

An Analysis of Print Book and E-Book Preferences

INF 397C Understanding Research

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1. INTRODUCTION

As technology has developed over the years, electronic books have risen in prominence in the literary field, threatening to supplant print books as the primary medium for reading and having an immense influence on people's reading habits. However, printed books have been around for thousands of years and have shown staying power even with the advent of E-Books as a medium.

We were therefore interested to know the current landscape of user preferences concerning electronic versus printed reading materials and dig out the reasons behind user preferences. With some research we were hoping to estimate whether print books would exist as a medium in the long term.

While we initially considered restricting our study to an academic field, we decided to expand our research to include the general public in order to gain a fuller understanding of how these preferences may differ depending on age group and socioeconomic status.

2. LITERATURE & PAST RESEARCH

Prior research on this topic has consistently found that e-books are not in a position to replace print books, a situation which holds true overall and on an individual scale- i.e. the majority of people who make use of e-books also read printed materials, and although many people have been engaging with electronic reading materials more often, very few forego printed material entirely. (Kudva & Zhang, 2013) Earlier research focused upon the study habits of college students has also suggested that in spite of familiarity with the technology inherent to e-books, they still maintain a large preference for printed materials in their learning. (Woody et al., 2010)

3. RESEARCH QUESTIONS

As we read about past research conducted on this subject and pondered what different aspects of people's identities and lifestyles may affect their preferences for electronic or printed reading materials, we devised several questions that we were hoping to answer through our own research:

- Is there a difference among demographics for their preferences?
- Does ease of access to printed materials affects their choice?
- Does a person's familiarity with electronic devices inspire them to read more?
- Does a person's preferences vary depending on the subject of the written work?
- What other reasons do people have behind their preferences?

Of course we had some predictions to what the answers to these questions might be. Our specific hypotheses were:

- 1) Younger subjects having a stronger preference for electronic reading materials than our older subjects
- 2) Women spending more time reading both printed material and electronic material overall over men, while men have a preference for e-materials due to their ease of casual use
- 3) People who prefer print materials will be more inclined to read engaging materials, and thus be more inclined to read overall
- 4) People who are visually impaired will prefer E-Books as they can enlarge their reading material and incorporate software that will read it aloud for them
- 5) People who live close to libraries or bookstores and have better access to printed materials will have a stronger preference for printed books while those who live farther from such facilities will prefer the convenience of access that comes with electronic books
- 6) People who have better access to motorized transportation will have a stronger preference for printed materials than those who do not because the weight of carrying those printed materials as opposed to the relatively lighter E-Readers will be less of a problem.

4. SAMPLE

The target population of this project were initially academics including Professors, doctoral students, Graduates and undergraduates. Since this is a broad study between the usage of e-readers and print books, we decided to extend the scope of the study to include avid readers who regularly visit libraries to eliminate any bias that might arise due to age, social status or familiarity with technology.

Our sample size was 43 graduate students and faculty and administration staff from the University of Texas' iSchool and 27 patrons of Pflugerville Public Library.

5. DATA COLLECTION

We utilized a questionnaire of 22-26 questions (varying between the online and physical copies of the questionnaires we distributed) to collect data from our subjects. Due to our subject matter, we divided our questionnaire into an online format and a print format so as to ensure we get unbiased results from people who may have a preference for print or may prefer electronic mediums.

Our printed version of the questionnaire was distributed at a Pflugerville Public Library in Texas with candy as an incentive, albeit with the clear understanding that neither the library nor the city sponsored the research. Due to there being no automated processes in the print edition, some questions were modified to still be relevant while collecting the sought after information from our subjects.

Our online version of the questionnaire was made using the software available on the Qualtrics website and the link to take it was distributed to our volunteering subjects via the University of Texas iSchool's Flipsider listserv.

The questionnaire consisted mostly of closed questions with some written-in open questions and follow ups implemented where we felt more clarification was required from our subjects. In the end, we received 43 online respondents and 27 paper respondents.

6. RESULTS

Based on the data collected from both sets of questionnaires, our team went ahead to analyze it and to answer the research questions. For the purpose of this paper we analyze the data according to the research questions posed by us in their respective order. As discussed earlier our questions cover the following topics, Demographics, Ease of access, familiarity and subject being read.

6.1 Is there a difference among demographics to prove one's preferences?

We examined the relationship between our respondent's age, gender, and visual capabilities to draw some conclusions regarding the importance of those factors in their reading preferences.

AGE:

About 73% of our respondents were at the age range of 16-34; people who grew in up in the lap of technological advancement and generally assumed to be comfortable using sophisticated devices. We therefore hypothesized that people who were in this age range would prefer using e-books over print.

Our assumption turned out to be true as we found out that there is a relation between these two variables (age and preference). Even though the graph shows that only 18% of the people around the age range of 16-24 and 5% around the age range of 25-34 said they prefer an e-reader as compared to zero percent from 35+.

Chart 1 - Age

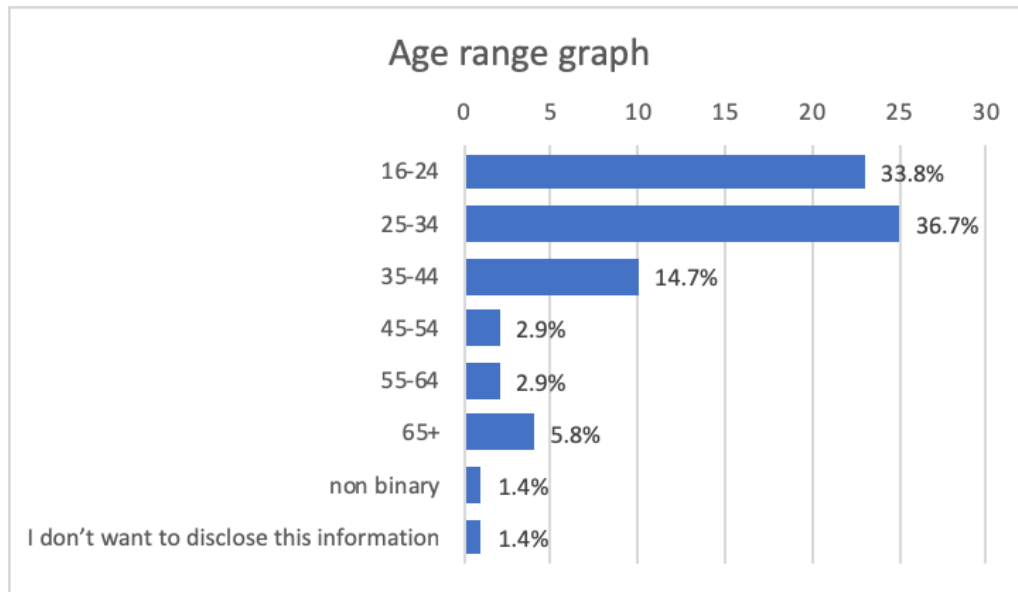
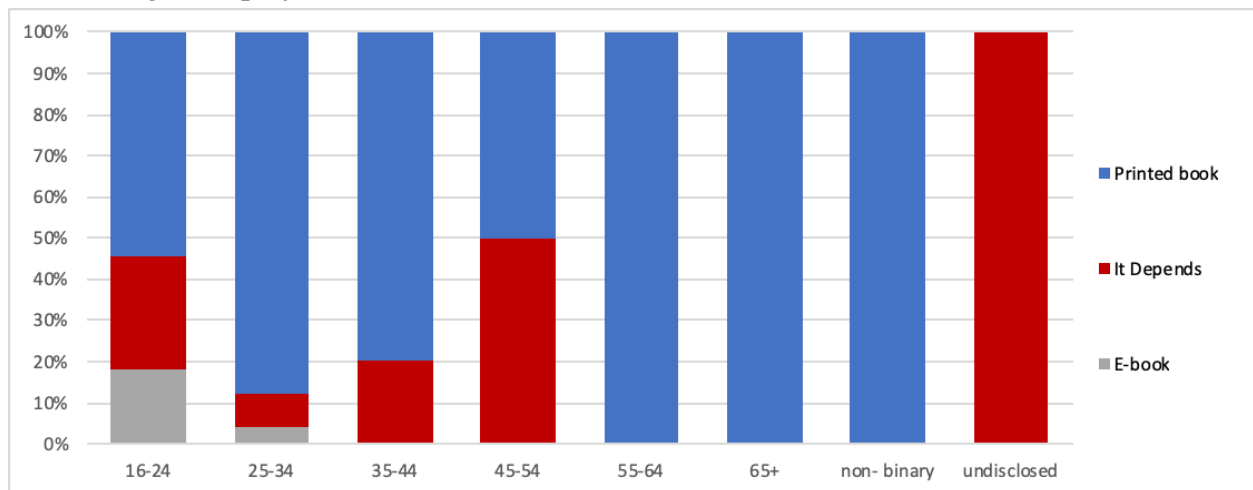


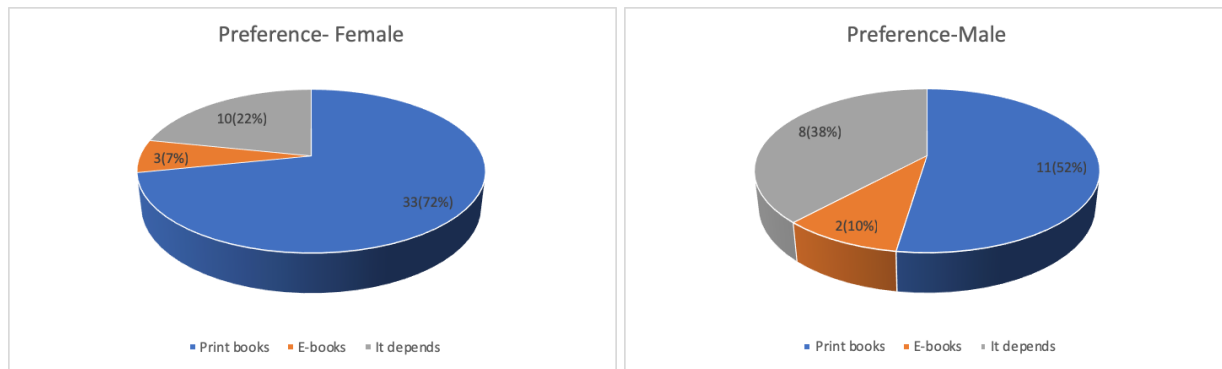
Chart 2 - Age and preference



GENDER:

As the chart suggests, we can speculate that women choose to read printed books more than men do, although the reason for this mandates further investigation. Due to a difference in the sample size of men and women respondents, we believe this analysis might be redundant and the numbers might be skewed. In order to test the strength of the data we did have, we utilized Chi-square and found that $p = 0.5796392711$, $p > 0.05$, suggesting that there is no significant relationship to prove that there is a gender bias for reading preference between electronic and print mediums.

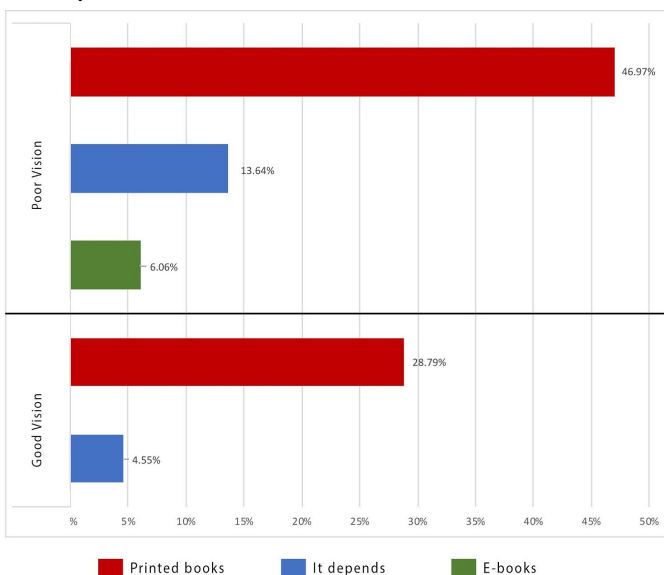
Chart 3 - Gender and preference



VISION:

It is common knowledge that E-readers come with a variety of features to benefit the public. Some of these include backlighting, freedom to enlarge the font size, and audio output softwares. Therefore it can be implied that people with impaired eyesight are more inclined to choose e-readers over print books. But as seen in Chart 3, this hypothesis is erroneous. Once again we used Chi-square to analyze the data. $p=0.6793$, $p>0.05$, and we found that there is no significant difference.

Chart 4 - Vision

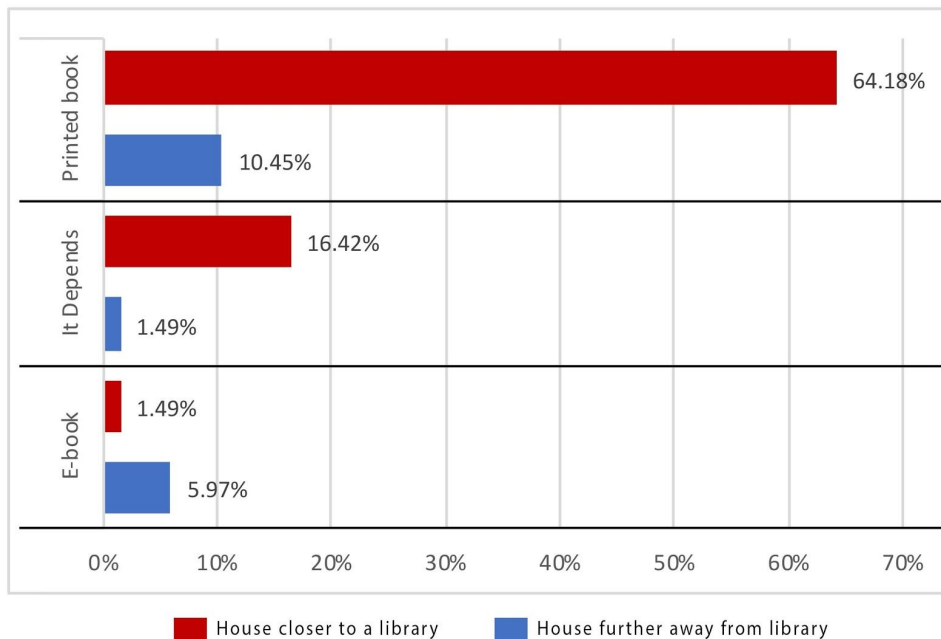


6.2 Does ease of access to printed material affect their choice?

Due to the convenience of having a library or a bookstore close to their residence, we hypothesized that the user's choice might be influenced by proximity. An interesting point to note is that people who answered the print questionnaire in the library mostly

lived near the library and 64% had a preference for print. Although it might hold true that a person who lives near a bookstore or library is more likely to read print material, the chi square test proves that both the variables, proximity, and preference are independent to each other.(As seen in inferential statistics section)

Chart 5 - Proximity and preference



We tried to check if there was any relation between the mode of transport and their desire to read a printed or an electronic source. Most of our respondents (about 70%) travelled by car (as seen in Chart 5). Interestingly, while we thought that ownership of a personal vehicle would facilitate easier transport of bulky print material and therefore be a strong factor for user preference, Chart-6 shows some inconsistencies. For example a significant number of people who travelled by public transport, also preferred to carry print books. We also performed a chi-square test on the two variables to test our assumption, and found that the transportation value for $p = 0.49$, $p > 0.05$ conveys no significant relation between both the variables (as seen in the inferential statistics section). This confirms that a person's mode of transportation has no effect on the way they read either.

Chart 6 - Mode of transportation

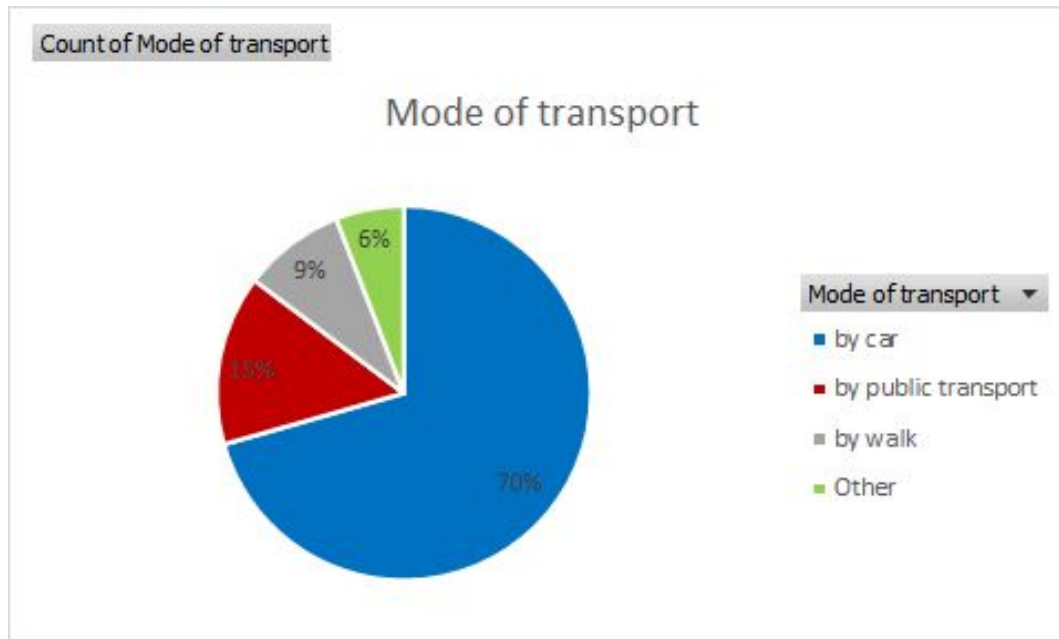
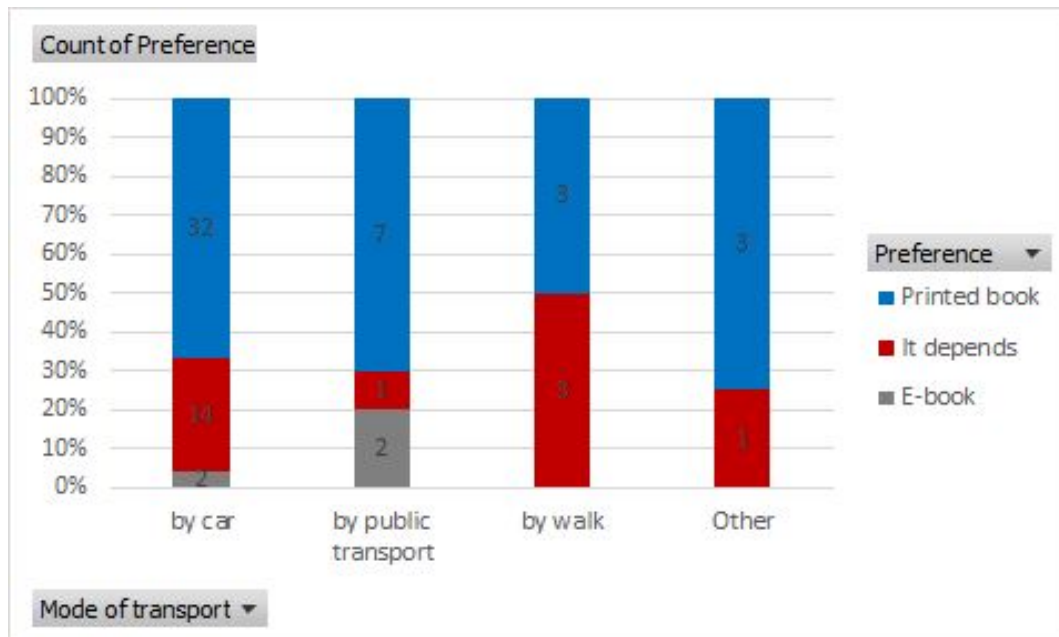


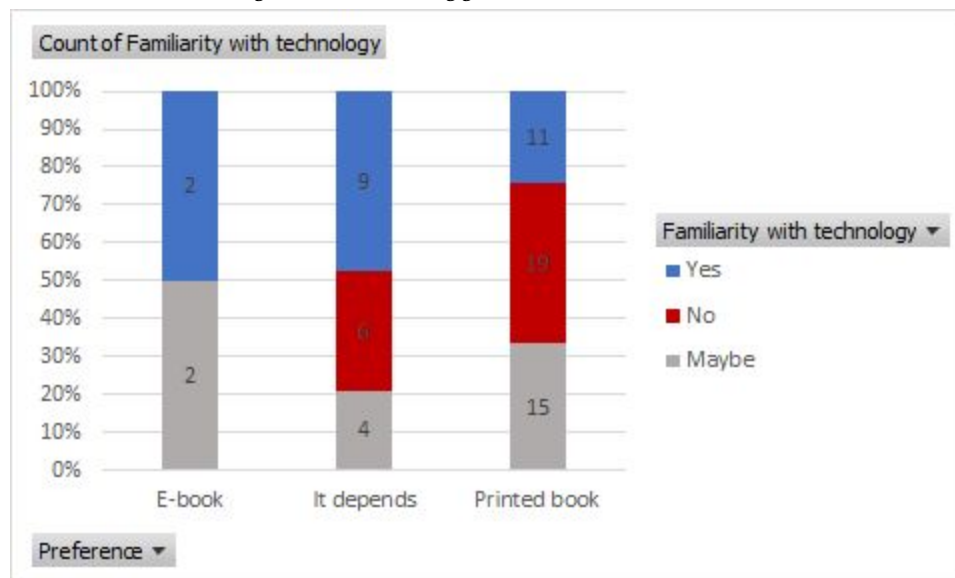
Chart - 7 Transportation and preference



6.3 Does the level of familiarity with technology change the preference?

As technology improves and provides more to the e-book experience, e-readers may have gained more use over the years. The data collected regarding people's familiarity with e-readers was reflected in their preference of use. While this may seem self-evident, it is worth noting that familiarity with a medium does not automatically relate to preference, as those who stated a preference for electronic reading materials were undoubtedly familiar with print material, but still selected electronic materials nonetheless. True, while there is a preference for print overall among the majority that utilizes both mediums, there is no denying that e-readers have made a net gain in popularity over time.

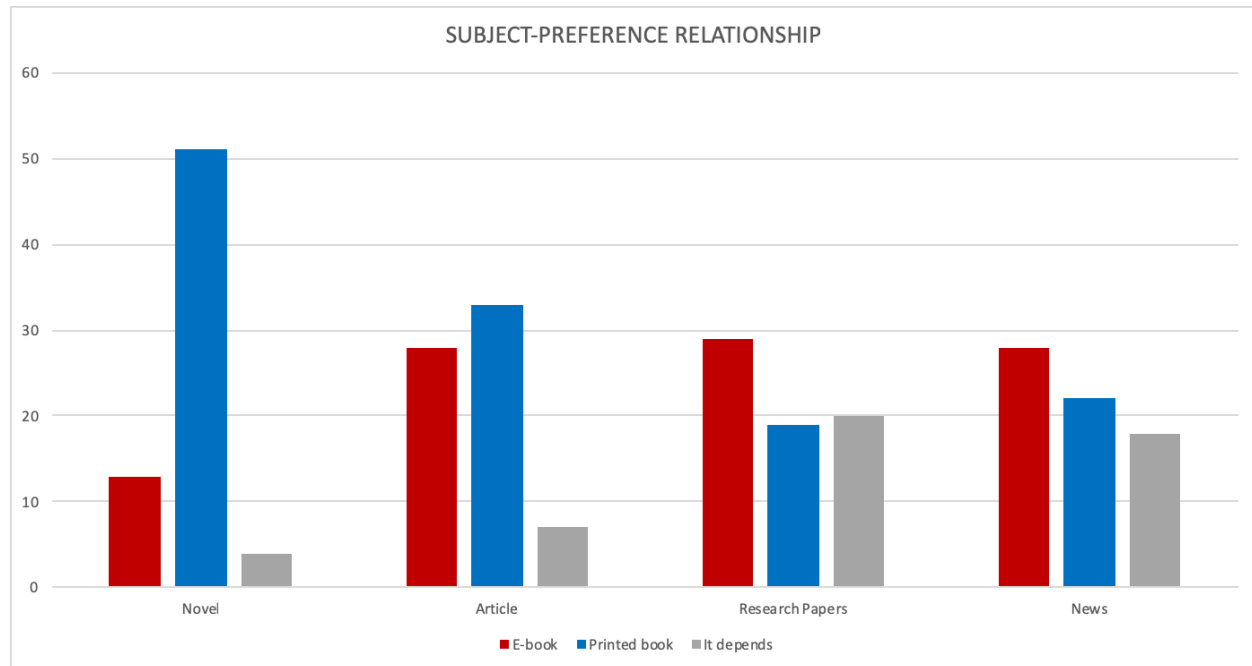
Chart 8 - Familiarity with technology



6.4 Do people's preferences vary depending on the subject of the written work?

Going through the information collected in our questionnaire it became clear that not only did people's preferences vary depending upon the subject of the material, but that there was a correlation between the subject of the materials they enjoyed reading and the reasons people gave behind their preferences.

Chart 9 - Relationship between subject and preference



6.5 What reasons do people have behind their preferences?

The most open ended question on our questionnaire involved the respondent's own specified reasons behind their preference. 59.26% of respondents claimed that they prefer printed books while 40.74% of respondents stated that their preference depends upon various factors. Among respondents whose preference was printed books, the most popular reasons given were: less visual strain, familiarity, tangibility, durability, economic factors, being better for the environment, and improved concentration due to a lack of online distractions. While the exact scientific validity of such perceived opinions (e.g. books are superior because of how they "feel") is beyond the scope of this research, it's worth noting that these are *popular* opinions as these sentiments were very common in the responses we received.

Chart 10- Summation of reasons given

Answer	Code
Believes printed books are better for their eyes	Visual strain
Don't have to power on anything	Durability
Grew up reading print books	Familiarity
Grew up with print books	Familiarity
Likes holding books to read and feels that looking on a screen too long hurts their eyes	Tangibility/Visual Strain
Likes the feeling of holding a physical book, only uses digital if price isn't reasonable	Tangibility/Economic
Print books are easier on eyes, Likes turning real pages, Easier to read print to children	Visual strain/Tangibility/
Print books keep them from getting distracted from going online and social media	Concentration
Print is easier on eyes	Visual strain
Used to them	Familiarity

We tried to understand the frequency of the reasons why people chose printed books over e-books and wrote our top 5 reasons.

CODE	FREQUENCY
1.Tangibility	48
2.Familiarity	37
3.Ease of use	24
4.Visual strain	20
5. Durability	12

7. ANALYSIS

After the descriptive statistics, we performed inferential statistics to gain more insight into our research questions. The data was both nominal and ordinal along with

interval data. After understanding the type of data we collected, the types of variables were determined along with the types of statistical tests to be performed with those variables.

We used chi square, a non parametric test to determine the relationship between the following variables

- a. Gender-Preference
- b. Vision- Preference
- c. Proximity to library-Preference
- d. Mode of transport-Preference
- e. Technology-Preference

For the purpose of the paper we show the Chi-square process followed by us for *Proximity to library-Preference* and *Mode of transport-Preference*.

PROXIMITY TO LIBRARY-PREFERENCE:

Our null hypothesis states that *there is no relationship between the proximity of the library to the user's preference or choice.*

We first made an *observed* count(O) of the quantitative data set that we got through the questionnaires.

Chart - 11 Observed data set (O)

Count of Preference	TYPE OF MEDIUM			
PROXIMITY TO LIBRARY	E-book	It depends	Printed book	Grand Total
No	4	2	7	13
Yes		17	38	55
Grand Total	4	19	45	68

We then began to calculate the expected results from Chart-11 and extrapolated the *expected* count(E) using the formula shown below.

$$E = \frac{\text{row total} \times \text{column total}}{\text{sample size}}$$

Chart - 12 Expected data set (E)

PROXIMITY TO LIBRARY	TYPE OF MEDIUM			
	E-book	It depends	Printed book	Grand total
No	0.76	3.63	8.6	13
Yes	3.24	15.37	36.4	55
Grand total	4	19	45	68

Now with the values “O” and “E” we calculated the chi square value for the two variables using the formula given below.

$$\chi^{2*} = \sum (O_i - E_i)^2 / E_i$$

Chart - 13 Chi-square calculation

Chi-square	E-book	It depends	Printed book
No	13.69	0.73	0.30
Yes	3.24	0.17	0.07
chi-square value (X^2)	18.2		

After finding the chi-square value, we deduced the degrees of freedom as, (number of rows - 1) * (number of columns - 1). After which we used an online calculator to generate the chance of probability.

Chi-square value (X^2)	18.20
Degrees of freedom	2
Chance of probability	0.99

Due to the high P value the null hypothesis cannot be rejected, implying that the variables are independent of each other.

MODE OF TRANSPORT-PREFERENCE:

We continued the same process of finding the *observed* count(O) of the quantitative data set that we got through the questionnaires.

Chart - 14 Observed data set (O)

Count of Preference	Column Labels			
Mode of transport	E-book	It depends	Printed book	Grand Total
by car	2	14	32	48
by public transport	2	1	7	10
by walk		3	3	6
Other		1	3	4
Grand Total	4	19	45	68

We then began to calculate the expected results from Chart-14 and extrapolated the *expected* count(E) using the formula shown below.

$$E = \frac{\text{row total} \times \text{column total}}{\text{sample size}}$$

Chart - 15 Expected data set (E)

MODE OF TRANSPORT	TYPE OF MEDIUM			
	E-book	It depends	Printed book	Grand Total
by car	2.82	13.41	31.76	48
by public transport	0.59	2.79	6.62	10
by walk	0.35	1.68	3.97	6
Other	0.24	1.12	2.65	4
Grand Total	4	19	45	68

Now with the values “O” and “E” we calculated the chi square value for the two variables using the formula given below.

$$\chi^2 = \sum (O_i - E_i)^2 / E_i$$

Chart - 13 Chi-square calculation

	E-book	It depends	Printed book
by car	0.24	0.03	0.00
by public transport	3.39	1.15	0.02
by walk	0.35	1.04	0.24
Other	0.235	0.012	0.047

After finding the chi-square value, we deduced the degrees of freedom as, (number of rows - 1) * (number of columns - 1). After which we used an online calculator to generate the chance of probability.

chi-square value (χ^2) 6.76

degrees of freedom 6

chance of probability 0.49

Due to the P value being more than 0.5 the null hypothesis cannot be rejected, implying that the variables are independent of each other.

8. CONCLUSIONS

After analyzing our data, we were able to develop some answers to our initial research questions and drew some conclusions based on what we found, to summarize:

Is there a difference among demographics for their preferences?

We researched factors based upon our respondents' opinions and locale that we thought might be relevant to their choices of reading medium. We found that for those who preferred e-readers as a medium, there may be some correlation to society's increasing concerns regarding the environment as e-readers and electronic reading material overall are commonly regarded as being environmentally friendly, saving trees from being utilized for paper in their print alternatives. Additionally, the improved usability and ease of access granted to e-readers as technology marches onward may be a contributing factor.

Does a person's familiarity with electronic devices inspire them to read more?

According to our data there seems to be no correlation between a person's familiarity with electronic devices and more time spent reading daily. There was an interesting discrepancy however between the amount of people who reported they did not know or were unsure if they were tech enthusiasts, and the average amount of computer devices our respondents reported owning, which suggests that electronic device ownership does not indicate enthusiasm of acquisition any more than it inspires acknowledged time spent reading.

Do people's preferences vary depending on the subject of the written work?

Yes, and it would seem that this is related to the reasons people give behind their preferences. For example, people prefer what they perceive to be reduced eye-strain, a lack of online distractions, and the comforts of tangibility and familiarity when spending time reading novels, while the perceived impersonal nature of electronic reading and availability of online resources for further research is favorable while reading the news or evaluating research papers.

What reasons do people have behind their preferences?

Reiterating the above, eye strain due to the backlighting inherent in most forms of electronic reading was among the most frequent reason given, along with tangibility, concentration, and familiarity all credited to print. Another important factor noted was the durability of printed reading materials, i.e. books do not run out of batteries, and your book won't break if you drop it, and even if it's ruined you don't risk losing your whole library because of it.

9. LESSONS LEARNED

As this research was conducted as part of a class project, it was very much a learning experience and we therefore find it is pertinent to describe some things we learned.

- We realized the importance of having a consistent vocabulary for a more succinct approach to the research. For example we had many instances in the questionnaire where we used “printed books” and “print books”, as well as “e-reader” and “e-books” interchangeably, and there was no guarantee that this didn't cause confusion for our respondents.
- While preparing the questionnaire we got too ambitious and asked a variety of questions whose data may have been redundant. We also did give enough thought to the analytical procedure while preparing the questionnaire, which proved to be a mistake.
- As we brainstormed research questions, we feel we tried to cover too broad a range of topics which in turn caused our research to lack some focus.

In recognizing these mistakes we think we are now a bit wiser regarding the execution and understanding of research moving forward.

10. APPENDIX

10.1 Online Questionnaire

10.2 Printed Questionnaire

10.3 References

10.1 ONLINE QUESTIONNAIRE

Q1 What is your age?

- ☐ 16-24 (1)
- ☐ 25-34 (2)
- ☐ 35-44 (3)
- ☐ 45-54 (4)
- ☐ 55-64 (5)
- ☐ 65+ (6)

Q2 What is your gender?

- ☐ Male (1)
- ☐ Female (2)
- ☐ Non-binary (3)

Q3 What is your occupation?

- ☐ Undergraduate student (1)
- ☐ Graduate student (2)
- ☐ Faculty (3)
- ☐ Other (4) _____

Q4 Do you have short or long sightedness?

- ☐ Yes (1)
- ☐ No (2)
- ☐ I don't want to disclose this information (3)

Q5 Is your house close to a bookstore/library?

- ☐ Yes (1)
- ☐ No (2)

- ☐ I don't want to disclose this information (3)

Q6 What is your primary form of transport?

- ☐ by walk (1)
- ☐ by car (2)
- ☐ by public transport (3)
- ☐ Other (4) _____

Q7 How many books have you read in the last month? Leave it "0" if you have not read any

How many e-books? : _____ (1)

How many printed books? : _____ (2)

Total : _____

Q8 Which of these devices do you own? Select all that apply

- ☐ Desktop or laptop (1)
- ☐ Electronic tablet (2)
- ☐ Smart Phone (3)
- ☐ Kindle or other E-reader (4)
- ☐ I don't own any of the above (5)

Q9 Have you purchased an E-book or a print book over the last month?

- ☐ Yes (1)
- ☐ No (2)
- ☐ Borrowed (3)

Q10 How many?

E-books : _____ (1)

Print books : _____ (2)

Total : _____

Q11 How much money do you spend on buying an E-book or a printed book in a month?

- ☐ A great deal (1)
- ☐ A lot (2)
- ☐ A moderate amount (3)
- ☐ A little (4)
- ☐ None at all (5)

Q12 Do you spend more money on E-books or printed books?

- ☐ E-books (1)

- Print books (2)
- I don't spend money on any (3)

Q13 What is your attitude between the prices of E-books and printed books?

- They are the same (1)
- E-book is cheaper (2)
- Others (3) _____

Q14 Do you think there is an improvement in digital readers from before?

- Yes (1)
- No (2)
- I don't know (3)

Q15 What do you use to help you absorb knowledge while reading?

- Pen and paper (1)
- Applications (2) _____
- Both (3)

Q16 Are you a tech enthusiast?

- Yes (1)
- No (2)
- Maybe (3)

Q17 If you have an overused printed book, what do you do with it?

Q18 What is your attitude towards environmental protection?

- Strongly agree (1)
- Agree (2)
- Neither agree nor disagree (3)
- Disagree (4)
- Strongly disagree (5)

Q19 Do you usually carry a backpack when you go out?

- Yes (1)
- No (2)
- It depends (3)

Q20 Do you have a habit of reading outside?

- ☐ Yes (Please write down where) (1)
-

- ☐ No (2)
- ☐ It depends (3)

Q21 On an average, how many hours do you spend on reading books everyday?

- ☐ I dont read at all (1)
- ☐ 1-3 (2)
- ☐ 4-6 (3)
- ☐ 7-9 (4)

Q22 What do you prefer?

- ☐ E-book (1)
- ☐ Printed book (2)
- ☐ It depends (3)

Display This Question:

If What do you prefer? = E-book

Q23 Why do you prefer an E-book? Select all that apply

- ☐ Cost (1)
 - ☐ Readability (2)
 - ☐ Availability (3)
 - ☐ Ability to take notes (4)
 - ☐ Impact on the environment (5)
 - ☐ Ease of use (6)
 - ☐ Easy to carry (7)
 - ☐ Other (8) _____
-

Display This Question:

If What do you prefer? = Printed book

Q24 Why do you prefer a printed book? Select all that apply

- ☐ Cost (1)
- ☐ Readability (2)
- ☐ Availability (3)
- ☐ Ability to take notes (4)

- ☐ Aesthetics (5)
- ☐ Familiarity (6)
- ☐ Ease of use (7)
- ☐ Easy to carry (8)
- ☐ Other (9) _____

Display This Question:

If What do you prefer? = It depends

Q25 Which version do you prefer for the following types of literature?

	E-book (1)	Printed book (2)
Novel (1)	<input type="radio"/>	<input type="radio"/>
Articles (2)	<input type="radio"/>	<input type="radio"/>
Research Papers (3)	<input type="radio"/>	<input type="radio"/>
News (4)	<input type="radio"/>	<input type="radio"/>

-----*End of Questionnaire*-----

10.2 PRINTED QUESTIONNAIRE

This questionnaire concerns preferences for E-Books or Printed Books.

This questionnaire is part of a research project for a class at the University of Texas's iSchool Program and is NOT involved with or sponsored by The City of Pflugerville, regardless of the distribution location.

All information collected here is completely anonymous, and cannot and will not be traced back to the individuals who fill out this questionnaire

What is your age (in years)?

☐ 16-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ 65+ ☐ I prefer not to disclose

What is your Gender?

☐ Male ☐ Female ☐ Non-Binary ☐ I prefer not to disclose

What is your current occupation?

☐ Undergraduate Student ☐ Graduate Student ☐ Faculty ☐ Other (Please specify):

Do you have a visual impairment?

☐ Yes ☐ No ☐ I prefer not to disclose

Do you live nearby a bookstore or library?

☐ Yes ☐ No ☐ I prefer not to disclose

What is your primary form of transportation?

☐ Walking ☐ Driving ☐ Public Transportation ☐ Other (Please specify):

How many E-Books have you read in the past month? _____

How many Print Books have you read in the past month? _____

Which of these devices do you own? (Select all that apply):

☐ Desktop or Laptop Computer ☐ Electronic Tablet ☐ Smart Phone ☐ Kindle or Other
E-Reader ☐ None of the above ☐ I prefer not to disclose

How many E-Books have you purchased in the past month? _____

How many E-Books have you borrowed in the past month? _____

How many Print Books have you purchased in the past month? _____

How many Print Books have you borrowed in the past month? _____

How much money do you spend on reading materials each month?

☐ A lot ☐ A moderate amount ☐ A little ☐ None ☐ I prefer not to disclose

Do you spend more on E-Books or Printed Books?

☐ E-Books ☐ Printed Books ☐ Neither ☐ I prefer not to disclose

Which do you feel are more expensive?

☐ E-Books ☐ Printed Books ☐ They're both the same

Do you think E-Readers have improved with time?

☐Yes ☐No ☐I'm not sure

What helps you absorb more knowledge while reading?

☐Pen and Paper ☐Digital Applications ☐I use both

Would you consider yourself a tech enthusiast?

☐Yes ☐No ☐I don't know

What do you do with used print books you no longer desire?

☐Discard them ☐Donate them ☐Other (Please specify):

Do you feel that the environment needs protection?

☐Strongly Agree ☐Agree ☐Neutral ☐Disagree ☐Strongly disagree

What are your feelings on carrying print books with you?

☐I am fine with carrying them ☐Cumbersome, but I'm okay carrying them ☐They are too cumbersome to deal with

Do you enjoy reading outside?

☐Yes (Please specify where):

☐No, I prefer to read inside

☐I do not enjoy reading

On an average, how many hours do you spend on reading books daily?

☐I don't read at all ☐Less than an hour ☐1-3 ☐4-6 ☐7-9 ☐10+

Overall, which do you prefer, and why?

☐Printed Books

☐E-Books ☐Neither ☐It depends

Which version do you prefer for the following types of literature?

Thank you for your time and contribution to our research!

10.3 REFERENCES

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