is difficult	2.03±.657	2.04±.789	0.000*
Cost factor for preferring text/e-book	2.24±.848	2.06±.781	0.029*
Preferring printed textbook even e-book available for free online	1.80±.725	1.94±.770	0.949
Printed textbook more retentive than e-book	1.89±.757	1.83±.749	0.377
Preferring e-book if it can be printed	3.17±.700	3.24±.689	0.102

$P<0.05^*$, independent sample t-test

In spite of these positive attitudes of postgraduates towards e-books, they felt that distraction while reading and short licensing period were drawbacks of the e-books. They even felt that reading from e-book was more strenuous and retention of the subject was very poor when compared with undergraduates. In the present study, there was a significant difference in the perceptions of male and female students with male students having a positive attitude towards e-books. The majority of male students found that e-books were easy to carry and could offer more updated information over printed books.

DISCUSSION

Computers provide easy access to unlimited knowledge and resources in every field and they currently enjoy prominence as a learning tool (Mohamed, 2012). The development of the internet has led to the adding of a lot of concepts starting with "e-'' to our lives (Nilgun, 2014). A recent innovation in computerized instruction is the electronic textbook (James, 2008). E-books offer a number of features and functions that are not available with printed textbooks such as searchability, built-in dictionary, cross-referencing, and ease in copying and pasting (Allen, 2015). Although e-books have started to gain traction in college campuses yet students seem less enamored with electronic textbooks (Matthew, 2009). This research intended to examine dental students preferences regarding e-book and printed textbook learning.

In the present study, 87% of the dental students reported that modern education is inconceivable without the internet. This might be due to the increased evolution of smart phones and electronic gadgets where one can access the information readily. 93% of the postgraduates stick to this statement with a statistically significant difference when compared with undergraduates (p=0.000). As a part of their regular curricular activities postgraduates might have perceived it more positively when compared to undergraduates. In our research work, 92% of the students perceived that internet usage meets present day educational standards.This was found similar to

Keeping all printed textbooks requires a lot of space for storage and it is difficult to carry all the time. e-books could end the problem of students having to lug around stacks of bulk hardcopies. Almost 83% of the dental students reported that e-books are easy in carrying and storage when compared to a printed book. This finding correlates with a study done by Ziming LIU (Ziming, 2012) on undergraduate students in California where the students perceived it as a potential benefit of the e-book. In the present study, 83% of the students reported that e- books offer more updated information over a printed copy. This might be due to the fact that printed copies become outdated by the time the publishers launch new editions. e –books may have their places, but they appear to have a number of unanticipated challenges that hinder them from widespread acceptance. About 78% of the students agreed to the fact that deviation/distraction while reading e-book is more when compared to printed textbook. This finding is consistent with the study done by (Ziming, 2012) LIU where 81.9% of the students reported the same. Online reading behavior tends to direct towards quick access rather than sustained concentration. Reading from a computer text feels disjointed and can be inconvenient for the students accustomed to using printed textbooks (Ziming, 2012).

In our study, most of the postgraduates reported strongly that e-books are distracting more when compared to undergraduates (p=0.001). As postgraduates work their exercises mostly on laptops they find it challenging to read with sustained concentration from a glowing screen when compared to undergraduates. The licensed e-books have an expiration date after which students cannot access them. The only way to access an e-textbook again is to buy another copy. The most common subscription period for e-textbooks is 180 days (Allen, 2008). In this study, 91% of the dental students agreed that short licensing period is one of the major disadvantages of the e-book. These findings were similar to the research done by Nicole Allen (Allen, 2008) and Ziming LIU (Ziming, 2012). 84% of the students reported that highlighting important points are difficult in e-books. This is consistent with the study done by Matthew *et al* (Matthew *et al.*, 2009)

where 84% of the paper preferring group found it as a disadvantage of the e-book. Even in a study done by Ziming LIU (Ziming, 2012) about 70.5% of the students found it difficult to annotate the text through highlighting. This might indicate that many students are unaware of the features of electronic textbooks or have been exposed to e-books without such features. It is an unpleasant experience to read lengthy digital texts on e-books. 82% of the students in the present study agreed that reading e-books are more strenuous when compared to printed textbook. Even in the study done by Matthew *et al* (Matthew *et al.*, 2009) about 82.1% of the paper group and 41.4% of the e-text group agreed that this is a disadvantage of the e-book. This might interpret that reading from e-books strains the eyes, burdens the reader. Students of a present generation still prefer a printed textbook over the e-text even if it is available for free online. In the present study, 80% of the students preferred a printed copy than a free e-book online. This is likely to be caused by their unpleasant experience in using e-books. This finding is similar to the study done by Ziming LIU (Ziming, 2012) where 66% of e-readers still prefer old-fashioned paper textbooks over e-books. About 81% of the students cited that subject read from printed textbooks can be retained for a longer period of time when compared to e-books and about 87% of the students would like to prefer an e-book if it could be printed also. This shows that students feel more comfortable to read, understand and retain subject more from a printed copy than from an e-version (Brumini, 2014). As students advance in their educational careers their preference for e-books increases, but in the present study, the undergraduate students were more positive to e-books when compared to postgraduates. This is contrary to the findings of the study done by Matthew (Matthew, 2009) *et al* and Brumini (Brumini, 2014) *et al* where higher the course of study higher the preferences for e-books.

This might be due to that younger generations show more interest to explore the internet to learn new things, finding it easier to study through e-books with the increase in technology. In the study conducted by Hendricson *et al.* (Hendricson *et al.,* 2006) they found that freshmen, in comparison with upperclassmen, had more positive attitude towards e-learning. The present research showed that there was a significant difference in perceptions between male and female students where males were more positive to e-books when compared to females. This finding is consistent with the studies done by Matthew *et al.* (Matthew, 2009), Nilgun Tosun (Nilgun, 2014) where males are more likely to prefer e-books. This situation shows male students are more interested in technology and the internet and they spend more time and have the ability to use them than females. In the present study, their knowledge on computer usage and awareness on e-book learning were not assessed which stands to be the major drawback of the study. Further in-depth evaluation regarding e- learning using prospective studies must be carried out to know which mode of learning would actually be beneficial for the students.

Conclusion

Although e-books have been considered more over printed textbook because of ease in usage and many other things, it is still not a replacement for printed textbook. For any immediate access of study material students referred e- material but for actual learning of subject, they preferred a printed textbook. Undergraduates were more positive towards e- books than postgraduates which show that younger generations were positive towards newer advancements.

Conflict of interest

The authors declare that they have no conflict of interest.

Disclosure statement

None of the authors have anything to disclose.

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