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PRINT OR ELECTRONIC FORMAT FOR ACADEMIC READING?

A Croatian student perspective

Luke Tomić, RIT Croatia (lt2264@rit.edu)

Rebecca Charry Roje, RIT Croatia (rebecca.charry@croatia.rit.edu)

Abstract

In recent years, online libraries, electronic textbooks and digital course readings have become widespread, if not the norm, in higher education, largely replacing traditional print materials. However, a wealth of research has consistently indicated that a majority of students worldwide prefer print format over digital for academic reading, particularly for longer, more challenging texts that require focus and concentration. This research investigates the trend in format preference over the last seven years among Croatian university students by collecting data on student reading format preferences, motivations and behaviors, and comparing them with similar data collected in 2015 (Pesut and Zivkovic, 2016; Mizrachi et. al, 2018). A questionnaire completed by 143 undergraduate students in Croatia indicates that the majority prefer print format for academic reading and see it as more conducive to learning, although the preference for print has weakened significantly over the past seven years. Furthermore, the minority of students preferring digital format or taking a neutral stance has grown. Gender is also shown to correlate significantly with format preference. Implications for educators and administrators and suggestions for supporting students by offering student materials in various format options are discussed.

Keywords: academic reading, format preference, digital reading, print reading, Croatia

1. Introduction

In recent years, advances in communication technology have naturally been accompanied by the widespread adoption of digital learning tools in education. A decades-long trend toward online education, including remote learning, asynchronous online courses, and MOOCs, which first gained attention in the United States in the 1990s, was accelerated by the Covid pandemic (Whitford, 2021). Part of this trend includes widespread digitalization of reading materials, including electronic textbooks, which have replaced traditional print materials to a large degree. In fact, printed college textbook sales have declined by nearly 35 percent since 2013, even as the education industry has grown over the same period. (Curcic, 2023).

Digitalization has also affected traditional, in-person teaching and learning. In most colleges and universities today, academic reading materials are almost always posted online as links or files through an online learning platform. Although some instructors may provide print materials or require students to print out digital materials and bring them to class, most often the choice to print out these materials or not is left up to students. When students choose to read digitally, they use a variety of digital devices for academic purposes, such as e-readers, laptops, and smartphones, according to their preferences and capabilities. Since print and digital formats each have their own advantages, most students use a combination of the two, depending on a variety of factors, from text length and difficulty to perceptions of cost and convenience (Ślęzak-Świat, 2019; Mizrachi et al. 2021). As students and educators move forward in an increasingly digitized educational landscape, understanding student preferences and habits, as well as the perceived and actual benefits of each format and the effect on student learning, is crucial not only for students themselves, but also for the educators and institutions that support their learning.

2. Student reading format preferences

As digitalization of reading materials has increased generally, particular attention has been paid to student preference between the two formats. At first, it might be assumed that younger readers, particularly Generation Z (born between 1997 and 2012), who are considered digital natives, with little or no memory of the world before the internet, would prefer digital reading in general. However, research suggests that much of Generation Z shows an enduring preference for reading in print, both for leisure (Pontes, 2020; Duffy, 2023) and in academic settings (Parodi et al., 2019; Baron et al., 2017; Aharony and Bar-Ilan, 2018).

The comprehensive worldwide Academic Reading Format International Study (ARFIS) by Mizrachi et al. (2018), which included more than 21,000 participants from 33 countries, found that a majority of students generally reported a preference for print regardless of country of origin. Students reported improved focus and retention of information when reading on paper, particularly for lengthy and challenging texts.

Further qualitative analysis of open-ended student comments on the ARFIS survey found that just under 9 percent of participants could be categorized as electronic-oriented, about 20 percent were neutral, and over 71 percent were considered print-oriented. (Mizrachi and Salaz, 2020).

In addition to format preference, decades of research have investigated the correlation between format and a variety of reading behaviors and attitudes. Baron et al. (2017) found that students reported they were more likely to re-read print material than digital material. In addition, student confidence, perceived immersion and overall attitude toward reading has been found to be more positive in print (Alieto et al. 2020; Jeong & Gweon, 2021).

The relationship between format preference and gender has also been investigated, with evidence indicating a stronger preference for print among females (Liu & Huang, 2008; Pálsdóttir & Einarsdóttir, 2016; Alieto et. al, 2020) and a preference for digital reading among males (Mirza et. al, 2021)

In light of the complexity of students' relationship to print and digital resources, we are led to ask a more nuanced question -- beyond basic student preferences, what factors influence

those preferences, and what do they perceive as the advantages and disadvantages of each format?

3. Perceived advantages of print format

Students perceive multiple advantages of print format, most strongly related to increased learning engagement and learning quality, but also including positive experiential aspects of print and its convenience (Mizrachi, 2020).

Regarding learning engagement and quality, students reported increased focus and concentration, ease of note taking and highlighting among the advantages of print (Baron et al., 2017). Many students also appreciate the tactile and physical experience of reading, including page turning and marking, use of fingers while reading, and positive associations with the permanence and perceived seriousness of physical materials (Pontes, 2020; Berg, 2020, Johnson et al. 2019). Students also report that they prefer print for its portability, ease of access, and freedom from dependence on an internet connection (Mizrachi & Salaz, 2020).

Conversely, students find the disadvantages of digital format to be both physical (eye strain and fatigue) (Johnston & Salaz, 2019; Pesut & Zivkovic, 2016) and cognitive, as they report that they are more likely to multitask and become distracted when reading digitally (Baron et al., 2017). Advertisements and popup windows were also cited as factors that discouraged students from reading digitally as well as perceived risk of personal data exposure (Chang et.al, 2023).

4. Perceived advantages of digital format

Advantages of digital format reported by students have been most strongly related to convenience. One of the primary motivations reported for digital preference was the lower cost for electronic textbooks, as well as avoiding the cost and inconvenience of printing digital articles and readings. (Ji et al., 2014, Johnston & Salaz, 2019) Students appreciate the portability of digital readings and the ease of accessing multiple sources on one device (Mizrachi, 2020). Regarding learning engagement, students appreciate the ability to easily navigate through digital texts using search features and hyperlinks and having access to information that could easily be updated. Finally, environmental sustainability concerns also motivate some students to choose digital formats (Johnston & Salaz, 2019; Baron et. al, 2017; Mizrachi & Salaz, 2020; Pesut & Zivkovic, 2017).

5. Reading format and academic performance

While research on student preferences and motivations rely on self-reported data, significant research has also examined the link between reading format and actual academic performance, particularly regarding text comprehension. Results have been mixed, indicating many contextual factors that influence comprehension.

While some research indicates that reading format has no impact on comprehension for narrative and leisure reading (Schwabe et al., 2022), or for relatively short, informative texts (Sage et al., 2019), the majority of research indicates enhanced comprehension in print in most circumstances. General findings supporting the superiority of print for enhanced comprehension have been found among children (Halamish & Elbaz, 2020) as well as adults

(Clinton, 2017; Fontaine et al., 2021; Kilag et al., 2023). A more nuanced approach was taken by Singer and Alexander (2017) who found that students performed equally well in each medium when asked to remember the main idea of a text but remembered details and key points better than when they had read the source in print.

Genre and context also play an important role in level of comprehension in each format. A meta-analysis by Delgado et. al (2018) found that the advantage of reading in print increased in particular contexts. For example, comprehension increased in paper format during time-constrained rather than self-paced reading, and while reading informative rather than narrative texts. The authors also found that the paper advantage was found to increase in more recently published studies. This last finding may be particularly notable, since it runs counter to the assumption that a paper advantage would fade with time as students adapt to increasingly effective digital reading technologies.

Some studies suggest that digital and print reading may involve different types of cognitive processes altogether. A study using eye-movement tracking by (Jian, 2022) found that different reading formats correlated with different cognitive strategies. This study found that print reading performance was higher, with print readers exhibiting more selective and intentional reading behavior. This is consistent with other studies suggesting that digital reading has encouraged skimming and scrolling, and that digital readers report being more easily prone to distraction and multitasking, which undermines learning engagement (Baron et al., 2017; Johnston & Ferguson, 2020; Flanigan & Titsworth, 2020; Liu, 2022). Overall, digital format seems more effective for information retrieval, visual learning and speed reading while print format is more effective for comprehension, deep reading and memorization (Slezak-Swiat, 2019).

Other studies suggest that student evaluation of their own learning, a metacognitive process known as calibration, is more accurate in print format than in digital format (Clinton, 2017; Halamish and Elbaz, 2020). In other words, students tend to overestimate their performance and learning engagement in digital contexts. Similarly, Slezak-Swiat (2019) notes “students’ overconfidence regarding what they really understand when they read from a digital interface” and warns that “digital reading is not the kind of reading that nurtures critical thinking” (90).

6. Format preference and reading behavior: Misaligned?

Several studies suggest that student reading behavior may not correlate with self-reported preferences. In other words, many students read digitally, in spite of the fact that they claim to prefer and focus better in print. (Alsaeedi et al. 2021; Mizrachi, 2020; Ji et al., 2014) Considering that students seem aware of the advantages of print format for learning engagement, it is possible that some students may be undermining the quality of their own learning for the sake of convenience.

Other research, however, suggests that most students have become skilled at choosing an effective reading format according to the learning context as well as their own personal learning styles and educational goals. Text length and difficulty, learning goals, perceived task importance, cost and convenience are the most important factors influencing students’ format decisions. (Salaz & Mizrachi, 2021). In other words, the question is no

longer which is better, but rather under which circumstances is each format more useful for a particular individual.

7. Previous data from Croatia

Data on format preference and motivation among Croatian students was collected in 2015 as part of the international ARFIS study (Mizrachi et al. 2018; Mizrachi et al. 2020; Pesut & Zivkovic, 2016). Their research confirmed strong student preference for print format and an aversion to digital format. In their study, over 81 percent of participants expressed a general preference for print, and 82 percent disagreed with a preference for digital format. Overall, the analysis of the data from Croatian respondents found that 84.5 percent of respondents could be classified as print-oriented, 4.7 percent as electronic oriented, and 10.8 percent as neutral. Croatian students were found to be more strongly print oriented than the overall average among the 33 countries surveyed (Mizrachi et al., 2018).

This data serves as a benchmark for the current study. Specifically, this research investigates the following questions:

RQ1: What are Croatian university student reading format preferences?

RQ2: What reasons do students give for their preferences?

RQ 3: How does gender impact format preference?

RQ4: How have these preferences changed over the past seven years?

8. Method

This study investigated students' self-reported academic reading format preferences, attitudes and behaviors through an online questionnaire.

9. Sample

Participants were 143 undergraduate students (54% male, 46% female, median age 21.1 years) at Rochester Institute of Technology in Croatia, at campuses located in Dubrovnik and Zagreb, enrolled in International Business (n=80), Hospitality and Tourism Management (n=49), or Web and Mobile Computing (n=16) degree programs.

10. Instrument

In order to compare our data with the data obtained through the original ARFIS survey, an adapted form of the ARFIS instrument was used. The instrument included 11 5-point Likert scale statements regarding students' reading format preferences, perceptions of convenience in digital and print formats, and learning engagement behaviors such as note taking and re-reading. The instrument also included one open ended comment, and three demographic items (gender, age, and program of study).

11. Procedure

Responses were collected in April of 2022. Participants were recruited through email and word of mouth. Participation was voluntary, anonymous and confidential. Informed consent was obtained from the participants. Steps were taken to ensure protection of

personal data in accordance with the European GDPR regulations. The language used was English. Collected data was analyzed using SSPS software.

12. Results

Overall results show a preference for print format, as indicated by responses to the following statements: "I prefer to have all my course materials in print format" and "I prefer to read all my course materials in electronic format." A majority of students reported a preference for print, while a plurality reported an aversion to digital format (Table 1).

Table 1: Student Format preferences (expressed in percentage)

	agree/strongly agree	disagree/strongly disagree	neutral
prefer print	57.3	21	21.7
prefer electronic	31	43	26

Results also indicate that a majority of students find print format more beneficial for learning, particularly for recall and focus. Students strongly agree with the statement "I remember information from my course readings best when I read them from printed pages" and "I can focus on the material better when I read it in print." There was also a high level of agreement with the statement "I am more likely to review my course readings (after I have read them more than once) when they are in print." (Table 2)

Table 2: Learning engagement in print format (expressed in percentage)

	agree/strongly agree	disagree/strongly disagree	neutral
focus in print	80.4	6.2	15.3
remember in print	66.4	14.6	20.9
re-read in print	61.3	16	24.7

Conversely, statements related to advantages of digital format received slightly negative answers. Although a plurality of students agreed that "It is more convenient for me to read my course materials in digital format" a strong majority disagreed that they remember and focus better in digital format.

Table 3: Learning engagement in digital format (expressed in percentage)

	agree/strongly agree	disagree/strongly disagree	neutral
digital more convenient	25.8	45.4	30.7
remember in digital	12.5	60.1	29.3
focus in digital	8.4	78.3	13.3

The length of the text seemed to play an important role in students' format choices. Students were more likely to prefer reading in print for "longer, more challenging texts" and reading in electronic format for "shorter, easier texts."

Table 4: Format preference according to length and difficulty.

	agree/strongly agree	disagree/strongly disagree	neutral
print format longer, more challenging texts	65.7	18.1	17.4
digital format for shorter, easier text	43	19	38

One of the student comments reflecting the importance of text length and difficulty in making this choice, stated:

"When the readings are short and not complex, I don't find a difference between electronic or on paper reading, but when the reading is longer and more complex, I find it easier to concentrate on printed paper readings."

13. Print vs. digital orientation

Two-step cluster analysis investigating correlations among various items on our instrument indicates that about 63 percent of participants can be classified as print oriented. These participants answered positively in general to multiple statements regarding preference for and advantages of print, including focus, recall and ability to take notes, while disagreeing with preference for and advantages of digital format. Comments from this group include:

> *Reading school materials in print version can hardly be replaced with a screen reading, which uses only a part of our brain. Long life to the paper books and paper course material!*

I just find reading from paper much easier, since I can take notes as well. I also learn the material better when it's on paper.

A smaller group, about 37 percent of participants, can be seen as digital oriented. These participants answered positively to statements of preference for and convenience of electronic format, while disagreeing with preference for print. Comments from this group included:

I have been in this online format of education for 2 years now, so I am really used to reading everything electronically and have no problem with that.

Electronic format is not only more convenient for me, but it is also more sustainable.

14. The role of gender in format preference

Gender differences were noted in response to almost all statements, with female participants reporting a stronger preference for and perceived benefits of print than males on nearly every item. The most statistically significant items (p=<0.05 on Levine's test) indicate females' more negative attitudes towards digital format. These items include preference for digital format, perceived convenience of digital format, and preference for printing out digital material (Table 5)

Table 5: Differences in format preference and perception by gender

Statement	Gender	Mean	SD	Sig.
prefer digital format	male	3.0	0.983	0.001
	female	2.51	1.285	
convenience of digital format	male	3.05	1.061	0.006
	female	2.65	1.221	
frequency of printing digital material	male	2.75	1.062	0.024
	female	3.38	1.285	

15. Student comments

Student comments provide insight into their format preferences, motivations, and overall attitudes. When invited to leave comments explaining their responses, about 20 percent of participants (n=29) did so. The comments support the overall statistical trends of our results. Among the comments, over 58 percent (n=17) expressed a general preference for print. Among those who expressed a specific reason, six mentioned learning benefits such as concentration, focus, recall and ease of note taking. Four mentioned negative aspects of

digital format such as eye strain and digital distraction from notifications and popup advertising.

Six comments directly expressing preference for digital format did not include mentions of learning quality or engagement factors. Rather, these comments focused on environmental and sustainability concerns, convenience and familiarity, as well as the inconvenience of printing out texts that were provided digitally. Two comments mentioned positive experiences with specific applications or technologies for notetaking and organizing in digital format and suggested that these be adopted by others.

Some students elaborated on contextual factors influencing their choices.

> *"I feel kinda wasteful when I print readings so that's why I don't print them that often if the professor didn't hand them out. I would generally prefer only having presentations and visual materials like pictures in a digital format while all that requires reading and note taking in printed format."*
>
> *"If it was easier to print and the printers weren't busted every now and then, I would maybe print a bit more."*
>
> These comments point to the importance of the role of the institutional environment and instructor behavior in students' choices. In other words, some students may be more likely to choose the "path of least resistance" (i.e. letting the instructor essentially make the choice for them) rather than taking action based on their own preferences.

These comments, though limited, suggest that students' format choices are also influenced by the institutional environment and the pedagogical practices of the instructor.

16. Discussion

Consistent with previous research, results of our study indicate that a majority of Croatian university students continue to prefer print format, particularly for reasons of learning engagement. The minority of students who prefer digital format seem motivated by reasons less related to learning quality, such as convenience and sustainability. For further insight into long term trends, our data has been compared to similar data collected in 2015.

17. Comparison with 2015 data

Although most respondents to our survey can be seen as print oriented, print preference seems to have weakened significantly compared to results from data collected in 2015 (Mizrachi et al. 2018; Mizrachi et al. 2020; Pesut & Zivkovic, 2016). Since a limited amount of data among the items on the two instruments is available and appropriate for comparison, we have focused on a comparison of four major items: Preference between the two formats, focus, and recall. Data shows an overall decline in preference for print, accompanied by a rise in preference for print and neutral stance. Preference for print declined by 22 percentage points, while preference for digital format rose by nearly 25 percent. Changes in responses to focus and recall were less dramatic, with the smallest change seen in response to the statement "I can focus on material better when I read it in print."

Table 6: Change in responses from 2015 to 2022 (in percentage points)

Statement	Agree/strongly agree	Disagree/strongly disagree	Neutral
prefer print	-22	+8	+16
prefer digital	+24.7	-38.2	+21.2
focus in print	-8.3	+1.5	+8.8
remember in print	-18.9	+6.4	+14.4

Note: 2015 data sourced from Mizrachi et al. 2018

However, the preference for print, and perception of its benefits, has eroded significantly in the past seven years. Not surprisingly, students are embracing digital reading, and the perceived benefits of print are fading, perhaps more quickly among males than females. The growth of neutral attitudes might suggest that more students are equally comfortable with both formats or have learned to adapt their reading format choices and reading behaviors to the task at hand. However, it also may indicate that more students simply "don't care" or see little difference between the two formats.

Thus, a rise in digital preferring readers may be a cause for concern if it is rooted in students' prioritizing convenience over learning quality. Assuming that higher education institutions value quality of learning as the top priority, the implications for instructors and institutions are various. First, print oriented students should be accommodated by removing barriers to print access. This could mean providing reliable, convenient and inexpensive access to printers, or even providing printed copies of materials upon request or in class. To ease students' environmental concerns about the use of paper, effective recycling and other creative sustainability initiatives should be a priority.

On the other hand, digital reading is clearly here to stay, and has many benefits. With advances in technology and increasing student experience and familiarity with digital reading tools, it will certainly become even more prevalent. In order to take advantage of the benefits of digital reading, and avoid its risks, students need training and guidance, perhaps in a discipline-specific, first-year orientation course, on how best to study in an online environment. This aspect of preparation for college study seems to be often overlooked, and simply left to individual students to "figure out" on their own. However, to maximize student learning, active education, training, and practice may be beneficial. Students should be guided in how to make choices among formats based on the learning task, content and context, as well as their own personal learning style or visual needs. Since many students do choose or are required to use digital format in some contexts, training seems necessary to assist them with digital navigation and annotation skills, strategies for minimizing digital distractions during online academic reading, and techniques for reducing eye strain and fatigue. Institutions may also consider providing, subsidizing or

requiring appropriate digital reading technologies and applications, to discourage students from reading on smartphones or open internet by "default."

18. Limitations and future research

Limitations of this study include the relatively small sample size and convenience sampling method. Due to limited availability of Croatia-specific data from the original ARFIS study, and variations between the two instruments, comparison of data from 2015 to 2022 should be interpreted cautiously. Additional research is necessary to confirm the trend and to expand specific areas of comparison, including notetaking and annotation habits and gender differences.

Considering that the preference for print format appears to be waning, it seems that even greater attention should be paid to investigating the impact of digital reading on comprehension, recall and learning engagement. If an increase in digital reading comes at the cost of learning quality, then higher education is at risk of not fulfilling its mission. Future research should be focused on re-examining the effect of digital format on comprehension, and exploring reading strategies and techniques to improve comprehension, recall and focus in a digital context.

The role of the course instructor in choosing or influencing students' choice of reading format also deserves investigation, with instructors' preferences, behaviors and attitudes towards reading format presenting a ripe area for further research.

Finally, the gender difference in format preference clearly invites further study. Since print format still seems to afford an advantage to deep reading and critical thinking, the female preference for print may be connected to the well documented gender gap favoring females in educational achievement generally (Smith & Reeves, 2022; Reeves, 2023). Since males are more likely to read digitally, and for example, less likely to re-read and annotate, understanding reading format preference and developing digital reading skills may be useful in helping males close this gap.

19. Conclusion

The insight into Croatian university students' reading format choices afforded by this study can serve as a preliminary foundation into further investigation of students' diminishing preferences for print format, and its effect on the quality of their learning. As print format fades in academic contexts and digital reading becomes the norm, academic reading strategies must inevitably change as well. As we move forward into an inevitably more digitalized world, educators have an obligation to help students understand and become aware of the differences between the experience of reading in print and reading on screen, and to help them navigate an ever-changing digital landscape by making conscious and well-informed choices about what it means to read academically in the digital age.

20. Bibliography

Aharony, N., & Bar-Ilan, J. (2018). Students' academic reading preferences: An exploratory study. *Journal of Librarianship and Information Science*, *50*(1), 3–13. https://doi.org/10.1177/0961000616656044

Alieto, E., Abequibel, B., Ricohermoso, C., & Alieto, E. O. (2020). An investigation on digital and print reading attitudes: Samples from Filipino preservice teachers from a non-metropolitan-based university. *Asian EFL Journal*, *27*(43), 278–311.

Alsaeedi, Z. S., Ngadiran, N. B. M., Kadir, Z. A., & Altowayti, W. A. H. (2021). An overview of reading habits and medium preference among university students. *2021 International Congress of Advanced Technology and Engineering (ICOTEN)*.

Baron, N. S., Calixte, R. M., & Havewala, M. (2017). The persistence of print among university students: An exploratory study. *Telematics and Informatics*, *34*(5), 590–604. https://doi.org/10.1016/j.tele.2016.11.008

Berg, S. A., Hoffmann, K., & Dawson, D. (2010). Not on the same page: Undergraduates' information retrieval in electronic and print books. *Journal of Academic Librarianship*, *36*(6), 518–525. https://doi.org/10.1016/j.acalib.2010.08.008

Chang, L., Wang, Y., Liu, J., Feng, Y., & Zhang, X. (2023). Study on factors influencing college students' digital academic reading behavior. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.1007247

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

Curcic, D. (2023, January 30). *Dimitrije curcic*. Wordsrated.com. https://wordsrated.com/author/dimitrije-curcic/page/8/

Delgado, P., Vargas, C., Ackerman, R., & Salmerón, L. (2018). Don't throw away your printed books: A meta-analysis on the effects of reading media on reading comprehension. *Educational Research Review*, *25*, 23–38. https://doi.org/10.1016/j.edurev.2018.09.003

Duffy, K. (2023, March 13). *Gen Zers are bookworms but say they're shunning e-books because of eye strain, digital detoxing and their love for libraries*. World Economic Forum. https://www.weforum.org/agenda/2023/03/gen-zers-are-bookworms-but-say-theyre-shunning-e-books-because-of-eye-strain-digital-detoxing-and-their-love-for-libraries/

Flanigan, A. E., & Titsworth, S. (2020). The impact of digital distraction on lecture note taking and student learning. *Instructional Science*, *48*(5), 495–524. https://doi.org/10.1007/s11251-020-09517-2

Fontaine, G., Zagury-Orly, I., Maheu-Cadotte, M.-A., Lapierre, A., Thibodeau-Jarry, N., Denus, S. de, 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

Halamish, V., & Elbaz, E. (2020). Children's reading comprehension and metacomprehension on screen versus on paper. *Computers & Education*, *145*(103737), 103737. https://doi.org/10.1016/j.compedu.2019.103737

Jeong, Y. J., & Gweon, G. (2021). Advantages of print reading over screen reading: A comparison of visual patterns, reading performance, and reading attitudes across

paper, computers, and tablets. *International Journal of Human-Computer Interaction*, *37*(17), 1674–1684. https://doi.org/10.1080/10447318.2021.1908668

Ji, S. W., Michaels, S., & Waterman, D. (2014). Print vs. electronic readings in college courses: Cost-efficiency and perceived learning. *The Internet and Higher Education*, *21*, 17–24. https://doi.org/10.1016/j.iheduc.2013.10.004

Jian, Y.-C. (2022). Reading in print versus digital media uses different cognitive strategies: evidence from eye movements during science-text reading. *Reading and Writing*, *35*(7), 1549–1568. https://doi.org/10.1007/s11145-021-10246-2

Johnston, N., & Ferguson, N. (2020). University students' engagement with textbooks in print and E-book formats. *Technical Services Quarterly*, *37*(1), 24–43. https://doi.org/10.1080/07317131.2019.1691760

Johnston, N., & Salaz, A. M. (2019). Exploring the reasons why university students prefer print over digital texts: An Australian perspective. *Journal of the Australian Library and Information Association*, *68*(2), 126–145. https://doi.org/10.1080/24750158.2019.1587858

Kilag, O. K. T., Peras, C. C., Echavez, R. B., Suba-an, J. D., Obaner, M. K. B., & Mansueto, D. P. (2023). Comparing learning outcomes: On-screen versus print reading. *INTERNATIONAL JOURNAL OF INCLUSIVE AND SUSTAINABLE EDUCATION*, *2*(5), 181–191. http://inter-publishing.com/index.php/IJISE/article/view/1808

Liu, Z., & Huang, X. (2008). Gender differences in the online reading environment. *The Journal of Documentation; Devoted to the Recording, Organization and Dissemination of Specialized Knowledge*, *64*(4), 616–626. https://doi.org/10.1108/00220410810884101

Liu, Z. (2022). Reading in the age of digital distraction. *The Journal of Documentation; Devoted to the Recording, Organization and Dissemination of Specialized Knowledge*, *78*(6), 1201–1212. https://doi.org/10.1108/jd-07-2021-0130

Mirza, Q., Pathan, H., Khatoon, S., & Hassan, A. (2021). Digital Age and Reading Habits: Empirical Evidence from Pakistani Engineering University. *TESOL International Journal*, *16*(1), 210–231.

Mizrachi, D., Salaz, A. M., Kurbanoglu, S., Boustany, J., & on behalf of the ARFIS Research Group. (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

Mizrachi, D., & Salaz, A. (2020). Beyond the surveys: Qualitative analysis from the academic reading format international study (ARFIS). *College and Research Libraries*, 808. https://doi.org/10.5860/crl.81.5.808

Mizrachi, D., & Salaz, A. M. (2022). Reading format attitudes in the time of COVID. *Journal of Academic Librarianship*, *48*(4), 102552. https://doi.org/10.1016/j.acalib.2022.102552

Parodi, G., Moreno-de-León, T., Julio, C., & Burdiles, G. (2019). Google or Gutenberg Generation: Chilean university students' reading habits and reading purposes. *Comunicar*, *27*(58), 85–94. https://doi.org/10.3916/c58-2019-08

Pálsdóttir, Á., & Einarsdóttir, S. B. (2016). Print vs. Digital preferences. Study material and reading behavior of students at the university of Iceland. In *Information Literacy: Key to an Inclusive Society* (pp. 228–237). Springer International Publishing.

Pešut, D., & Živković, D. (2016). Students' academic reading format preferences in Croatia. *New Library World*, *117*(5/6), 392–406. https://doi.org/10.1108/nlw-02-2016-0008

Pontes, J. (2020). *Why Millennials and Generation Z prefer print books over E-books*. Jocelynpontes.com. https://www.jocelynpontes.com/wp-content/uploads/2020/10/Masters-Thesis-for-MA-Publishing_Jocelyn-Pontes.pdf

Reeves, R. V. (2023). *Of Boys and Men: Why the modern male is struggling, why it matters, and what to do about it*. Swift Press.

Sage, K., Piazzini, M., Downey, J. C., IV, & Masilela, L. (2020). Reading from print, laptop computer, and e-reader: Differences and similarities for college students' learning. *Journal of Research on Technology in Education*, *52*(4), 441–460. https://doi.org/10.1080/15391523.2020.1713264

Schwabe, A., Lind, F., Kosch, L., & Boomgaarden, H. G. (2022). No negative effects of reading on screen on comprehension of narrative texts compared to print: A meta-analysis. *Media Psychology*, *25*(6), 779–796. https://doi.org/10.1080/15213269.2022.2070216

Singer, L. M., & Alexander, P. A. (2017). Reading across mediums: Effects of reading digital and print texts on comprehension and calibration. *Journal of Experimental Education*, *85*(1), 155–172. https://doi.org/10.1080/00220973.2016.1143794

Ślęzak-Świat, A. M. (2019). Complementarity of reading from paper and screen in the development of critical thinking skills for 21st-century literacy. *Theory and Practice of Second Language Acquisition*, *5*(2), 75–93. https://doi.org/10.31261/tapsla.7564

Smith, E., & Reeves, R. V. (2022, October 12). *Boys left behind: Education gender gaps across the US*. Brookings. https://www.brookings.edu/articles/boys-left-behind-education-gender-gaps-across-the-us/

Whitford, E. (2021, February 23). *Faculty turned to digital materials in lieu of print textbooks after pandemic hit*. Inside Higher Ed | Higher Education News, Events and Jobs. https://www.insidehighered.com/news/2021/02/24/faculty-turned-digital-materials-lieu-print-textbooks-after-pandemic-hit