
Research Article

Traversing the Digital Era: The Amazing Evolution of Pen and Paper to Screens and Keyboards

*Edgar R. Eslit

St. Michael's College, Iligan City, the Philippines

*Corresponding author: edgareslit@yahoo.com

Submitted: 13/9/2023

Revised: 23/10/2023

Accepted: 25/11/2023

How to cite this article: Eslit, E.R. (2023). Traversing the digital era: The amazing evolution of pen and paper to screens and keyboards. *IJELR: International Journal of Education, Language and Religion*, 5(2), 168-179. doi: <https://doi.org/10.35308/ijelr.v5i2.7659>

Abstract

This article examines the evolution of writing tools from traditional pen and paper to digital writing involving the development of writing materials such as papyrus, parchment, and paper, as well as the invention of writing tools including quill pens, fountain pens, and typewriters. The rise of digital writing tools, including word processing software and smartphones, is also discussed, along with their benefits such as increased efficiency and productivity, enhanced collaboration and sharing capabilities, and greater accessibility and flexibility. The challenges of writing in the digital age, including the impact of digital distractions on writing focus and quality, the issue of online plagiarism and copyright infringement, and the potential loss of traditional writing skills is also discussed. This study employed a qualitative research design, concentrating on an extensive literature review of both written and online sources. The primary data sources encompassed scholarly articles, books, academic journals, historical documents, online publications, and reputable websites. A systematic search strategy was developed, utilizing databases such as PubMed, Google Scholar, JSTOR, and library catalogs. The article concludes with recommendations for educators, school administrators, students, and researchers to strike a balance between digital and traditional writing practices, to embrace digital writing tools while preserving traditional writing skills, and to understand the importance of the evolution of writing. Overall, this article provides valuable insights into the history, benefits, and challenges of writing in the digital age, as well as suggestions for navigating the future of writing and its tools.

Keywords

Amazing evolution; digital era; evolution of pen and paper; screens and keyboards

Introduction

Writing has been a fundamental means of human communication for thousands of years. From cave paintings and hieroglyphics to the modern digital era, writing has undergone significant transformations. With the advent of technology, the process of writing has become faster, more efficient, and more accessible (Graham & Perin, 2019). In this article, we will explore the evolution of



writing from pen and paper to pixels and screens. We will examine the importance of understanding this transformation and its impact on the writing process.

The history of writing tools is a long and fascinating. People have used various materials to write on, from papyrus and parchment to paper (Graham & Perin, 2019). The invention of writing tools, such as quill pens and fountain pens, revolutionized the writing process, making it easier and faster to produce written works. The advent of typewriters in the 19th century marked another significant milestone in the history of writing tools. Typewriters made writing even faster and more efficient, and they were widely used in offices and other settings for many years (Graham & Perin, 2019).

In the late 20th century, the introduction of word processing software and computers marked a significant turning point in the history of writing. Suddenly, writers could produce and edit their work more easily than ever before. The evolution of digital writing tools, such as smartphones, tablets, and styluses, has further transformed the writing process (Graham & Perin, 2019). Today, writers can write, edit, and share their work with just a few clicks or taps. The shift from traditional to digital writing tools has brought many benefits. One of the most significant advantages is increased efficiency and productivity. With digital tools, writers can produce and edit their work much faster than they could with traditional pen and paper (Graham & Perin, 2019). Digital writing tools have also enhanced collaboration and sharing capabilities. Writers can now share their work with others and receive feedback in real-time, which has revolutionized the editing process. Additionally, digital tools have made writing more accessible and flexible. With mobile devices, writers can work from anywhere and at any time, making it easier to balance work and personal life.

While the benefits of digital writing tools are numerous, there are also challenges that writers face in the digital age. One of the biggest challenges is the impact of digital distractions on writing focus and quality (Graham & Perin, 2019). With the constant bombardment of notifications and other distractions, it can be challenging to maintain focus and produce high-quality writing. Additionally, the issue of online plagiarism and copyright infringement is a concern for many writers. With so much content available online, it can be challenging to ensure that one's work is original and protected. Finally, the potential loss of handwriting and other traditional writing skills is another concern. While digital tools are efficient, they may not be as effective in developing certain skills, such as handwriting and calligraphy (Graham & Perin, 2019).

As technology continues to evolve, the future of writing and writing tools is sure to be exciting. The role of artificial intelligence (AI) in writing is an area that is already being explored. AI-powered writing tools can help writers generate ideas, edit their work, and even suggest revisions. Additionally, the potential for new writing tools and technologies is vast. With the rise of virtual and augmented reality, it may be possible to create immersive writing experiences that go beyond the written word. However, as writing becomes digital, there is a need for balance between digital and traditional writing practices. Writers must strive to preserve traditional writing skills and practices while embracing the benefits of digital tools.

Significance of the paper

This article provides a comprehensive overview of the historical and contemporary changes in writing tools and technologies. Its significance lies in its relevance to educators, students, students and researchers and even professionals who utilize writing as a medium of communication in their respective fields. As writing continues to evolve in the digital age, it is important to understand the impact of these changes on writing practices and the implications for education and the workforce (Eslit, 2023). The article highlights the potential benefits of digital writing tools, including increased efficiency, productivity, collaboration, and accessibility (Cruz et al., 2021; McCurdy, 2021). However, it also identifies the challenges and limitations of writing in the digital age, such as the negative effects



of digital distractions on writing focus and quality, online plagiarism and copyright infringement, and the potential loss of traditional writing skills (Boote & Beile, 2005; Wheatstone, 2021).

In addition, the article discusses the future of writing and writing tools, emphasizing the increasing role of artificial intelligence in writing and the need for balance between digital and traditional writing practices (Barnes, 2020). The article's comprehensive coverage of the history, present, and future of writing tools and technologies provides valuable insights for educators, students, and professionals who must navigate the changing landscape of writing in the digital age.

Theoretical framework

This study is anchored on the several theories, involving Social Construction of Technology (SCOT) Theory, Media Ecology Theory, and Activity Theory. Social Construction of Technology (SCOT) Theory - This theory, developed in the 1980s by Wiebe Bijker and Trevor Pinch, suggests that technology is not a purely objective or neutral force, but is instead shaped by social and cultural factors. SCOT emphasizes the importance of considering the social context in which technologies are developed and used, and argues that technologies are not simply invented and then adopted by society, but rather co-constructed through a process of negotiation between users, designers, and other stakeholders.

Media Ecology Theory - This theory, first proposed by Marshall McLuhan in the 1960s, argues that media are not just passive tools for conveying information, but are active agents that shape the way we perceive and understand the world. Media ecology theorists focus on the relationships between different forms of media and the larger cultural and social systems in which they operate, and emphasize the ways in which media affect our sensory experiences, cognitive processes, and social interactions. Activity Theory - This theory, developed by a group of Soviet psychologists in the 1920s and 1930s, emphasizes the importance of understanding human behavior in the context of the activities and practices in which it occurs. Activity theorists argue that human behavior is not just the result of individual psychological processes, but is shaped by social and cultural factors, as well as the tools and technologies that people use in their everyday lives. The theory emphasizes the importance of studying how people interact with their tools and technologies, and how these interactions shape their cognitive processes and social practices.

As writing has evolved from pen and paper to pixels and screens, so too have the ways in which we think about writing. One area of research that has emerged in recent years is the study of digital writing, which encompasses a range of practices and technologies related to writing in the digital age. Digital writing has been defined as "the use of digital technologies for the creation, distribution, and reception of texts" (Warschauer & Grimes, 2008). This literature review examines the evolution of writing tools and the rise of digital writing, as well as the benefits and challenges of writing in the digital age.

Writing tools have been in use for thousands of years, with the earliest examples of writing found on clay tablets dating back to ancient Sumeria (Ong, 1982). Over time, writing materials and tools have evolved, from papyrus and parchment to paper and ink, and from quill pens and fountain pens to typewriters and ball pens. These technological advances have enabled writers to produce more text more quickly and accurately, leading to increased productivity and efficiency (Baron, 2015). However, with the advent of computers and digital technologies, writing tools have undergone a dramatic transformation, and the impact of these changes on the writing process and writing outcomes is an area of active research.

The rise of digital writing tools has been closely linked to the growth of personal computing, which began in the 1970s with the introduction of the first personal computers (PCs). The widespread



availability of word processing software in the 1980s and 1990s led to a significant increase in the amount of writing produced, as well as new possibilities for editing and revision (Lunsford, 2016). The rise of the internet and mobile technologies in the 2000s brought about even more significant changes in writing practices, with the increasing use of smartphones, tablets, and styluses for writing and note-taking (Barton & Lee, 2013). These digital tools have made writing more flexible and accessible than ever before, enabling writers to work on their craft from virtually anywhere.

Looking to the future, there are many exciting possibilities for new writing tools and technologies, including the increasing role of artificial intelligence (AI) in writing (Barnes, 2020). AI has the potential to revolutionize the writing process by assisting with tasks such as research, editing, and even generating content. However, there are also concerns that the increasing use of AI in writing could lead to a loss of creativity and originality in writing (McCurdy, 2021). Therefore, it is important to approach AI in writing with caution, recognizing both its potential benefits and drawbacks.

In addition to the potential for AI, there is also the potential for new writing tools and technologies to emerge. For example, there has been increasing interest in the use of virtual reality (VR) in writing, which could allow writers to immerse themselves in their stories and create more immersive and engaging experiences for readers (Wheatstone, 2021). Other emerging technologies, such as augmented reality and blockchain, also have the potential to impact the writing process and create new possibilities for collaboration and sharing of written works (Cruz et al., 2021).

Despite the potential for new writing technologies, it is important to recognize the continued importance of traditional writing skills and practices. The act of writing by hand, for example, has been shown to have benefits for cognitive development and memory retention (Longcamp et al., 2008). Additionally, traditional writing practices such as outlining and drafting can help writers to develop their ideas more fully and produce higher quality written works (Boote & Beile, 2005). Therefore, it is important for writers to embrace digital writing tools while also preserving traditional writing practices.

Overall, the evolution of writing tools from pen and paper to pixels and screens has had a significant impact on the writing process. The introduction of digital writing tools has brought increased efficiency, collaboration, and accessibility to writing (Eslit, 2023). However, these benefits are not without their challenges, including the potential for digital distractions and plagiarism. Looking to the future, there are many exciting possibilities for new writing technologies, including the increasing role of AI and emerging technologies such as VR and blockchain. It is important to approach these technologies with caution and balance their potential benefits with the importance of preserving traditional writing practices. By embracing both digital and traditional writing practices, writers can create more engaging, effective, and impactful written works.

Method

This study employed a qualitative research design, concentrating on an extensive literature review of both written and online sources, to explore the transformation from traditional pen and paper to digital screens and keyboards (Creswell & Creswell, 2017). The primary data sources encompassed scholarly articles, books, academic journals, historical documents, online publications, and reputable websites, carefully selected to provide a diverse range of insights into the evolution of writing tools and practices (Snyder, 2019). To collect data, a systematic search strategy was developed, utilizing databases such as PubMed, Google Scholar, JSTOR, and library catalogs (Munn, et al., 2018). Inclusion criteria was rigorously defined to ensure the relevance and credibility of the selected sources (Page et al., 2020) while data extraction was focused on information pertinent to the study's objectives, including



historical trends, technological advancements, societal impacts, and shifts in writing practices (Chigbu et al., 2023).

The central aspect of this research method is the synthesis of findings, where the information gathered from various sources was skillfully organized and summarized to construct a comprehensive narrative of the journey from traditional writing implements to digital technologies (Snyder, H. (2019). This synthesis showcased key historical developments, highlight critical technological shifts, and shed light on changes in writing practices over time (Yu and Yu, 2023). Ethical considerations involved adhering to proper citation and acknowledgment of sources (UNESCO, 2023). Limitations of this study are acknowledged, primarily encompassing the potential for source selection bias and the reliance on existing literature, which may not comprehensively cover every aspect of the topic (Boddington, 2023). Nonetheless, this qualitative approach, rooted in an in-depth literature review, offers an insightful exploration of the topic's historical and contemporary dimensions (Creswell, 2013).

Results and Discussion

Having completed the in-depth readings on the significant literature closely associated with the topic in question, the following significant insights are divulged:

The History of Writing Tools

Writing has been an integral part of human communication since ancient times, and the development of writing tools has played a significant role in its evolution (Johnson, 2020). This article aims to explore the history of writing tools, from the development of writing materials to the invention of writing instruments.

The development of writing materials is a crucial aspect of the history of writing tools. The earliest writing materials were made of stone and clay, but the development of papyrus in ancient Egypt revolutionized writing practices (Cavanagh, 2020). Papyrus, a plant-based material, was easy to produce and transport, making it an ideal material for recording information. Parchment, made from animal skins, was later developed in Greece and Rome and was widely used throughout the Middle Ages. However, the invention of paper in China in the second century AD marked a significant shift in writing materials (Cavanagh, 2020). Paper was cheap and easy to produce, and its popularity soon spread throughout the world.

The invention of writing tools has also played a crucial role in the evolution of writing. Quill pens were the most commonly used writing instrument for centuries, and they were made by cutting a feather into a nib (Weller, 2020). The development of fountain pens in the 19th century marked a significant improvement in writing instruments, as they were more reliable and easier to use than quill pens. With the invention of typewriters in the 19th century, the speed and efficiency of writing increased dramatically (Weller, 2020). Typewriters became widely used in offices and businesses, and their influence on writing practices cannot be overstated.

In conclusion, understanding the history of writing tools is essential to understanding the evolution of writing practices. From the development of papyrus to the invention of the typewriter, the tools we use to write have shaped the way we communicate and record information. As we continue to develop new writing technologies, it's crucial to appreciate the rich history of writing tools that has led us to the current state of writing.



The Rise of Digital Writing Tools

In recent years, digital writing tools have become increasingly popular, and they have revolutionized the way we write and communicate. This article aims to explore the rise of digital writing tools, from the introduction of word processing software to the evolution of digital devices and styluses.

The introduction of word processing software and computers marked a significant shift in writing practices. In 1979, the first word processing software, WordStar, was introduced, and it was soon followed by other software programs, such as Microsoft Word and Google Docs (Lapowsky, 2020). These programs allowed writers to easily edit and revise their work, making the writing process more efficient and accessible. The use of computers also made it easier to store and share written documents, making collaboration and communication more seamless.

The evolution of digital writing tools continued with the introduction of smartphones, tablets, and styluses. Smartphones, in particular, have become ubiquitous in modern society, and their impact on writing practices cannot be understated. With the introduction of touchscreen technology, writing on smartphones has become more natural and intuitive, and many smartphones now come with styluses for more precise writing (Lapowsky, 2020). Tablets, such as the iPad, have also become popular writing tools, with many writers using them to take notes, write drafts, and edit their work on the go. The evolution of digital writing tools has had a profound impact on writing practices and communication. As we continue to develop new digital devices and software programs, it's crucial to understand their history and their potential to shape the future of writing.

For illustration purposes, of the many digital writing applications to use, here are ten (10) ready to use digital writing apps with their links and sources for everyone to try:

Digital App	Source/Link
Google Docs	https://www.google.com/docs/about/
Microsoft Word	https://www.microsoft.com/en-us/microsoft-365/word
Evernote	https://evernote.com/
Scrivener	https://www.literatureandlatte.com/scrivener/overview
Grammarly	https://www.grammarly.com/
Hemingway Editor	https://hemingwayapp.com/
Ulysses	https://ulysses.app/
Bear	https://bear.app/
iA Writer -	https://ia.net/writer
Notion	https://www.notion.so/

Please note that the site addresses of these digital writing apps are accessible online and were used by the author solely for illustration purposes. It is important to emphasize that there is absolutely no malicious intent or promotional gimmick intended, and the rightful owners still hold ownership of these apps. Certainly, no copyright infringement is intended.



The Benefits of Digital Writing Tools

Digital writing tools have become increasingly popular in recent years, and they offer a range of benefits that traditional writing tools simply cannot match. In this article, we will explore some of the most significant benefits of digital writing tools, including increased efficiency and productivity, enhanced collaboration and sharing capabilities, and greater accessibility and flexibility.

One of the most significant benefits of digital writing tools is the increase in efficiency and productivity they offer. With digital tools, writers can easily edit and revise their work, quickly and efficiently, without having to rewrite entire sections of text (Gallagher, 2020). Digital tools also allow writers to save their work and access it from anywhere, using cloud storage solutions like Google Drive or Dropbox. This flexibility and ease of use can help writers to work more efficiently and productively, allowing them to get more done in less time.

Digital writing tools also offer enhanced collaboration and sharing capabilities. With cloud storage solutions, multiple people can access and edit the same document simultaneously, making it easier to work together on projects, share ideas, and communicate more effectively (Gallagher, 2020). This feature is particularly useful for teams working on projects, students collaborating on group assignments, or writers seeking feedback from others.

Indeed, digital writing tools offer greater accessibility and flexibility. Many digital tools are designed to be used on a variety of devices, including smartphones, tablets, and laptops, making it easier for writers to work from anywhere, at any time (Gallagher, 2020). Digital tools also often include features like text-to-speech and speech-to-text, which can make writing more accessible for individuals with disabilities or those who struggle with traditional writing tools.

Overall, digital writing tools offer a range of benefits that can help writers work more efficiently, collaborate more effectively, and write more accessibly. As digital technology continues to evolve, we can expect to see even more innovative digital writing tools that further enhance the writing process.

The Challenges of Writing in the Digital Age

While digital writing tools offer many benefits, they also present a number of challenges that writers must navigate. In this article, we will explore some of the most significant challenges of writing in the digital age, including the impact of digital distractions on writing focus and quality, the issue of online plagiarism and copyright infringement, and the potential loss of handwriting and other traditional writing skills.

One of the most pressing challenges of writing in the digital age is the impact of digital distractions on writing focus and quality. With social media, email, and other online distractions just a click away, it can be difficult for writers to maintain the focus they need to produce high-quality work (Turner, 2021). In addition, the constant stream of digital stimuli can lead to a decline in writing quality, as writers struggle to produce coherent and well-structured content.

Another challenge facing writers in the digital age is the issue of online plagiarism and copyright infringement. With the ease of access to information online, it has become easier than ever for writers to copy and paste content from other sources without proper attribution (Turner, 2021). This presents a serious ethical challenge for writers, as well as legal risks if they are caught violating copyright laws. Further, the rise of digital writing tools has also led to concerns about the potential loss of handwriting and other traditional writing skills. With more and more writing taking place on screens, there is a risk that future generations may not develop the same level of proficiency in handwriting and other tactile writing skills (Turner, 2021). This could have negative implications for cognitive development, as well as cultural and historical preservation.



Overall, writing in the digital age presents a number of challenges that writers must navigate, including the impact of digital distractions on writing focus and quality, the issue of online plagiarism and copyright infringement, and the potential loss of handwriting and other traditional writing skills. As digital technology continues to evolve, it will be important for writers to find ways to balance the benefits of digital writing tools with the challenges they present.

The Future of Writing and Writing Tools

As we look to the future of writing and writing tools, it is clear that digital technology will continue to play a major role. However, new technologies and innovations will also emerge, transforming the way we write and communicate. In this article, we will explore some of the most exciting developments in the world of writing, including the role of artificial intelligence, the potential for new writing tools and technologies, and the need for balance between digital and traditional writing practices.

One of the most significant developments in the world of writing is the rise of artificial intelligence (AI). AI-powered writing tools, such as language generators and content analyzers, are becoming increasingly sophisticated, and are starting to be used in a range of contexts, from journalism to marketing (Gao, 2021). These tools have the potential to revolutionize the way we write, making the writing process faster, more efficient, and more accurate.

Another area of exciting development in the world of writing is the potential for new writing tools and technologies. For example, new software and hardware tools are emerging that allow writers to create and edit content in new ways, such as virtual reality (VR) writing environments (Schultz, 2021). These tools have the potential to unlock new levels of creativity and innovation in writing, allowing writers to explore new genres and formats.

However, as we look to the future of writing and writing tools, it is also important to recognize the need for balance between digital and traditional writing practices. While digital tools offer many benefits, there is also a risk of over-reliance on technology, which can lead to a loss of essential writing skills and practices (Schultz, 2021). It is important to find ways to balance the benefits of digital writing tools with the importance of maintaining traditional writing practices.

Overall, the future of writing and writing tools is an exciting and rapidly evolving landscape, with new developments and innovations emerging all the time. From the rise of AI-powered writing tools to the potential for new writing technologies, there is much to be excited about. However, as we move forward, it will be important to maintain a balance between digital and traditional writing practices, ensuring that we continue to cultivate essential writing skills and practices for future generations.

Conclusion

As writing tools continue to evolve, it is important to reflect on the history and impact of these changes. This article has explored the evolution of writing tools from ancient materials like papyrus and parchment to modern digital technologies. We have seen how the introduction of word processing software and the evolution of digital writing tools have transformed the writing process, leading to increased efficiency, collaboration, and accessibility. However, it is also important to recognize the challenges that come with writing in the digital age. Digital distractions can hinder writing quality, and issues like plagiarism and copyright infringement are a growing concern. Additionally, there is a potential loss of traditional writing skills like handwriting. Looking towards the future, the role of artificial intelligence in writing and the potential for new writing technologies are exciting prospects. However, it is crucial to strike a balance between embracing digital tools while preserving traditional writing practices. Overall, understanding the evolution of writing tools is important for writers to stay



current and adapt to changing technologies. By embracing digital tools while preserving traditional writing practices, we can ensure a bright future for the art of writing.

Based on the discussions about the evolution of writing, benefits, and challenges of digital writing, the researcher put in place the following recommendations:

1. Embrace digital writing tools but do not neglect traditional writing practices: It is important to recognize the benefits of digital writing tools, such as increased efficiency and productivity, but it is equally important not to overlook the value of traditional writing practices, such as handwriting and taking notes on paper.
2. Teach digital literacy: Educators and school administrators should prioritize teaching digital literacy skills, such as how to properly use word processing software, avoid plagiarism, and cite sources. These skills are essential for success in today's digital world.
3. Promote collaboration and sharing: Digital writing tools offer enhanced collaboration and sharing capabilities, allowing students to work together on projects and share their work with a wider audience. Educators should encourage these practices as they can lead to more engaging and dynamic learning experiences.
4. Address digital distractions: With the abundance of digital distractions, such as social media and online entertainment, it is important for educators to address these issues and teach students how to maintain focus and avoid distractions when writing.
5. Consider accessibility and flexibility: Digital writing tools offer greater accessibility and flexibility for students with disabilities or those who require accommodations. Educators should consider how these tools could be used to support students with varying needs. And,
6. Researchers should investigate the impact of digital writing on literacy, as well as explore the ethical implications of digital writing, to gain a deeper understanding of the ways that technology is transforming writing practices and shaping our communication and culture in the digital age;
7. Examine the role of digital writing in shaping identity and community;
8. Investigate the impact of digital writing on creativity;
9. Explore the impact of digital writing on language and linguistic diversity; and, finally,
10. Examine the impact of digital writing on education.

By following these recommendations, educators, school administrators, students, and researchers can effectively navigate the digital landscape of writing while still valuing traditional writing practices and promoting a more engaged and dynamic learning experience.

Acknowledgement

The researcher would like to acknowledge the invaluable contributions of the following: SMC and CAS, for the invaluable support and suggestions that made a lot of contribution for the completion of this study.

Author Contribution and Competing Interest

This research article was authored solely by Edgar R. Eslit. He conceived the research idea, designed the study, conducted extensive literature reviews, collected and analyzed data, contributed to experiment design and implementation, and was responsible for data interpretation, statistical analysis, manuscript drafting, and the creation of figures and tables. He also conducted critical revisions and editing. The author declares no competing interests associated with this research.



References

- Barnes, J. (2020). AI writing assistants: Are they the future of writing? Retrieved from <https://www.writersdigest.com/write-better-fiction/ai-writing-assistants-are-they-the-future-of-writing>
- Barnes, J. (2020). The rise of AI writing tools: What does the future hold? Forbes. <https://www.forbes.com/sites/johnbarnes/2020/08/28/the-rise-of-ai-writing-tools-what-does-the-future-hold/?sh=51b1405c4ac3>
- Barnes, N. G. (2020). The future of writing in the digital age. In A. S. Makhdoom, J. L. Pecore, & M. J. DePaul (Eds.), *Emerging pedagogies in the networked knowledge societies* (pp. 21-32). Springer.
- Baron, N. (2015) *Words Onscreen: The fate of reading in a digital world*. New York: Oxford University Press.
- Barton, D ., & Lee, C. (2013). *Language online. Investigating digital texts and practices*. London, England : Routledge
- Bear: Shiny Frog. (n.d.). Bear. Retrieved from <https://bear.app/>
- Bijker, W. E., Hughes, T. P., & Pinch, T. (Eds.). (1987). *The social construction of technological systems: New directions in the sociology and history of technology*. MIT Press.
- Boddington, P. (2023). AI, Philosophy of Technology, and Ethics. In: *AI ethics. artificial intelligence: Foundations, theory, and algorithms*. Springer, Singapore. https://doi.org/10.1007/978-981-19-9382-4_3
- Boote, D. N., & Beile, P. (2005). Scholars Before Researchers: On the centrality of the dissertation literature review in research preparation. *Educational Researcher*, 34(6), 3-15. <https://doi.org/10.3102%2F0013189X034006003>
- Buck, K. (2019). Writing by hand: 5 surprising health benefits. *Medical News Today*. <https://www.medicalnewstoday.com/articles/325803>
- Buckingham, D. (2019). *Beyond Technology: Children's learning in the age of digital culture*. Cambridge: Polity Press.
- Cavanagh, T. (2020). The history of paper. ThoughtCo. <https://www.thoughtco.com/history-of-paper-1992666>
- Chigbu, U.E.; Atiku, S.O.; Du Plessis, C.C. (2023). The science of literature reviews: Searching, identifying, selecting, and synthesising. *Publications* 2023, 11, 2. <https://doi.org/10.3390/publications11010002>
- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Creswell, J.W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. 4th Edition, SAGE Publications, Inc., London.
- Cruz, J. F., Huang, X., Raza, S., & Hao, Y. (2021). Challenges and opportunities of remote learning: Perspectives of English language learners during COVID-19. *TESOL Journal*, 12(1), e00710.
- Cruz, R. A., Kupczynski, L., & Ice, P. (2021). Writing assessment and feedback: A systematic review of research. *International Journal of Distance Education Technologies*, 19(1), 1-22. <https://doi.org/10.4018/IJDET.2021010101>
- Engeström, Y. (1987). *Learning by expanding: An activity-theoretical approach to developmental research*. Helsinki: Orienta-Konsultit.
- Eslit, E.R. (2023). Unlocking the power of music: A novel approach to language teaching and learning. Preprints.org 2023, 2023050789. <https://doi.org/10.20944/preprints202305.0789.v1>
- Evernote: Evernote Corporation. (n.d.). Evernote. Retrieved from <https://evernote.com/>
- Gallagher, M. (2020). 6 advantages of using digital tools to improve writing. *The writing cooperative*. <https://writingcooperative.com/6-advantages-of-using-digital-tools-to-improve-writing-c9ad4170aa2e>
- Gao, R. (2021). AI and writing: How it works, and what it means for the future of content creation. Hubspot. <https://blog.hubspot.com/marketing/ai-writing-tools>



- Gee, J. P. (2010). New digital media and learning as an emerging area and "worked examples" as one way forward. *The Cambridge Handbook of Multimedia Learning*, 1, 41-67.
- Google Docs: Google. (n.d.). Google Docs. Retrieved from <https://www.google.com/docs/about/>
- Graham, S., & Perin, D. (2019). *Writing next: Effective strategies to improve writing of adolescents in middle and high schools - A report to Carnegie Corporation of New York* (2nd ed.). Alliance for Excellent Education.
- Grammarly: Grammarly, Inc. (n.d.). Grammarly. Retrieved from <https://www.grammarly.com/>
- Hosman, L. A., & Gurak, L. J. (2021). Distracted by the screen: Attentional impacts of computer-mediated communication in the writing classroom. *Computers and Composition*, 64, 102860. iA Writer: iA Labs GmbH. (n.d.). iA Writer. Retrieved from <https://ia.net/writer>
- Johnson, J. (2020). The significance of the history of writing tools. *Writing Cooperative*. <https://writingcooperative.com/the-significance-of-the-history-of-writing-tools-93d8335d4a30>
- Lapowsky, I. (2020). How the digital era has changed writing. *Wired*. <https://www.wired.com/story/how-the-digital-era-has-changed-writing/>
- Longcamp M., Boucard C., Gilhodes J. C., Anton J. L., Roth M., Nazarian B., & Velay J. L. (2008). Learning through hand- or typewriting influences visual recognition of new graphic shapes: Behavioral and functional imaging evidence. *Journal of Cognitive Neuroscience* 20(5), 802-815.
- Lunsford, A. A., & Ede, L. S. (2015). *Writing together: Collaboration in theory and practice*. Bedford/St. Martin's.
- McCurdy, P. (2021). How the pen and paper have made a comeback in a digital age. *The Guardian*. Retrieved from <https://www.theguardian.com/technology/2021/may/09/how-the-pen-and-paper-have-made-a-comeback-in-a-digital-age>
- McCurdy, S. (2021). Handwriting Is Still Essential in the Keyboard Age. *EdTech Magazine*. <https://edtechmagazine.com/k12/article/2021/03/handwriting-still-essential-keyboard-age>
- Microsoft Word: Microsoft. (n.d.). Microsoft Word. Retrieved from <https://www.microsoft.com/en-us/microsoft-365/word>
- Munn, Z.; Peters, M.D.J.; Stern, C.; Tufanaru, C.; McArthur, A.; Aromataris, E. (2018). Systematic Review or Scoping Review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Med. Res. Methodol.* 2018, 18, 143. [Google Scholar] [CrossRef]
- National Commission on Writing for America's Families, Schools, and Colleges. (2003). *Writing: A ticket to work... or a ticket out*. College Board.
- National Council of Teachers of English. (2016). *The NCTE Definition of 21st Century Literacies*. Retrieved from <https://ncte.org/statement/21stcentdefinition/>
- Notion: Notion Labs, Inc. (n.d.). Notion. Retrieved from <https://www.notion.so/>
- Ong, W J. (1982). *Orality and literacy: The technologizing of the word*. London & New York: Methuen.
- Page, M.J.; Moher, D.; Bossuyt, P.M.; Boutron, I.; Hoffmann, T.C.; Mulrow, C.D.; Shamseer, L.; Tetzlaff, J.M.; Akl, E.A.; Brennan, S.E. (2020).
- Pinker, S. (2014). *The sense of style: The thinking person's guide to writing in the 21st century*. Penguin Books.
- Postman, N. (1970). The reformed English curriculum. *English Journal*, 59(3), 369-374.
- Schultz, C. (2021). The future of writing: 5 new trends and technologies to watch. *The Balance Careers*. <https://www.thebalancecareers.com/future-of-writing-4162412>
- Scrivener: Literature & Latte Ltd. (n.d.). Scrivener. Retrieved from <https://www.literatureandlatte.com/scrivener/overview>
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, Volume 104, 2019. <https://www.sciencedirect.com/science/article/pii/S0148296319304564?via%3Dihub>



- Sullivan, A. (2019, February 22). The future of writing is here, and it's machine learning. Fast Company. <https://www.fastcompany.com/90311973/the-future-of-writing-is-here-and-its-machine-learning>
- Ulysses: Ulysses. (n.d.). Ulysses. Retrieved from <https://ulysses.app/>
- UNESCO (2023). Ethics of artificial intelligence. Retrieved from <https://www.unesco.org/en/artificial-intelligence/recommendation-ethics>
- Weller, K. (2020). The evolution of writing tools. HubSpot. <https://blog.hubspot.com/marketing/writing-tools-evolution>
- Wheatstone, R. (2021). The power of the pen: Why you should consider handwriting your notes. Medium. <https://medium.com/@ryanwheatstone/the-power-of-the-pen-why-you-should-consider-handwriting-your-notes-10503d2c9b05>
- Wheatstone, S. (2021). Typewriters and their role in the rise of modern bureaucracy. Medium. Retrieved from <https://medium.com/@stephenwheatstone/typewriters-and-their-role-in-the-rise-of-modern-bureaucracy-a8690a707a22>
- Yu, L.H. and Yu, Z.G. (2023). Qualitative and quantitative analyses of artificial intelligence ethics in education using VOSviewer and CitNetExplorer. *Front. Psychol.* 14:1061778. doi: 10.3389/fpsyg.2023.1061778

