Digital versus Paper Reading: Hospitality Students' Preferences

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Abstract

Education is increasingly transitioning to a digital landscape, foregoing textbooks and paper reading. Existing research points out that reading on paper is significantly more effective than reading on digital devices. This research investigated students' habits and preferences regarding digital and paper reading and note-taking for college assignments. A survey distributed to 143 college students suggests that generally students prefer paper, but do not take the time to print, so they end up reading digitally. Implications of this study suggest that educational institutions should pay closer attention to how their students study, and support students and faculty members for paper reading.

Digital versus Paper Reading: Hospitality Students' Preferences

Imagine an everyday scenario in a college classroom. A professor shares a reading to her students online for them to study. Student A prints out the files or uses a textbook and studies the reading on paper. Student B studies the reading on his laptop. Student C studies the reading on her phone. Are the outcomes the same when tested on the efficiency of their reading? Does it matter which tool – digital or paper – a student uses?

How do students decide which tools to use? If Professor X shares a file online, and Professor Y hands out printed copies to students, do these approaches change student behavior towards studying? Moreover, will students remember, learn, and understand the knowledge more significantly depending on which tool they use? First, before answering these questions: for whom is it relevant and why?

This research project is relevant to students and professors. Students use both digital and analog study tools. Each student has his or her unique combination of preferences. These preferences, and the effect of students' choices on their learning, are the focus of this research. The problem we will try to solve is student's preferences; whether students are choosing among analog and digital formats based on what is easier and more convenient, without regard to which is more effective for learning. Before we try to solve this problem, where does education and educational reading stand nowadays?

Trends in Educational Technologies

Today, educational tools have been changing as rapidly as technology has advanced in the last decades. Now we are in an age of evolving tools to process information. We know educational institutions are moving increasingly to a digital landscape because of the natural progression of technology, as well the COVID-19 pandemic and lockdowns speeding that process. In fact, according to UNESCO, 98% of the global student population switched to online classes after the pandemic hit. "This extremely high demand for online education recourses" says

Edtick, "has probably accelerated the digitization of the Education sector by five to ten years." Students are finding solace in digital tools. How precisely?

Digital learning technology has helped students achieve better grades (Chernev, 2022). In America, 81% of college students agreed this to be true. Indeed, digital tools offer convenience, accessibility, and creative alternatives for learning. Students being able to contact professors via email is a great example of how digital technology opens new streams of learning. On the other hand, textbooks, which is reading on physical paper, is declining (B. Lenon). Many schools also removed textbooks as the main teaching curriculum in the West. In England, 92% of students in secondary sciences are not issued textbooks. Why are textbooks being pushed to the side?

Textbooks are in an odd position. In 2015, an educational consultant for the Obama administration advised the president to phase out printed textbooks in schools and transfer to electronic textbooks (Inspiration Education, 2018). Inspiration Education states it is because electronic textbooks are rendering printed textbooks obsolete. It's important to note that the question of phasing into a digital landscape, and abandoning paper, has reached on a governmental policy change level. A number or practical reasons emerge for why this is the case.

Electronic textbooks are cheaper to students and faculty to spend on. Students spend on one device like a laptop and all of their readings appear there. Already most of American college students own laptops (Purdue). This is instead of carrying multiple heavy books and having to spend a lot of money on each book. Many textbooks are also inaccurate because of new scientific findings (Inspiration Education, 2018). That is why newer editions are constantly released. It is easier to manage these editions on a digital device rather than having older-edition textbooks.

Bill and Melinda Gates predicted in 2018 that soon printed textbooks would become obsolete in educations settings, as well (Learning Liftoff, 2019). They note that school textbooks are too limited, and that a blend of artificial intelligence and software will open better learning opportunities for future students (Learning Liftoff, 2019). Some of these opportunities are the use of videos, quizzes that reveal where students fail - and with AI provide personalized learning, and play educational games. It's interesting to see potentialities within a digital landscape that will open up new paths to learning. Although, these aspects are out of the scope of this research.

In any case, Learning Liftoff (2019.) points out issues with Gates's prediction. Printed textbooks are still the status quo in many schools due to economic reasons. Some families cannot afford devices such as laptops or phones, therefore textbooks are handed out and lend generationally by schools and former students. Even if families could afford devices, some schools also lack finances and know-how to invest in a digital infrastructure so that such learning could be provided. Moreover, many students and teachers still prefer paper format for personal practical reasons. In a later section of this paper a deeper look will be conducted into preferences.

Digital devices themselves have flaws. ProCon (2018) states that reading on paper leads to better comprehension than digital, as do many other scholarly researches. Digital devices causes' higher fatigue and eye strain than in comparison to textbooks (Scientific American, 2013.). Regarding interaction, paper offers an intuitive ability to highlight, take notes, and draw on (Scientific American). Such an experience lacks in digital reading and its note-taking software (Scientific American, 2013). Also, Johnson (2013.) points out that every reading software with interactive features is different. Users need to re-learn software abilities to interact with readings.

On a final note, one positive aspect of abandoning textbooks is that it frees professors having to abide by a book; their course structure is not confined and chronologically ordered as the chapters in a textbook (Lenon, 2021). The digitalization of education has enhanced professor's ability to alter course structure. Therefore, many professors rely on uploading material or giving paper handouts to students, or both. Afterwards, students use digital devices in order to reach uploaded material. Two questions are asked: Are there differences from reading and note-taking digitally or on paper? Also, what do students prefer?

Digital versus Paper: Comprehension, Detail Retention and Note Taking

"Should I upload the readings online, or print them out and hand them to students?" thinks the conscientious professor. Does it matter? It does. It is important to point out where in the relationship between student and tool differences appears. What does the research suggest for

reading the same text digitally or on paper in regards to comprehension, knowledge retention, note taking, and behavior?

V. Clinton (2019.) conducted a meta-analysis of total of 29 reports and 33 studies that compared paper to screen reading. Paper reading performed slightly better in comprehension than reading on screens. It especially does better considering the type of reading. Long and challenging texts are more understood when read on paper. This statement happens to repeat in among multiple sources.

There is no difference in performance when reading short and casual reading texts on either medium (V.Clinton, 2019.). Looking in, when reading challenging texts the main idea is understood well enough through both mediums. However, those who read on screens aren't not able to recall details well as those who read on paper do. Regarding the time, it takes to read through, both mediums show no differences.

Another study on 371 middle school students concluded that comprehension on paper slightly outperformed reading on screens, especially for longer texts (Goodwin, 2019.). In this study they also looked at behavioral differences in highlighting. Students who would highlight more on paper negatively predicted comprehension. Whereas students who highlighted on devices positively predicted comprehension.

The reason highlighting negatively predicted comprehension on paper was because students were highlighting more often, but unimportant things. On the other hand, digital users were highlighting less but important things, aiding comprehension. Highlighting seems to be "pseudo-work" (Jordan Peterson, 2017) if it's used for comprehension. According to George Lucas Educational Foundation, highlighting for novice learners can, and most often does, hinders actual learning because it gives one a false sense of mastery over the text. Also, one doesn't know what's important so they highlight based on intuition unimportant things (Terada, 2021.)

Students who read on paper would take significantly more notes than those who read digitally (Goodwin, 2019). Note-taking behavior seems to be different regarding which medium is used. According to Mueller and Oppenheimer research results on note-taking (2014); those who take notes on paper had superior test performance than participants who took notes on a laptop. It seems writing on paper has better retention than taking typed laptop notes due to

"enhanced encoding" – more likely to become memory(Goodwin, 2019). Participants who wrote on paper had less word count and reinterpreted information in their own words. Laptop note takers were more likely to copy the information. These results are based on methods including taking notes on lectures, not specifically from a text.

Lavoie (2021.) conducted a meta-analysis of 10 studies on students regarding differences in reading comprehension between mediums in health professional education. Results are similar to previous researches: a slight advantage for paper based reading. Moreover, when the text was relevant to the student's professional discipline, there was a distinct advantage for paper reading over digital. This supports the results of previous studies that challenging texts are better comprehended when read on paper.

A similar research looked into a comparison of paper versus digital textbooks among undergraduate students. They've found that there no difference between either medium when it came to student performance; both comprehension scores were equally well for a reading that was not challenging (Johnson, 2013.).

These results coincides with A. Goodwin's research of middle class students, as well as Clinton's meta-analysis. When the text is of moderate difficulty, comprehension across both tools are equal, or sometimes slightly advantageous for paper. When texts are challenging, the meta-analyses and single research papers agree that reading on paper outperforms digital in comprehension

Consequences of Digital Reading: Distraction, Skimming and Scrolling

Digital reading changes one's behavior that less often occurs reading on paper. They are more prone to distractions and to skim through text. Because of this lack of seriousness towards a reading, it mostly affects deep learning which is the most important kind of learning. What does research in digital devices find?

M. I. Furenes (2021) did a meta-analysis comparing children's reading on paper versus screen. This collection of studies included 1,812 children looking into textbook usage and digital book usage. For children, paper outperformed digital regarding comprehension. However, when digital books included enhancements that bolster learning and visual appeal it performed equally as well as textbooks, or even more. A key note about digital devices is that they are prone to being a distraction from the main content of the text, where children would be occupied with the device itself or features.

Digital devices being a distraction is not only a children's problem. It as much of a problem to any adult as well. Phones and laptops are full of distractions and easy access to sidetrack (Agarwal, 2021.). Also, these tools are usually associated in a context with leisure behavior and entertainment. Agarwal (2021.) notes two problems that arise from this.

First, people's attention capacity and remembering requires a certain amount of bandwidth and focus. When this is interrupted with distractions, it hinders learning and the ability to deeply understand. Secondly, the contextual cue of digital devices promote a different set of behaviors than paper reading, due to devices being associated with leisure activity. Scrolling, skimming, and searching for keywords is more likely associated with digital devices. "Scrolling encourages scanning rather than actually reading all the words", says Dr. Baron (2021.)

Research in Qatar using Tobii glasses tracked eye-movement of students reading a text in psychology through both paper and digital format. They were asked to write a 150-word summary and the researches tracked eye and hand movement. What they found was that digital users engaged less meaningfully with the text: they were more likely to skim and scroll; essentially jump around the text with their eyes. They also started writing the summary after the first reading. This indicates people feeling they understood the text more than they actually did after their first read. On the other hand, paper users engaged with the entire text first, than they would write their summary. They also recalled more details and wrote easier than digital users.

All in all we can conclude a few final statements from these reviews:

- Reading shorter texts on paper is slightly advantageous or not at all for comprehension in comparison to digital reading However, there is a distinct advantage for long, challenging texts on paper (Lavoie, 2021.)
- Retention of details is much greater when reading on paper. (V. Clinton 2019)
- Highlighting on paper doesn't predict an advantage in comprehension against highlighting on digital. (Goodwin, 2019.)
- Note-taking on paper outperforms note-taking on laptops. Also, more notes of better quality are taken on paper. (Mueller, 2014.)
- Digital devices are more prone to distractions, hindering deep learning. (Agarwal, 2021.)
- A person is more likely to not meaningfully engage with a text on devices due to a people's behavior of skimming and scrolling. (Baron, 2021.)

After looking into the differences between both analog and digital tools, what have researches in students preferences found?

Student Preferences: Digital versus Paper

In her conglomerate research study, Mizrachi (2018.) gathered research on the topic of student preferences and behaviors among university students worldwide (21 countries including UK, China, USA, United Arab Emirates, Slovenia etc.). All researches had the AFRIS questionnaire distributed to 10,293 student.. The main findings were that most students' study behaviors were not affected by their country of origin, and that most overall prefer academic readings in print. Students believe they focus better and retain more information when they read on paper, as well as choosing paper over digital when it comes to longer texts.

The findings of Mizrachi's study correlates with the results of previous research. Not only do students perform slightly better on paper, but they also seem to prefer paper and know this intuitively for academic and challenging readings. On the other hand, there is still a

preference for leisure reading on paper, but there are many variations between countries. And almost a third of participants of all countries neither agree nor disagree for leisure reading.

Mizrachi's findings were pre-pandemic. In the following, her survey will be distributed to Croatian students and we'll see whether anything changed post pandemic: Are students now more opt for digital reading, or still have a preference for paper?

Method

This research paper looks into how students study, when do they take notes, and their preferences in the digital versus paper context. Participants were 143 undergraduate students at Rochester Institute of Technology College in Croatia, at campuses located in Dubrovnik and Zagreb. In terms of gender, 54% were women and 46% were men. Ages averaged at 21 with a standard deviation of 2.3. A convenience sample of the students were reached by snowball method, email and in-person. Participation was voluntary, anonymous and confidential.

The survey instrument was an adaptation of the Academic Reading Questionnaire (Mizrachi, 2018.). There were 22 Likert scale statements regarding students' reading and note taking habits and preferences, and 5 demographic items. Statements were formulated as 5 Likert-style answers on agreement for preferences, and frequency for habits, with a 6th option reserved for applicants whom questions are not applicable. Sample statements include: "It really does not matter to me if I read course assignments on paper or on screen. It's pretty much the same" and "How often do you take the time to print out electronic course readings." The language used was English.

Results

Overall, results show that most students prefer paper over digital reading. However, they mostly use digital because they don't print and opt for shorter readings on devices. They take less notes when reading digitally, and report that they don't find it convenient. A lot of our results are similar to D. Mizrachi's studies, and there even seems to be a

high preference for reading on mobile phones among student. First we begin with students' preferences.

Student Preferences and Habits

Upon the first two statements of the survey *"I prefer to have all my course material in print format (e.g. book, course, reader, handouts)"* (M=3.58, SD=1.16) and *"It is more convenient to read my assigned readings electronically than to ream them in print"* (M=2.72, SD=1.18) there is an overall preference for paper; a preference disliking digital reading. Students do not find electronic readings more convenient than paper readings. A majority prefer their course materials in print format (Figure 1, Figure2.)
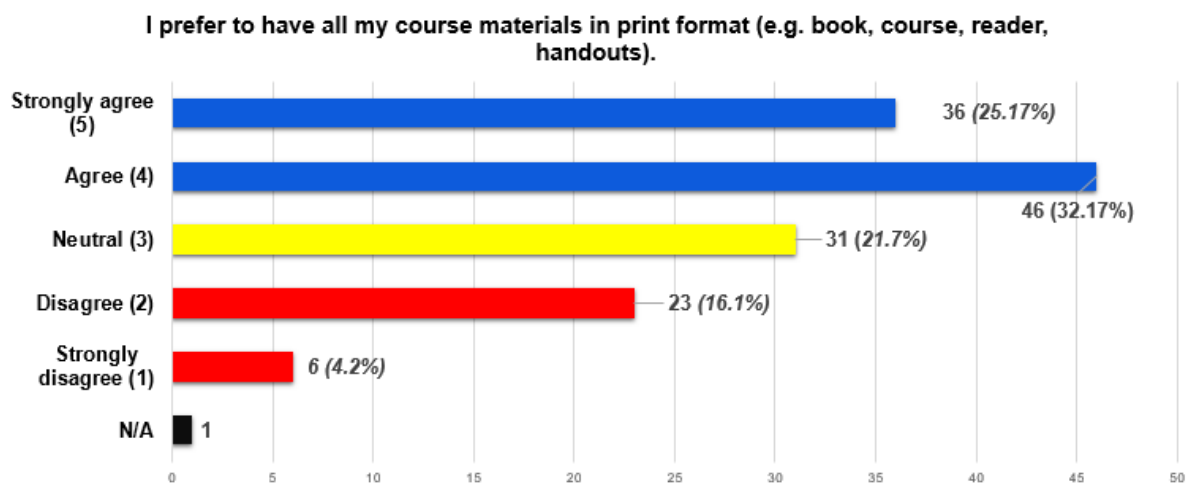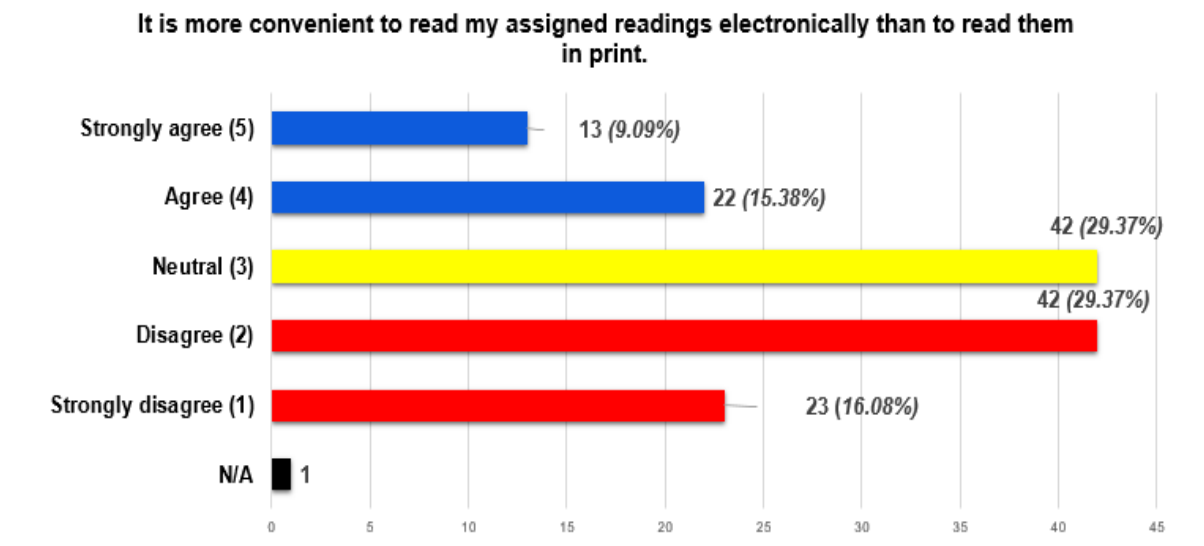
Figure 1

I prefer to have all my course materials in print format (e.g. book, course, reader, handouts).

Strongly agree (5): 36 (25.17%)
Agree (4): 46 (32.17%)
Neutral (3): 31 (21.7%)
Disagree (2): 23 (16.1%)
Strongly disagree (1): 6 (4.2%)
N/A: 1

Figure 2

It is more convenient to read my assigned readings electronically than to read them in print.

In all preference questions, there is a trend. **Most students for school assignments generally prefer paper over digital**. They are more likely to review a reading if they have it in paper format (M=3.67, SD=1.08). For longer texts a majority prefer paper (M=3.86, SD=1.17). When provided the statement *"Electronic readings help me learn and remember better than paper"* (M=2.33, SD=0.94), only 9% agreed. On the other end, 60% agreed that they remember better (M=3.85, SD=1.18) and 70% focused better (M=4.35, SD=0.85) on paper. Most students disagree with the statement that it doesn't really matter to them which medium they use (M=2.63, SD=1.17); stated differently, **it matters to a majority of students which medium they use**.

If a reading is less than 5 pages, more students prefer to read it electronically (M=3.4, SD=1.06). **For shorter readings, more students will opt to read it digitally than on print**. Also, more students in general do not print out readings (M=3.09, SD=1.23). Specifically, 6 out of 10 students either sometimes or never print at all. It is intriguing to notice that although students answered that they focus and remember better on paper, they do opt to read digitally for shorter readings and by not printing.

Two statements reflected on students' behavior on note taking. One statement was how frequently students take separate notes on paper from an electronic reading (M=3.26, SD=1.11). The other statement was about taking notes while reading on paper (M=3.53, SD=1.11). There's no distinct trend individually; both have equal and high standard deviation, and they seem to both lean on that students frequently do take notes on both mediums.

However, there is a marginal group lost that cease to take notes when the reading is digital. This is reflected in the mean by 0.27 points, and also noticeable in Figure 3. Both *rarely* and *sometimes* columns for paper reading shrink in comparison to screen reading, where *often* and *always* columns increase.

Figure 3
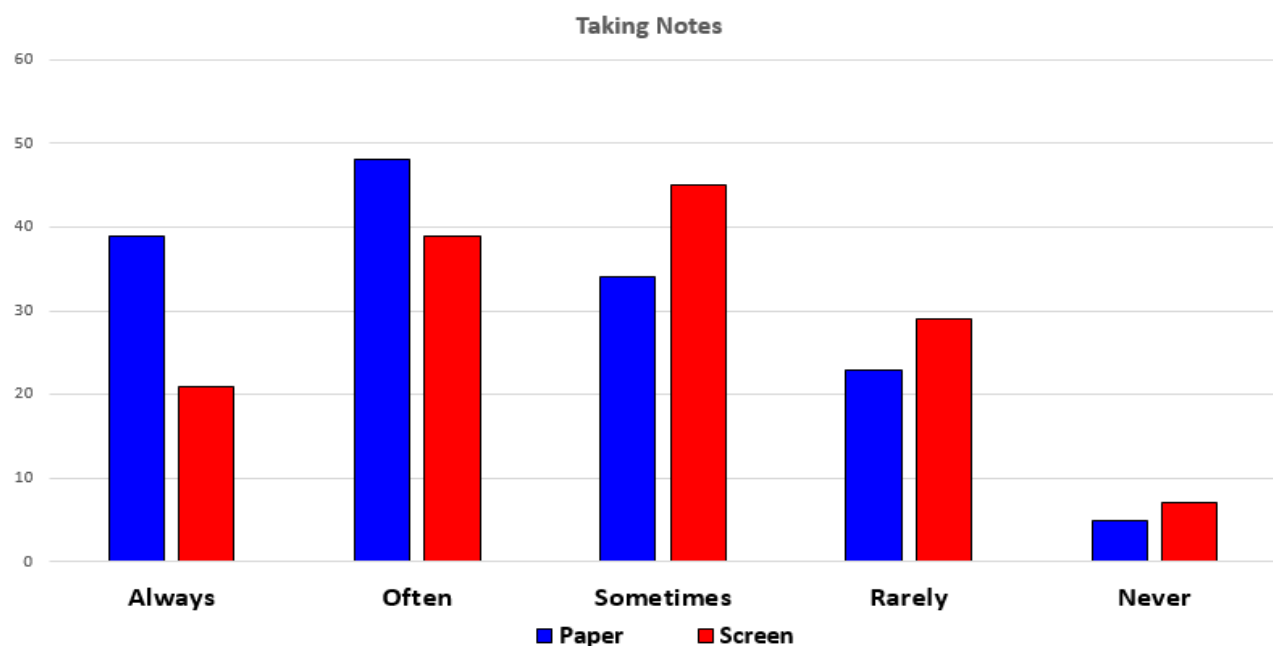
Which Device do Students Use?

The students were provided with three statements that asked which digital medium they preferred most out of laptop, desktop and mobile phone. By far the most preferred medium is laptop (M=3.68,

SD=1.11). Desktop computers and mobile devices are used less, almost to an equal degree (M=2.89, SD=1.23 / M=2.96, SD=1.11). This is represented in Figure 4.

However, a large number of students use mobile phones for electronic readings; up to 36% of respondents use it often. Students are more likely to read on their phones than on desktops, after their laptops.
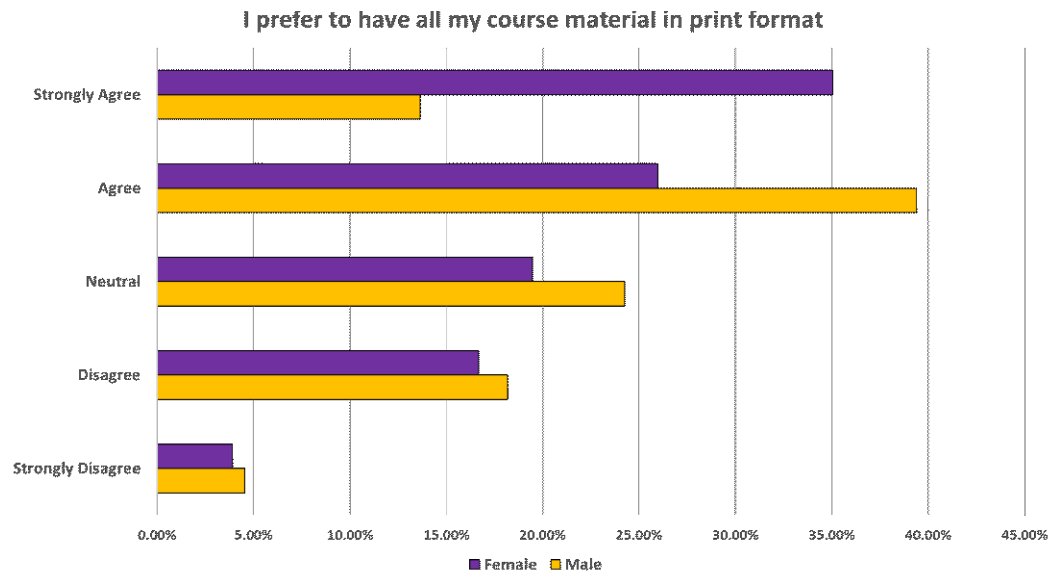
Figure 4
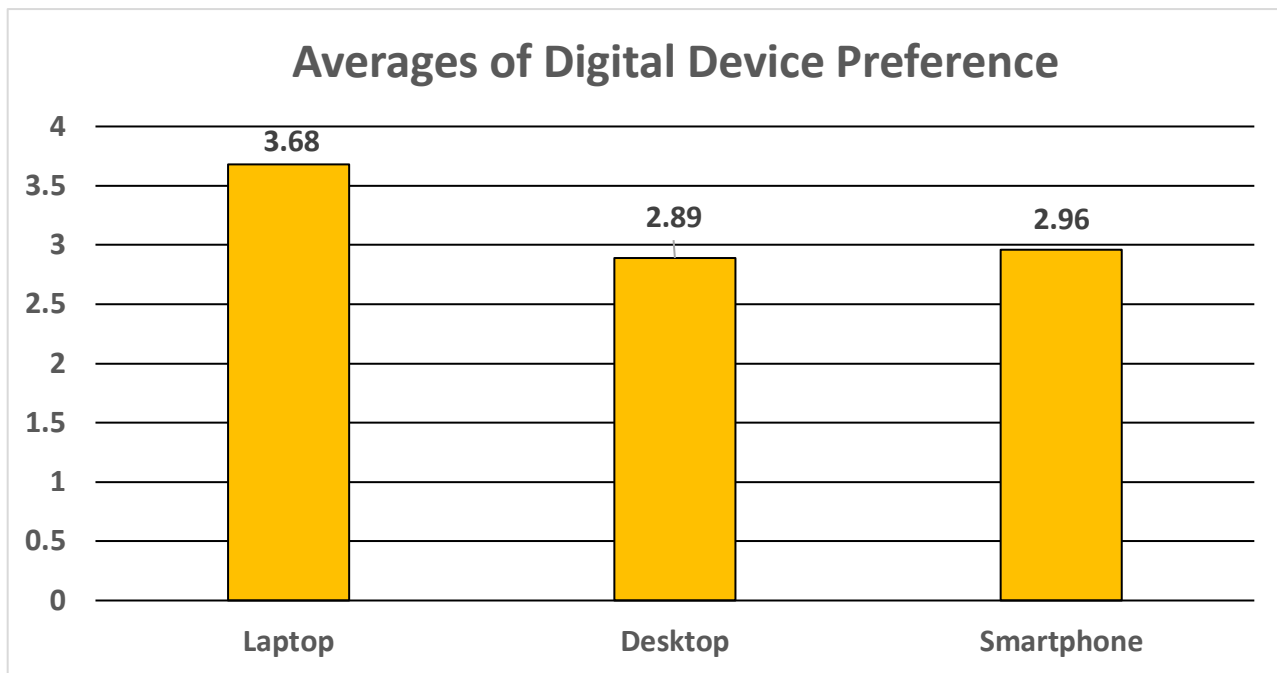
**Differences between genders**

Women appear to have stronger opinions on the topic then men, mostly preferring paper when statements were proposed. When filtered for gender, women were more likely to choose 'Strongly Agree' or 'Strongly Disagree', where men were more likely to choose 'Neutral', or 'Agree' and 'Disagree'. In Figure 5 and Figure 6. Two statements show this difference of opinions between genders represented in percentage format.

Figure 5

I prefer to have all my course material in print format

In Figure 5, 35% of female participants answered 'Strongly Agree', where only 14% of men answered the same. However, almost 40% of men answered on 'Agree'. 5% more male participants answered neutral as well. In Figure 6, we will see a similar occurrence.
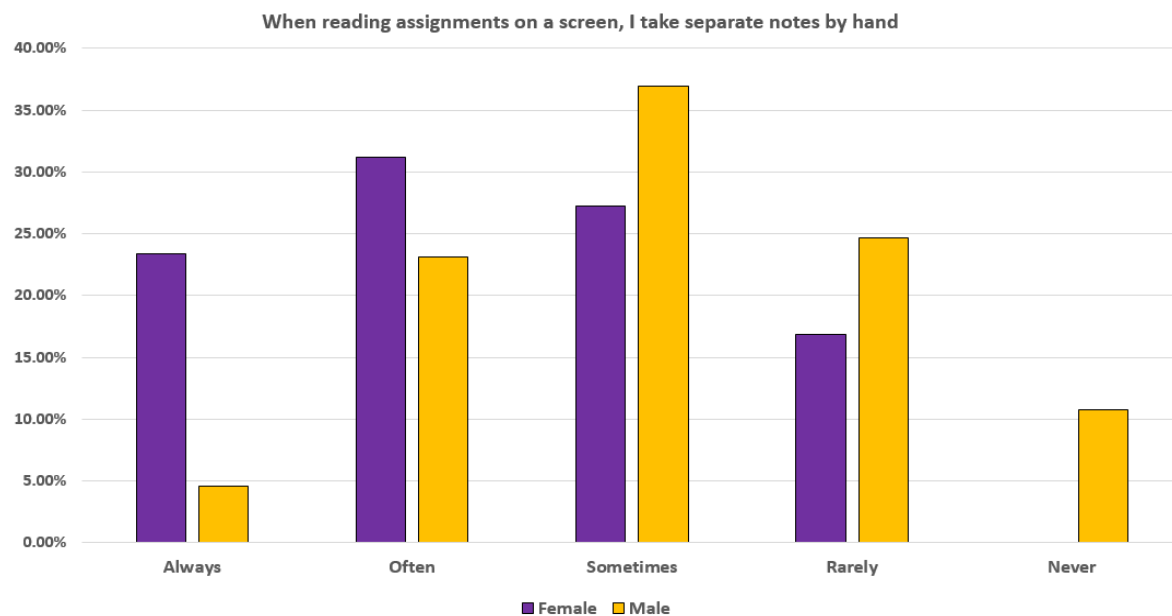
Figure 6

For school assignments, I generally prefer electronic readings over print
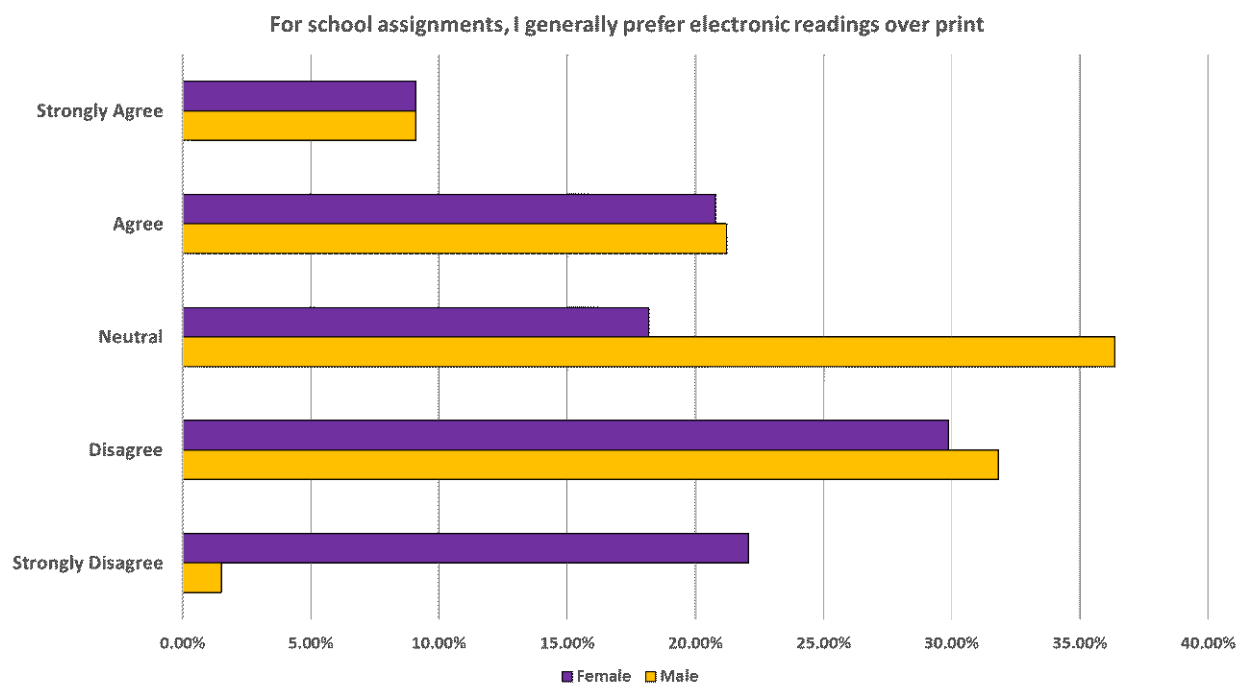
For the statement "*For school assignments, I generally prefer electronic readings over print*", we see most men answered 'Neutral', and only minute number of participants 'answered Strongly Disagree'. However, the contrast between male and female participants is seen at the 'Strongly Disagree' cluster bar. Almost 23% of female answered it, where only 2% of males did.

Men are more comfortable with digital or answered neutral. Still, more men agreed they preferred paper over digital, but a larger section of men stated they also are okay with digital. However, in the literature review there are no gender differences in terms of outcomes whether reading digital or paper. Men don't perform better than women in terms of comprehension, retention, and behavioral attitudes. Further implications will be mentioned in the discussion.

Women all tend to take more notes than men do. On the statement *"When reading assignments by screen I take separate notes by hand",* more men rarely take notes, if they take them at all. The mean on this statement for men equaled to 2.86 for men with a standard deviation of 1.04, and for women it equaled to 3.61 with a standard deviation of 1.03. This is represented in Figure 7.

Figure 7

When reading assignments on a screen, I take separate notes by hand

In Figure 7, the stark difference is seen at the extremes. No female participants answered never, where up to 11% of males did. On the other end, almost a quarter of women always take notes, where only almost 5% of males do.

Additionally, on the statement "I usually take notes on my printed course readings", women take more notes than men also. Women's mean is 3.9 with a standard deviation of 1.04 and men's mean is 3.07 with a stand deviation of 1.01 This reaffirms the previous conclusion that women do take more notes than men.

Other conclusions from the results are: men are more willing to read shorter readings on digital than women are, men print their readings less than women, women read from their laptops more often and are less likely to use their phones than men.

Differences between International Business Students (IB) and Hospitality & Tourism Management Students (HTM)

In this survey, there were 79 IB and 48 HTM students. In general, HTM students heavily prefer paper over digital than IB; Although more IB students do prefer paper over digital, there are larger portions of students who don't prefer paper over digital. On the statement *"If an assigned reading is longer than 10 pages, I prefer to read it in print"*, Almost 70% of HTM students chose 'Strongly Agree', where 26% of IB students chose the same. IB's responses have a higher standard deviation of 1.09. HTM's responses have a low standard deviation of 0.77. This is presented in Figure 8.

Figure 8

If an assigned reading is longer than 10 pages, I prefer to read it in print
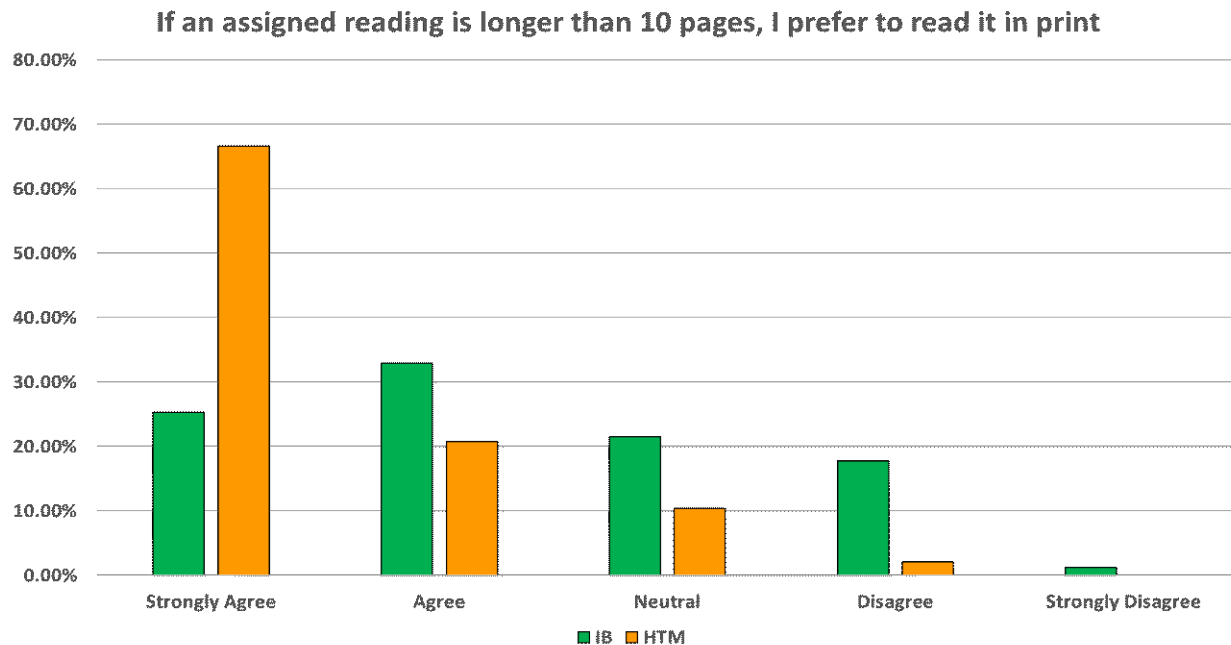
On the statement *"Electronic readings help me learn and remember better than paper"* HTM heavily disagreed with the statement (M=2.09, SD=1.03). However, IB also heavily disagreed with the statement (M=2.48, SD=0.89). This intriguing to note because most HTM students don't prefer digital and also don't think it helps them learn and remember better. On the other hand, there are significantly more IB students who do prefer digital over paper, but even that group knows that is doesn't help them study better. **There is a significant group of IB students who prefer digital over paper, but know they do not study better with it.**

HTM students are far more likely to print out their electronic readings than IB students. Only 5 HTM students answered rarely, where 35 IB students answered the same. This counters one of our hypothesis that HTM students don't take the time to print out their paper readings. They do, especially females as no HTM female participant answered rarely to this question. Below in Figure 9 is a representation of their different habits of printing electronic readings.

Figure 9

How often do you take the time to print out electronic course readings?
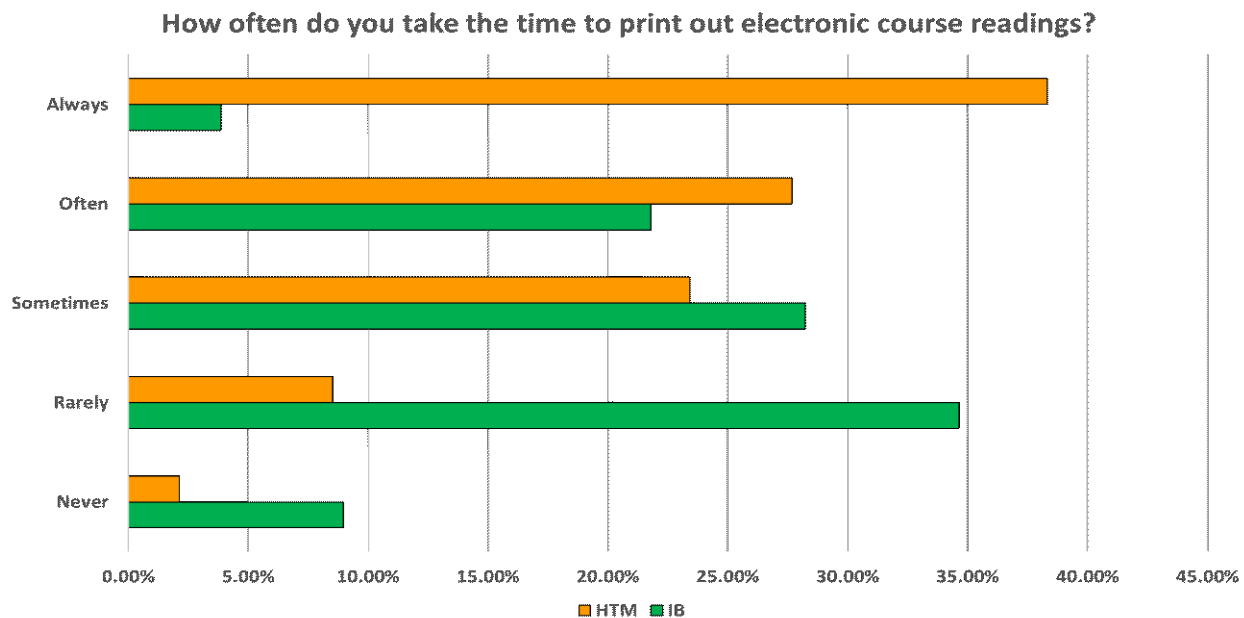
Finally, IB students are more likely to use digital devices such as laptops, desktops and mobiles more often than HTM students are. On the statement for *"How often do you use a laptop/table to read electronic course readings?"* majority of IB students answered 'Often and Always' (M=3.91, SD=0.98), whereas HTM students less so (M=3.20, SD=1.09). HTM students had lower scores comparing to IB students on all three digital mediums, meaning they preferred digital devices less. This may be because most HTM students prefer paper to digital and take the time to print course material.

Participant Comments

A part of the survey left open sentences for participants to add anything else they would like to mention about their habits and preferences. Overall, 28 comments were written by participants. These comments give us deeper insight to what they think.

Comments were divided into those who prefer digital and those who prefer paper. 19 comments were pro paper, and 8 comments were pro digital. 2 comments were ambiguous.

Two students who were pro digital mention they are because of sustainability concerns. One student mentions that being digital is a more sustainable practice, and one student's shares they feel wasteful when printing. Another two students express that they are pro digital because they avoid the hassle to actually spare the time to print, one expressing "*If it was easier to print and the printers weren't busted every now and then, I would maybe print a bit more*"

Two students who were pro paper mention eyestrain when reading digitally. One person also mentions that they prefer paper to digital because being online provides too many distractions. This answer is particularly interesting because it resonates with the literature review. In it, it mentions that a downside of digital reading is distraction. It steers your attention away, losing one's focus. There were multiple comments reflecting on paper better ability to focus on, and take notes. One student said, *"It is much more easier to focus on something when it is printed on paper, you can highlight certain sections, take notes"*.

DISCUSSION

In short, these are the conclusions from the results:

- Most students prefer to have their course materials in print digital.
- Although digital tools are implemented in institutions for convenience, most students do not find them more convenient.
- Students are less likely to re-read course material once they are digital.
- Almost all students know they don't learn or focus better on digital readings.
- For longer readings, most prefer paper because they can focus and remember better.
- Students take less notes when reading digitally and 0.27 less students on average who cease to take notes at all once digital tools are used.
- For shorter readings, most students will opt to read digitally.
- Students mostly prefer to use their laptop as favorite choice of digital medium. Also, one in three students often use their phone for course readings.

Findings from this questionnaire generally confirm previous research in the field. We can firmly say that **most students prefer paper over digital, most students know that reading from paper is better than reading on digital, they take more notes when studying on paper, for shorter readings they opt digitally, and almost 60 percent of students sometimes or rarely take the time to print out readings.**

What does this say about the students? Most of them prefer their course materials in print and do not find digital tools more convenient, but mostly still use digital tools. We know that digital reading results in slightly less text comprehension, and much less comprehension for challenging texts. Students take less notes when reading digitally, and some cease to take any notes all together which means they are less engaged with the text. They have difficult time retaining details from texts when reading digitally. Lastly, their behavior also changes when they read digitally. They are more prone to distractions and their eye movement on the text shift and act differently; they skim and scroll often, skipping lines and looking for keywords and falsely believe they actually understand a text. Why do they still read digitally then?

Perhaps they are ignorant about the topic. There were many neutral answers in the survey, which might indicate that they are indifferent about the subject, not thinking it was important. With technology today, we seem modern and up-to-date with the times so we do not question our habits and choices. However, here we see that a lot is lost for students: especially deep learning, which is the most valuable learning of all. While moving forward with the times, students seem to falling behind in the quality of their reading. So what should the students do?

The question should not be directed to students: It is for professors and educational institutions. Human behavior is largely determined by their environment (J. Clear, 2018). And students in classrooms are no exception. Students' behavior towards courses will largely be a reflection of the expectations and incentives of the professor, as well as proper services provided by the institution.

The quality of classes during lectures is determined by the amount and quality of work students do at home; if students don't read and understand their readings, class discussion suffers. Student exams suffer. Professor's reputation suffers. What needs to be understand is the dilemma between papers versus digital reading isn't a matter of preference; it's about real consequences to the quality of students' studying and time.

What should professors and institutions do? First, educate the students about the science on paper versus digital reading. Let them know they have a choice, and with each choice there is a trade-off. The starkest trade-off for opting to the digital route is a shift in behavior towards one's study. They won't take it as serious if it were on paper because of the distractions, eye-strain, and their eye-movement (eye-movement really being a reflection of attitude.

Secondly, encourage students to print. But even better, print readings out for them, and deliver them in their hands. Print both shorter and longer readings. Encourage them to take notes, which they most likely will because paper readings in itself encourages note-taking. Like this, you guarantee that they will read in print. In the results of this survey, we saw that most people prefer paper but don't take the time to print, and will read shorter readings digitally.

Should the students print themselves if it matters to them? Why should professors print for students if they won't print for themselves? Because it is the professor's responsibility to shape student's course experience. If that matters to professors, then how students study outside affects their experience as well. It certainly affects the quality of class discussions and probably exam grades.

It seems that overall student's preferences have not changed due to the COVID-19 pandemic. One would assume as the increased pace to a digital landscape due to the pandemic would have changed some students' preferences, and it undoubtedly did for some. But, also, perhaps people are realizing that an all-consuming digital world is too much; we still want human touch - a paper touch.

Paper reading is more align with being human. This is shown in research with the consequences of one's behavior where they are more likely to be distracted, experience eyestrain, and be less focused by skimming.

Limitations and Future Research

There are a few limitations to this research. The first one is that all participants were from one college and are not representative of all hospitality students. Second, the HTM group was also

much smaller comparing to IB group. Third, the results are probably influenced by many individual factors such as the availability of printers, relationships with professors, etc.

For future research, we suggest collecting the GPA's of students and see are there any correlations to study preferences. Also, collecting data in different degree programs and seeing differences rise there to notice is their perhaps different preferences, and perhaps asking why. Other interesting idea would to dive deeper into before and after COVID-19 pandemic preferences and habits.

In final, this research paper is another add-on to the 'paper versus digital' debate. Paper reading outperforms digital reading. Students are more focused, more engaged, learn deeper, and prefer paper in their hands, from pixels on their screens. Why are we, then, dismissing paper and accepting an ever-consuming digitalization of things? Because it is easier? Because it is cheaper? Does that make it good then? Do we sacrifice our time, efficiency, and the quality of our learning, for what is easier?

REFERENCES

29 Astonishing E-learning Statistics for 2022. (2022, March 14). Techjury. https://techjury.net/blog/elearning-statistics/#gref

Agarwal, S. (2021, 20 September). *Paper vs. E-ink vs. LED: Does the display affect how well we absorb information?* Digital Trends https://www.digitaltrends.com/features/paper-vs-e-ink-vs-led-how-display-affects-learning/

B Lenon (2021, May 16). Why are English schools not using textbooks? School of Education. https://educationblog.buckingham.ac.uk/2021/05/16/why-are-english-schools-not-using-textbooks-by-professor-barnaby-lenon/

Carnegie Mellon University. (2017.). *Print Isn't Dead: Students Prefer It Over Digital for Academic Reading, Study Finds - News - Carnegie Mellon University*. https://www.cmu.edu/news/stories/archives/2017/may/study-finds-print-is-not-dead.html

Clear, J. (2018). *Atomic Habits.* Part 1: Make it Obvious, Random House. New York.

Clinton, V. (2019). Reading from paper compared to screens: A systematic review and meta-analysis. Journal of Research in Reading, 42(2), 288–325. https://doi.org/10.1111/1467-9817.12269

Fontaine, G., Zagury-Orly, I., Maheu-Cadotte, M. A., Lapierre, A., Thibodeau-Jarry, N., Denus, S. D., Lordkipanidzé, M., Dupont, P., & Lavoie, P. (2021). A Meta-Analysis of the Effect of Paper Versus Digital Reading on Reading Comprehension in Health Professional Education. American Journal of Pharmaceutical Education, 85(10), 8525. https://doi.org/10.5688/ajpe8525

Furenes, M. I., Kucirkova, N., & Bus, A. G. (2021). A Comparison of Children's Reading on Paper Versus Screen: A Meta-Analysis. Review of Educational Research, 003465432199807. https://doi.org/10.3102/0034654321998074

Goodwin, A. P., Cho, S. J., Reynolds, D., Brady, K., & Salas, J. (2019). Digital Versus Paper Reading Processes and Links to Comprehension for Middle School Students. American Educational Research Journal, 57(4), 1837–1867. https://doi.org/10.3102/0002831219890300

J. Peterson (2017.) *Don't Take Notes During Lecture! YouTube*. Retrieved March 23, 2022, from https://www.youtube.com/watch?v=lMvvdz7YJ-Q.

Jabr, F. (2013, April 11). The Reading Brain in the Digital Age: The Science of Paper versus Screens. Scientific American. https://www.scientificamerican.com/article/reading-paper-screens/

Johnson, J. W. (2013). A comparison study of the use of paper versus digital textbooks by undergraduate students. Indiana State University. https://scholars.indstate.edu/handle/10484/537

Mizrachi, D., Salaz, A. M., Kurbanoglu, S., & Boustany, J. (2018). Academic reading format preferences and behaviors among university students worldwide: A comparative survey analysis. *PLOS ONE*, *13*(5), e0197444. https://doi.org/10.1371/journal.pone.0197444

Nuwer, R. (2016). Are paper books really disappearing? BBC Future. https://www.bbc.com/future/article/20160124-are-paper-books-really-disappearing

Terada, Y. (2021,). *Highlighting Is Ineffective—Here's How to Change That*. George Lucas Educational Foundation. https://www.edutopia.org/article/highlighting-ineffective-heres-how-change#:~:text=In%20a%202013%20study%2C%20researchers,came%20with%20a%20significant%20opportunity

The Evolution Of Technology In The Classroom | Purdue Online. (2022). Purdue University Online. https://online.purdue.edu/blog/education/evolution-technology-classroom

The Pen Is Mightier Than the Keyboard: Advantages of Longhand Over Laptop Note Taking. (2018). Psychological Science, 29(9), 1565–1568. https://doi.org/10.1177/0956797618781773

The Position of Online Education Before And After The COVID-19 Pandemic. EdTick. (2020, August 31).https://www.edtick.com/en/news/the-position-of-online-education-before-and-after-the-covid-19-pandemic\

Why Bill Gates Says School Textbooks Will Soon Be Obsolete.(2019, September 4). Learning Liftoff. https://www.learningliftoff.com/why-bill-gates-says-school-textbooks-will-soon-be-obsolete/

Why textbooks don't work anymore - and what does. (2018, September 7). Inspiration Education Tutoring. https://inspirationeducation.co.nz/parent-advice/why-textbooks-dont-work-anymore-and-what-does/