Heliyon 9 (2023) e16776

Contents lists available at ScienceDirect

Heliyon

journal homepage: www.cell.com/heliyon

Preferences for printed books versus E−books among university students in a Middle Eastern country

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ARTICLE INFO

Keywords:
Books
Learning
Education
Students
Digital libraries
Reference books

ABSTRACT

Background: Learning styles vary among the students at the university level which has changed from traditional to more technology pervaded strategies involving digital gadgets. The Academic libraries are being challenged to upgrade from old fashioned hard copy resources to digital libraries including electronic books.
Purpose: The main purpose of the study is to assess the preferences of using printed books versus e-books.
Methods: A descriptive cross sectional survey design was used to collect the data. A total of 607 students were included in the study. Data collected was analyzed using descriptive and inferential statistics.
Results: Results showed that 86.8% of the students were in undergraduate program with 48.9% students in the second year of the program, 95.6% in the age group of 17–26 years and 59.5% of them being females. The study concluded that 74.6% of students prefer e-books in terms of easy to carry and 80.6% of them spent more than 1 h reading from e-books, while 66.7% of the students preferred printed books due to the ease in studying and 67.9% favored as it is easy to make notes. However, 54% of them felt studying from the digital copies difficult.
Conclusion: The study concludes that the students prefer e-books as they spent more time reading from e-books and are easy to carry; while traditional printed copy is comfortable to use and easy to take notes and study for exams.
Implications for practice: As many changes are happening in the instructional design strategies with the introduction of hybrid methods of teaching and learning, the findings of the study will guide the stake holders and educational policy makers to design novel and modernized educational design that has a psychological, and social impact among the students.

1. Introduction

Reading has been the most primeval and fundamental learning practice that has traversed since the inception of education [1]. Reading has revolutionized and transitioned from scripts deciphered in papyrus to the invention of printing [1,2]. The dynamicity of 21st century learning environment is dominated by digital world which has become the inevitable tomorrow with digitalization of the print format dating back to 1970 while Stephen king's is credited as the first e-publisher [3].

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https://doi.org/10.1016/j.heliyon.2023.e16776
Received 23 November 2022; Received in revised form 25 May 2023; Accepted 26 May 2023
Available online 29 May 2023

With the advent of technology, education has metamorphosed due to varied teaching styles, availability of study materials on web and expectation of the customers i.e., students who diverted from regular traditional learning strategies to alternative modes using technology such as soft copy of the study materials through laptop, and smartphones [2]. With the growing use of tablets, smart phones and laptops, digitalization in the field of education is no more a novel or contemporary thought as it is already infused in many educational sectors for almost a decade. It is identified that 95% of libraries started purchasing or subscribing for e-books since 2011 [4]. Moreover, web based teaching and learning are mandated in most of the course learning [5,6].

Globally, novel methods like lecture capture technology has been widely recognized and integrated in medical education [7]. While online and hybrid methods of teaching in nursing and medical education once considered impracticable has broken the myths during the COVID-19 times through remote teaching using technology-showing promises towards newer method of teaching learning strategies [7,8]. The current student groups identified as "generation Y″ who "want it all" and "want it now" feel that technology fulfills their learning needs through digital world of books [9]. Digitalization with innovative teaching learning approaches in pedagogy teaching, flipped classroom [8,10], simulation and clinical teaching has proven to improve retention of knowledge and dexterity in skills, and enhancing clinical learning [7,11].

2. Review of literature

2.1. Benefits of using e-books

Digitalization of books enhances the accessibility, convenience, ability to search with options of free downloads, being easy to carry, store, and to share among their peers [12]. Furthermore, recent studies confirmed the benefits of E books over the printed books [2,11,13,14]. With so much documented evidence on the advantages of the E−resources, studies conclude that the cost of study material influences the students' choices and outcomes [1,15]. Effects of mathematics e-books on student's achievement in mathematics was analyzed in a meta-analysis. The data was collected from 17 studies with 3115 students. The meta-analysis confirmed that the mathematics e-books were more effective when used for less than four weeks and very effective when the sample is less than 30 students [16]. Regardless of abundant benefits of using E-books, many students feel uncomfortable while reading from E-books as it causes tiredness while reading through the screen [17,18].

Benefits of using printed books.

Despite there are numerous benefits of using E-resources, learners still prefer printed books which can be borrowed from the library and utilized by students for learning together [19,20]. Several literatures support studying from printed books, which is directly instrumental towards their grades, making notes while studying, achieving the objectives and paves way towards preparation for higher education [1,9,11,21,22]. Additionally, in the past the students considered printed books and teachers as the main source of knowledge [23]. Furthermore, a recent research found that the comprehension and selective and intentional reading behavior was better when reading in print [24].

2.2. Cost of printed and e-books

In 2019, the Association of American publishers generated $ 26 billion by publishing books in various media, with print books accounting for $22.6 billion and e-books for $2.04 billion. Likewise, e-book sales in the United States declined slightly to $983 million in 2019 [25]. However, earlier report states that the digital media has disrupted the business of printing books. Furthermore, due to the space constraints, libraries are considering changing book selection procedure to favor e-books over print. A report in The Huffington Post pointed out that every four out of five publishers produce e-books. Moreover, majority of publishers produce 50% of their titles as e-books. Around one-half produce 75% of their titles as e-books. Besides, 36% of publishers originate more than 10% of their profits from e-books, a percentage that has doubled in one year [26]. These contradicting results should be explored further to understand the reason for differences in the production of print and e-books.

2.3. Gender differences in usage of e-books and printed books

Previous studies reported that females are more likely to read e-books, while male participants are more into the printed books [27]. Additionally, another study found that among 4830 adolescents aged 12–17 years, more girls enjoyed reading compared to boys and both boys and girls preferred to read for pleasure [28]. In addition, national and international studies consistently reveal gender differences in their results. Girls consistently outperform boys on tests of reading comprehension [29]. Another study that compared the gender differences in the reading found that girls outperformed boys regardless of the type of reading instruction [30].

3. Problem statement and research gap

Literature advocates equal benefits for both the printed and electronic learning materials. However, in the recent days there is a paradigm shift from text book learning to digital learning with readiness to replace textbooks to e-learning [2]. Even though, the print and e-books essentially have the same content, the function and the way people use it differs [31]. Most of the studies have analyzed only the reasons for non-usage of print resources. In addition, many researchers have failed to examine the type of readers opting for both the formats. If such studies are conducted, it would provide a comparative insight into the preference of readers. Likewise, it will give a complete picture on the reasons for adoption and non-adoption of printed and e-books [31]. Most of the existing studies

compared the preference of printed text books over e-books in different regions of the world. However, to the best of the researcher's knowledge, no literature has identified the difference in the preference of using printed vs electronic books in Oman and in the Middle Eastern countries. Therefore, this study intended to assess the preference of students in their choice of using printed versus digital materials in a Middle Eastern country.

4. Methods

4.1. Research approach

A quantitative research approach was adopted.

4.2. Research design

A cross sectional descriptive survey design was used to collect the data.

4.3. Research setting

The study was conducted among the male and female students studying in all nine Colleges of Sultan Qaboos University, Oman. It included College of Medicine and Health sciences, College of Nursing, College of Agricultural and Marine sciences, College of Arts and social sciences, Economics and political sciences, College of education, College of Engineering, College of Law and College of science.

4.4. Study group

The study group included Undergraduate and Graduate University students of Sultan Qaboos University, Oman.

4.5. Sample and sample size

Sample size was calculated based on sample size calculation formula considering the parameters $Z_2 = 0.84$, confidence level of 95% and margin of error as 5%. A total of 607 students were recruited to the study using convenient sampling technique.

Program	Number of students
College of Nursing	255
College of Science	52
College of Medicine	16
College of Agriculture and Marine Science	34
College of Law	45
College of Arts and Social Science	50
College of Education	44
College of Economics and Political Science	62
College of Engineering	49

4.6. Criteria for sample selection

The study included the students who have completed foundation courses and minimum one semester from their major undergraduate or graduate program.

4.7. Description of data collection instruments

The questionnaire was constructed based on the review of literature with construct & content validity from the experts. Data were collected using the questionnaire which had three sections. The first section consisted of demographic information of the participants and had seven items. The second section included nine dichotomous questions on learning habits. The third section included six items on the preference to printed and digital resources using a five-point rating scale. The scale ranged from strongly agree (5) to strongly disagree (1). The validity and reliability of the tool was taken through pilot study with 10% of the total population. The pilot study results showed that the tools are reliable and the "r" value is 0.89 and valid to use in the current study.

4.8. Ethical considerations

Ethical approval was obtained from the Research and Ethics committee, College of Nursing, Sultan Qaboos University prior to data collection (Ref. No. CON/DF/2021/5). The purpose of the study was explained and consent was taken from the students. None of the identifying information was collected from the students. They were given the freedom to withdraw their participation from the study at

any point of time. They were not forced to participate in the study. All the collected data were stored in a password protected file. Only the investigators had the access to the data.

4.9. Data collection procedure

After getting formal permission to collect data from the Deans of the colleges, the investigators visited the classrooms. The questionnaire was administered to the students conveniently after getting written consent from the students to participate in the study. The investigators were available in the classroom to clarify the doubts of the students. The survey was completed by the students in 10 min.

4.10. Data analysis procedure

The data collected was entered in the SPSS and statistically analyzed using descriptive statistics (frequency, percentage, mean, and standard deviation) to describe the participants' demographic and educational characteristics. Inferential statistics using independent *t*-test and ANOVA was used to describe the relationship between the demographic variables and usage of the study materials. Post hoc analysis Tukey's Hones test was used to describe the significance of difference in the sample means.

5. Results

The results show that 58.33% of students belong to cohort of 2019 & 2020 affirming that they have studied in the campus for a minimum of 2–3 years (Fig. 1). Fig. 2 illustrates that 59.5% of the respondents were females and this supports the profile of the university, which has admission statistics of 50–60% female students during each academic year. In addition, results display that 95.6% belonging to the age group of 17–26 years with 86.8% registered to the undergraduate courses. It is revealed that 42% of respondents are from Major of Nursing while 10.2% were from College of economics and Political science whilst only 2.6% responded from College of medicine (Table 1). Table 2 reveals that 46.3% students spend less than 1 h to 34.7% spending up to 3 h per day studying from printed books while 19.4% spend less than 1 h to 41.5% spending up to 3 h studying from electronic sources.

Table 3 evidently illustrates that 74.6% find ease to carry the soft copies, while 67.9% and 66.7% prefer hard copies for making notes and for exam purpose. Table 4 clearly differentiates the preference of the students in using the printed copy with 57.5% comfortable in studying from printed material. On the contrary, 54% experienced difficulty in using the on-screen or soft material for studying. The study clearly confirms that irrespective of the popularity of the technological advancement and integration in education, students clearly find it easy to study from the printed textbooks. Table 5 gives a detailed description of the devices preferred for studying the onscreen material and that 39.4% of students use laptop while an equal percent of 31.1% students use I-Pad. The least preferred device is the desktop based on the survey. While it is equally contradicting to observe that 3% of students use no gadgets as mentioned in the table.

The inferential statistics using independent T test and one-way ANOVA comparing the demographic data to preference of the study material was significant for age, gender, cohort and years at university with $p < 0.05$.

The Post hoc test Tukey's Honest Significant Difference (HSD) test was used to assess the significance of difference ($p < 0.05$) between the cumulative GPA of students to preference in reading using the electronic copy. The college of nursing score was significant compared to College of Arts and Social Science. While the College of medicine scores were significant in comparison to College of

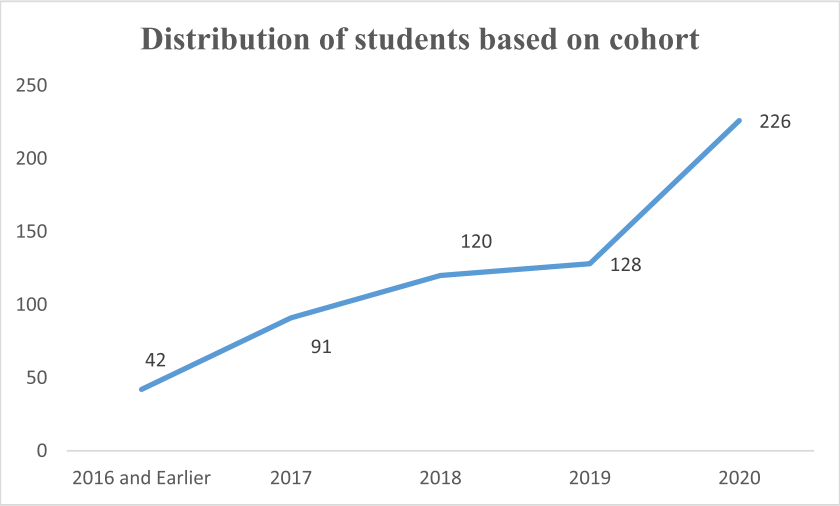

Fig: 1. Distribution of students based on cohort.

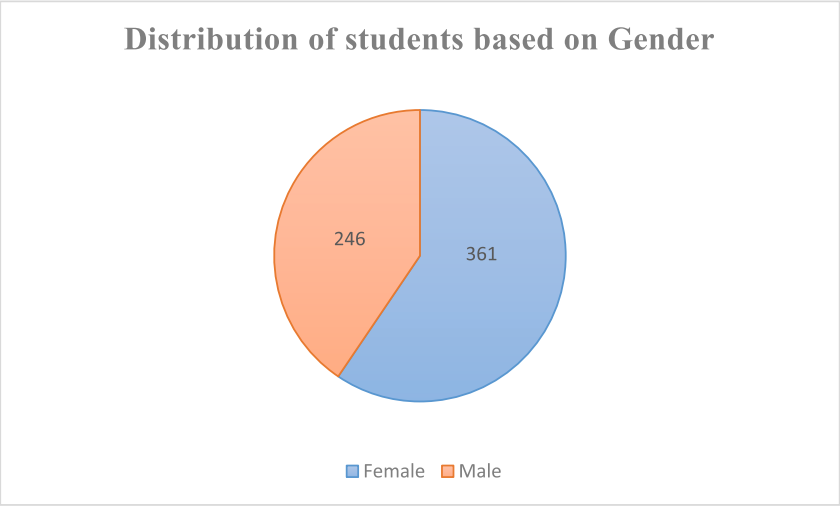

Fig: 2. Distribution of students based on gender.

Table 1
Demographic variables of the participants.

S. No	Details	Number (No)	Percentage (%)
1.	Gender		
	Female	361	59.5
	Male	246	40.5
2.	Age		
	17–21 years	417	68.7
	22–25 years	163	26.9
	26 years and above	27	4.4
3.	Distribution according to Cohort		
	2016 and Earlier	42	6.9
	2017	91	15.0
	2018	120	19.8
	2019	128	21.1
	2020	226	37.23
4.	Number of years at University		
	Less than one Year	57	9.4
	Two- Three Years	297	48.9
	Four- Five Years	234	38.6
	Six years and above	19	3.1
5.	The Cumulative GPA of the previous semester		
	Less than 1	13	2.1
	More than 1 but less than 2	56	9.2
	More than 2 but less than 3	309	50.9
	More than 3	229	37.7
6.	Degree Program		
	Undergraduate	527	86.8
	Postgraduate	75	12.4
	Doctorate	5	.8
7.	Program		
	College of Nursing	255	42.0
	College of Science	52	8.6
	College of Medicine	16	2.6
	College of Agriculture and Marine Science	34	5.6
	College of Law	45	7.4
	College of Arts and Social Science	50	8.2
	College of Education	44	7.2
	College of Economics and Political Science	62	10.2
	College of Engineering	49	8.1

Table 2
Duration of time spent reading from Printed books and E-books.

Time spent reading per day	Printed books		E-books	
	Number (No)	Percentage (%)	Number(No)	Percentage (%)
Less than 1 h	281	46.3	118	19.4
1–3 h	211	34.7	252	41.5
More than 3 h	115	19	237	39.1
Total	607		607	

Table 3
Description of data in terms of ease to carry, make notes and study for exams.

	Easy to carry		Easy to make Notes		Easy to study for exams	
	Number (No)	Percentage (%)	Number (No)	Percentage (%)	Number (No)	Percentage (%)
Printed books	154	25.4	412	67.9	405	66.7
E-books	453	74.6	195	32.1	202	33.3
Total	607	100.0	607	100.0	607	100.0

Table 4
Comfort index while using the Printed books and E-books.

	E-books		Printed books	
	Number (No)	Percentage (%)	Number(No)	Percentage (%)
Easy	179	29.5	349	57.5
Neither easy or Difficult	100	16.5	67	11.0
Difficult	328	54.0	191	31.5
Total	607	100.0	607	100.0

Table 5
Preference of the device while using E-books.

	Number (No)	Percentage(%)
Desktop	15	2.5
Laptop	239	39.4
I-Pad	189	31.1
Phone	64	10.5
Tablet	53	8.7
E– Book reader (Kindle/Nook)	29	4.8
None of the above	18	3.0
Total	607	100.0

science, College of Arts and social science, College of Education and College of Law (Table 6)

6. Discussion

In higher education, textbooks play an essential role and are fundamental in creating critical link between teaching and knowledge acquisition [32]. The major source of knowledge was obtained from printed textbooks until e-books came to existence and usage [6]. E-books has many advantages including key word searching, being paperless, takes less space, ability to change the font size as desired, ability to view animation and video, portability, easy preservation and protection of the content [33]. However, earlier research has argued that the students can remember well when they are reading from the printed textbook [6,17,18]. Moreover, readers enjoy reading from the printed book [34]. Likewise, reading time is faster when reading from the printed book [35]. As different results are reported while comparing the preference of reading from printed book and electronic book, the current study investigated the preference of undergraduate and graduate university students in relation to reading e-books as compared to printed book in a Middle Eastern country.

The current study findings demonstrated that majority of students preferred reading resource material in e-format and spent more time in reading from an E-book as compared to referring to printed material. In line with our study findings, many other researchers reported similar findings across various universities who have identified that majority of the students prefer using e book as compared to using it in printed format [36]. Likewise, in another study, more than half of the university students preferred using e source as compared to those who preferred printed source [37,38]. These results clearly show that use of e resources have reached a level where

Table 6
Post hoc analysis of cumulative score to preference to reading materials.

(I) College Major	Program(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
College of Nursing	College of Science	2.832	2.017	.896	−3.45	9.11
	College of Medicine	−9.828	3.416	.096	−20.46	.80
	College of Agriculture and Marine Science	2.059	2.420	.995	−5.47	9.59
	College of Law	6.144	2.143	.099	−.53	12.81
	College of Arts and Social Science	6.422*	2.050	.047	.04	12.80
	College of Education	4.566	2.163	.467	−2.17	11.30
	College of Economics and Political Science	.252	1.877	1.000	−5.59	6.09
	College of Engineering	.248	2.067	1.000	−6.19	6.68
College of Science	College of Nursing	−2.832	2.017	.896	−9.11	3.45
	College of Medicine	−12.660*	3.789	.025	−24.46	−.87
	College of Agriculture and Marine Science	−.773	2.923	1.000	−9.87	8.33
	College of Law	3.312	2.698	.950	−5.09	11.71
	College of Arts and Social Science	3.590	2.625	.910	−4.58	11.76
	College of Education	1.734	2.715	.999	−6.72	10.18
	College of Economics and Political Science	−2.580	2.492	.982	−10.34	5.18
	College of Engineering	−2.584	2.639	.988	−10.80	5.63
College of Medicine	College of Nursing	9.828	3.416	.096	−.80	20.46
	College of Science	12.660*	3.789	.025	.87	24.46
	College of Agriculture and Marine Science	11.887	4.018	.077	−.62	24.40
	College of Law	15.972*	3.858	.001	3.96	27.98
	College of Arts and Social Science	16.250*	3.807	.001	4.40	28.10
	College of Education	14.394*	3.869	.007	2.35	26.44
	College of Economics and Political Science	10.081	3.716	.146	−1.49	21.65
	College of Engineering	10.077	3.816	.172	−1.80	21.96
College of Agriculture and Marine Science	College of Nursing	−2.059	2.420	.995	−9.59	5.47
	College of Science	.773	2.923	1.000	−8.33	9.87
	College of Medicine	−11.887	4.018	.077	−24.40	.62
	College of Law	4.085	3.011	.913	−5.29	13.46
	College of Arts and Social Science	4.363	2.946	.864	−4.81	13.53
	College of Education	2.507	3.026	.996	−6.91	11.93
	College of Economics and Political Science	−1.807	2.828	.999	−10.61	7.00
	College of Engineering	−1.811	2.958	1.000	−11.02	7.40
College of Law	College of Nursing	−6.144	2.143	.099	−12.81	.53
	College of Science	−3.312	2.698	.950	−11.71	5.09
	College of Medicine	−15.972*	3.858	.001	−27.98	−3.96
	College of Agriculture and Marine Science	−4.085	3.011	.913	−13.46	5.29
	College of Arts and Social Science	.278	2.723	1.000	−8.20	8.76
	College of Education	−1.578	2.810	1.000	−10.33	7.17
	College of Economics and Political Science	−5.892	2.595	.362	−13.97	2.19
	College of Engineering	−5.896	2.736	.437	−14.41	2.62
College of Arts and Social Science	College of Nursing	−6.422*	2.050	.047	−12.80	−.04
	College of Science	−3.590	2.625	.910	−11.76	4.58
	College of Medicine	−16.250*	3.807	.001	−28.10	−4.40
	College of Agriculture and Marine Science	−4.363	2.946	.864	−13.53	4.81
	College of Law	−.278	2.723	1.000	−8.76	8.20
	College of Education	−1.856	2.739	.999	−10.38	6.67
	College of Economics and Political Science	−6.169	2.519	.260	−14.01	1.67
	College of Engineering	−6.173	2.664	.333	−14.47	2.12
College of Education	College of Nursing	−4.566	2.163	.467	−11.30	2.17
	College of Science	−1.734	2.715	.999	−10.18	6.72
	College of Medicine	−14.394*	3.869	.007	−26.44	−2.35
	College of Agriculture and Marine Science	−2.507	3.026	.996	−11.93	6.91
	College of Law	1.578	2.810	1.000	−7.17	10.33
	College of Arts and Social Science	1.856	2.739	.999	−6.67	10.38

(*continued on next page*)

Table 6 (*continued*)

(I) College Major	Program(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
	College of Economics and Political Science	−4.313	2.612	.776	−12.45	3.82
	College of Engineering	−4.317	2.752	.822	−12.89	4.25
College of Economics and Political Science	College of Nursing	−.252	1.877	1.000	−6.09	5.59
	College of Science	2.580	2.492	.982	−5.18	10.34
	College of Medicine	−10.081	3.716	.146	−21.65	1.49
	College of Agriculture and Marine Science	1.807	2.828	.999	−7.00	10.61
	College of Law	5.892	2.595	.362	−2.19	13.97
	College of Arts and Social Science	6.169	2.519	.260	−1.67	14.01
	College of Education	4.313	2.612	.776	−3.82	12.45
	College of Engineering	−.004	2.533	1.000	−7.89	7.88
College of Engineering	College of Nursing	−.248	2.067	1.000	−6.68	6.19
	College of Science	2.584	2.639	.988	−5.63	10.80
	College of Medicine	−10.077	3.816	.172	−21.96	1.80
	College of Agriculture and Marine Science	1.811	2.958	1.000	−7.40	11.02
	College of Law	5.896	2.736	.437	−2.62	14.41
	College of Arts and Social Science	6.173	2.664	.333	−2.12	14.47
	College of Education	4.317	2.752	.822	−4.25	12.89
	College of Economics and Political Science	.004	2.533	1.000	−7.88	7.89

*. The mean difference is significant at the 0.05 level.

they form the basis of students learning resource and experience. Portability is viewed as a key benefit of e books, as supported by few other reports where many respondents felt they could carry many e−books on one device; and create personalized online library in the device used [21].

Although the preference for e−material is demonstrated high on overall terms wherein majority of the students find ease in portability of e−learning material, printed copy of study material is still the preferred mode of choice in terms of ease of notes preparation and preparation for exams. Similar findings are shown in a study conducted by the National Association of College Stores (NACS, 2010), wherein a larger portion of students had not purchased e-books and they preferred choosing printed text book. NACS (2011) again conducted a follow up study and interestingly noted that more than the previous number of participants indicated their preference for printed version. This results shows that the readers still prefer printed version of books considering their advantages [9]. Furthermore, many other studies showed the preference of the readers for printed books [9,39–41]. Nevertheless, contradicting to the findings from our study, recent research supports that students found e−books easy to read and found it as an effective tool [42]. Furthermore, Evans (2017) [34] stated that students found it fun reading from I- Pads. This calls for further research in identifying the reasons for this contradictory study findings.

Our study findings support the age old belief that most students still prefer to read course content and lengthy materials in printed form, however there is paradigm shift towards e−reading and e−learning with easy and smoother access to course material and resources online. Researchers present similar reports where in movement to e−learning has been parallel with reading from printed material. Reading print books is perceived as desirable when long and deep reading is required due to the ease and pleasure associated with print reading [21,36].

In terms of preferred mode of online reading, most preferred device was laptop followed by I pad. Olsen et al. (2013) [43] reported I pad as the most preferred device for e−reading in a study among students in bachelor's program. Casseldon (2020) [21] reported that Personal computers are most favored device for reading e−books predominantly due to easy availability and accessibility at home. University computers are also found to be equally popular. Laptops are less preferred, but still accepted better than tabs and I pad. Additionally, phones are more variedly used than laptops by university students contradicting to the findings presented in our study [22]. Due to technological invasion to daily life, digital texts are unavoidable in learning and teaching. One of the best ways is to integrate e−reading with traditional mode of reading resources. Digital materials can be optimized if both teachers and student find them equally engaging.

Lastly, our study reported that the demographic variables such as age, gender, cohort and years at university having association with the preference of the study material. In line with our study findings, Tosun (2014) [44] and Milal et al. (2021) [27]reported that the rate of preferring to e-books in female students is higher than male students. Woody, Daniel, & Baker, (2010) [45] informed in their study that the students did not prefer e-books over printed books even though the students were most technologically savvy. This calls for further research to explore these differences in the preferences.

7. Limitations

The samples were not equally representative of all nine colleges in the university which might limit its generalizability to all the

study participants. The core study participants included level 2, 3 and 4 students, whereas minimal number of students participated from level 1 and 5. Hence, the differences between the levels of students and their preference could not be analyzed in our study. Moreover, the preference among the newly admitted students to the university could not be studied.

8. Implications for practice

Studies have evidently highlighted that no single learning style is universally accepted among the current Gen Z students and this is highly influenced by exposure to technology [8,46–48]. In similar line, a longitudinal study highlights that traditional teaching was preferred by students older than 25 years while in-lecture videos and PowerPoints were favored by Gen Z students [49]. Hence, the revision of curriculum must be designed for wide range of students who are flexible, adaptable and proficient to educational technology. The findings of the study have reinforced that e-books will not replace the hard copy textbooks but will stay as complement in the system of education. The results have strongly urged the researchers to include a diverse method of teaching and learning styles in didactic and clinical courses. In addition, the study has implications for educational institutions, libraries, and other stakeholders such as publishers who seek to understand and accommodate user preferences in an increasingly internet-based digital environment. Additionally, the study findings are of great interest to the media and publishing companies as e-books and e-readers are rapidly evolving. Furthermore, findings of this study provides a unique insight on user choices and preferences while reading books and who is adopting such technology and how it is being implemented.

9. Recommendations

The authors recommend further studies to identify the preference to printed and e-books among different levels of university students and among students from various disciplines and its influence on their academic achievement. With a plausible scope for increased hybrid and online courses, which includes synchronous face to face, asynchronous and hybrid platforms for learning and teaching urges researchers to explore and evaluate the preferred learning styles and its relationship with the use of printed and e-books and educational outcomes. There is a need to explore major advantages and setbacks of using printed and e-books in various disciplines. A longitudinal study is suggested to determine the predictors and perception of students whether e-books will fully replace printed books and the future of education only with digital learning.

10. Conclusion

The study concludes that even though the student community is very much inclined towards the digital world and allured to technology in education but the choice of the learning styles is in complete contrast with the students preferring traditional learning styles using printed textbooks. There is significant relationship to the grades with the choice of learning. The main reason for preferring the printed copy of books is because it enhances their learning towards acquisition of knowledge, making notes and keeps the students focused with the objectives of the course content while learning from digital E−books exposes the students to enormous resources to a single topic which affects the students in satisfaction of their learning. Post COVID has led to many changes in instructional design strategies with introduction of hybrid methods in teaching which influences the cognitive engagement and exposing the students to unpredictable challenges in their steady learning habits. The findings of the study will guide the stake holders and educational policy makers in designing novel modernized educational design that has a psychological, and social impact among the students.

Author contribution statement

Anandhi Deva Amirtharaj: Conceived and designed the experiments; performed the experiments; analyzed and interpreted the data; wrote the paper.

Divya Raghavan; Judie Arulappan: Conceived and designed the experiments; performed the experiments; wrote the paper.

Data availability statement

Data will be made available on request.

Funding statement

The study was funded by Dean's fund, Sultan Qaboos University, Sultanate of Oman (CON/DF/2021/5).

Additional information

No additional information is available for this paper.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to

influence the work reported in this paper.

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