MANAGING THE INTERSECTION OF ARTIFICIAL INTELLIGENCE, DIGITAL TYPING, AND HANDWRITING FOR SUSTAINABLE QUALITY EDUCATION ENHANCEMENT

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ARTICLE INFO	ABSTRACT
	Objective: The research objective is to investigate how the rapid advancement of technology, particularly the increasing reliance on digital tools and artificial intelligence (AI) for note-taking and communication, influences handwriting practices. Specifically, to explore the attitudes, emotions, and experiences surrounding handwriting and digital communication in Jakarta. **Theoretical Framework:** This research employs Social Change Theory as the theoretical framework to understand how technology influences handwriting practices. Social Change Theory provides a lens through which to examine the societal shifts brought about by technological advancements, considering how these changes impact individuals' behaviors, attitudes, and perceptions regarding handwriting and digital communication. **Method:** The study utilizes qualitative research methods, including focus group discussions, observations, and interviews. These methods allow for a comprehensive exploration of participants' attitudes, emotions, and experiences related to handwriting and digital communication. **Results and Discussion:** Findings from the study suggest that while AI and digital typing offer efficiency and accessibility, handwriting retains unique cognitive and emotional benefits. Participants express a range of attitudes towards handwriting and digital communication, highlighting both the advantages and drawbacks of each method. Managing the integration of AI, digital typing, and handwriting in education emerges as a potential solution to address concerns about technology dependence while fostering critical thinking and cultural appreciation for sustainability and the enhancement of the quality of education, as SDG' No. 4. **Research Implications:** The findings of this research have several implications for educational practice and policy that should recognize the value of incorporating handwriting alongside AI and digital typing in educational curricula. Doi: https://doi.org/10.26668/businessreview/2024.v9i4.4534

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Intern. Journal of Profess. Bus. Review. |Miami, v. 9 | n. 4| p. 01-19 | e04534 | 2024.

1

GERENCIANDO A INTERSEÇÃO DE INTELIGÊNCIA ARTIFICIAL, DIGITAÇÃO DIGITAL E ESCRITA À MÃO PARA O APRIMORAMENTO SUSTENTÁVEL DA EDUCAÇÃO DE QUALIDADE

RESUMO

Objetivo: O objetivo da pesquisa é investigar como o rápido avanço da tecnologia, particularmente a crescente dependência de ferramentas digitais e inteligência artificial (IA) para anotações e comunicação, influencia as práticas de escrita à mão. Especificamente, explorar as atitudes, emoções e experiências relacionadas à escrita à mão e à comunicação digital em Jacarta.

Estrutura Teórica: Esta pesquisa emprega a Teoria da Mudança Social como estrutura teórica para entender como a tecnologia influencia as práticas de escrita à mão. A Teoria da Mudança Social fornece uma lente para examinar as mudanças sociais provocadas pelos avanços tecnológicos, considerando como essas mudanças afetam os comportamentos, as atitudes e as percepções dos indivíduos com relação à escrita à mão e à comunicação digital.

Método: O estudo utiliza métodos de pesquisa qualitativa, incluindo discussões em grupos de foco, observações e entrevistas. Esses métodos permitem uma exploração abrangente das atitudes, emoções e experiências dos participantes relacionadas à escrita à mão e à comunicação digital.

Resultados e Discussão: Os resultados do estudo sugerem que, embora a IA e a digitação digital ofereçam eficiência e acessibilidade, a escrita à mão mantém benefícios cognitivos e emocionais exclusivos. Os participantes expressam uma série de atitudes em relação à escrita à mão e à comunicação digital, destacando as vantagens e desvantagens de cada método. O gerenciamento da integração da IA, da digitação digital e da escrita à mão na educação surge como uma solução em potencial para abordar as preocupações com a dependência da tecnologia e, ao mesmo tempo, promover o pensamento crítico e a valorização cultural para a sustentabilidade e a melhoria da qualidade da educação, conforme o ODS nº 4.

Implicações da Pesquisa: Os resultados desta pesquisa têm várias implicações para a prática e a política educacional que devem reconhecer o valor da incorporação da escrita à mão juntamente com a IA e a digitação digital nos currículos educacionais.

Palavras-chave: IA, Escrita Manual, Impacto, Mudança Social, Integração Educacional.

GESTIÓN DE LA INTERSECCIÓN ENTRE INTELIGENCIA ARTIFICIAL, MECANOGRAFÍA DIGITAL Y ESCRITURA MANUAL PARA LA MEJORA SOSTENIBLE DE LA CALIDAD DE LA EDUCACIÓN

RESUMEN

Objetivo: El objetivo de la investigación es investigar cómo el rápido avance de la tecnología, en particular la creciente dependencia de las herramientas digitales y la inteligencia artificial (IA) para la toma de notas y la comunicación, influye en las prácticas de escritura a mano. En concreto, explorar las actitudes, emociones y experiencias en torno a la escritura a mano y la comunicación digital en Yakarta.

Marco Teórico: Esta investigación emplea la Teoría del Cambio Social como marco teórico para comprender cómo influye la tecnología en las prácticas de escritura a mano. La Teoría del Cambio Social proporciona una lente a través de la cual examinar los cambios sociales provocados por los avances tecnológicos, teniendo en cuenta cómo estos cambios afectan a los comportamientos, actitudes y percepciones de los individuos en relación con la escritura a mano y la comunicación digital.

Método: El estudio utiliza métodos de investigación cualitativa, incluidos grupos de discusión, observaciones y entrevistas. Estos métodos permiten una exploración exhaustiva de las actitudes, emociones y experiencias de los participantes en relación con la escritura a mano y la comunicación digital.

Resultados y Debate: Los resultados del estudio sugieren que, aunque la IA y la mecanografía digital ofrecen eficiencia y accesibilidad, la escritura a mano conserva ventajas cognitivas y emocionales únicas. Los participantes expresan diversas actitudes hacia la escritura a mano y la comunicación digital, destacando tanto las ventajas como los inconvenientes de cada método. La gestión de la integración de la IA, la mecanografía digital y la escritura a mano en la educación surge como una solución potencial para abordar las preocupaciones sobre la dependencia de la tecnología, al tiempo que fomenta el pensamiento crítico y la apreciación cultural para la sostenibilidad y la mejora de la calidad de la educación, como SDG 'N º 4.

Implicaciones de la Investigación: Los resultados de esta investigación tienen varias implicaciones para la práctica y la política educativas que deberían reconocer el valor de incorporar la escritura a mano junto con la IA y la mecanografía digital en los currículos educativos.

Palabras clave: IA, Escritura Manuscrita, Impacto, Cambio Social, Integración Educativa.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

2

1 INTRODUCTION

The world is changing at an increasingly rapid pace, with the influence of technical progress impacting the social values that shape world civilization. Several aspects of daily life have changed due to technological advances, especially regarding smoothness and efficiency in various fields. These sectors include education and human culture. Technology is an integral part of writing; technology makes writing possible (Lee & Bradford, 2020).

In contemporary educational settings, students have been accustomed to integrating technology into their everyday routines by utilizing many gadgets, including computers, mobile phones, iPads, and iPods. They combine these diverse technologies to handle academic work and visualize limitless creativity on digital displays. Students can now change the way they carry out responsibilities and complete learning activities, thanks to the availability of technological devices. These modifications are incorporated into the process of writing and publishing the paper. Writing papers and publications is one of these changes. Hans Jonas, a philosopher, posed a persistent inquiry into the societal implications of technology. He sought to pass responsibility to the generations after us, and he made significant progress in discussions regarding ethics (Uwasu, 2020).

Changes in the composition and distribution of written works have occurred at key points in human history, and technological advances have transformed the writing process. In fact, technology has gradually replaced human culture, including handwriting. During school, there was a feeling of satisfaction when someone's handwriting was praised, and their writing ability was even assessed in the Beautiful Writing class. Now, it doesn't matter whether someone's handwriting is beautiful or not, because it can be typed on any device. The increasing prevalence of digital gadget use among teenagers presents new concerns in the form of digital eye fatigue at a young age (Ichhpujani et al., 2019). Technology has also become the preferred method of communication, because entering communication material into a computer is faster than handwriting and easier to read than handwriting.

Email or electronic mail makes it easier to correspond with friends. Writing everyday stories, as previously done in diaries, is now mostly done on computers and can be sent directly to blogs. All of this continually degrades the art of handwriting, except for the personal touch in handwriting, which may be difficult to replicate with a sheet of paper written on a computer.

Computers help translate text, improve grammar, composition, and diction. Digital documents provide a variety of benefits, including environmental sustainability. Many of these

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

3

texts can now be published by publishers with just an internet connection and a location to store digital files, which they can then sell online as E-Books. The eBook-based SNS platform ePUB3 adopts a quasi-experimental research method (Tsai et al., 2020).

Typing is used for written communication, and a tap on the screen indicates that handwriting is no longer necessary. It's true, signatures must be written by hand, but now they can be encrypted or created digitally. So that almost unlimited records and textual materials can be managed by computers.

In fact, signature-only credit cards are becoming increasingly rare, as most credit cards now have a chip and code number. Our children today are taught to swipe, squeeze and touch smartphone and tablet screens from an early age. These children are accustomed to using fingers and electronic devices rather than writing on paper. Computers also help students with convenience. The search engine facilitates game listening, sharing, and transmission of information, including student reviews of facilitator guidance. This allows students to concentrate more on the things they are learning online, rather than listening to the facilitator. Students don't need time to copy notes manually.

According to Lavenia and Anastasya (2022) shows that writing on smartphones and computers is indeed simpler and faster, and this is the reason why people are now starting to abandon handwriting for reasons of efficiency. Writing via the device will make it easier to capture what has been recorded on the computer; cannot be lost, but handwritten documents are vulnerable to loss or damage.

The National Handwriting Association (2022), states that creating signs is fundamental for humans. Symbolic depictions for others to understand are uniquely human, and it is known that humans have been writing since the discovery of cave paintings.

Initial symbols are used to store information and express it, just like now. Communication is the process of sending and receiving signals that occur in a context, are distorted by noise, have effects (and ethical components), and allow for feedback (DeVito, 2019).

In recent years, advances in technology have drastically changed the way people write by hand. While the use of gadgets for writing is increasing, the ability to write longhand remains important in schools, workplaces and everyday life.

Apps and software that take notes using artificial intelligence are growing in popularity as tools for jotting down ideas, to-do lists, and other information. Because it can be synced

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

4

across multiple devices, the app provides a simplified experience and eliminates the need to hand-write notes on paper.

The development of design software and digital art tools powered by artificial intelligence (AI) has enabled artists and designers to produce digital works without using conventional art materials. In the creative sector, methods such as conventional sketching and handwriting are becoming less and less used as a direct result of the ease and adaptability offered by digital media.

AI also contributes to the automation of text production through applications such as chatbots and tools for automated content development. Because this system is capable of producing large amounts of text in a short time, the need for human writing is reduced. The use of more conventional communication methods, such as handwriting, will become less necessary as people prefer the practicality of communicating via digital platforms. In today's digital era, the debate between traditional handwriting and digital typing is increasingly prevalent, especially in educational settings. However, this discourse is about more than just convenience or personal preference. This is related to global efforts to achieve According to UNESCO (2022), Sustainable Development Goal (SDG) number 4 centers on the objective of providing excellent Education. This goal aims to provide inclusive and equal access to excellent education, while also promoting lifelong learning opportunities for all individuals. Both digital typing and handwriting play an important role in advancing this noble agenda. The research question is: How has increasing reliance on technology, particularly digital communications, and artificial intelligence, impacted the role and practice of handwriting in modern society to ensure quality education, and what are the cognitive, emotional, and social implications of this transformation?

1.1 RESEARCH PROBLEMS

Ongoing technological advances, including the widespread use of digital devices, artificial intelligence, and the shift towards digital communications, are leading to less emphasis on handwriting in many aspects of life. This raises concerns about the potential consequences on cognitive processes, emotional relationships, and societal practices typically associated with handwriting. Exploring these consequences and understanding the changing role of handwriting in the context of technological advances is of paramount importance.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

5

1.2 RESEARCH PURPOSES

To analyse the emotional and social impact of handwritten communication, explore its differences from digital communication and the unique relationships it fosters, and understand efforts and initiatives aimed at preserving and promoting handwriting in the face of technological advances, and cultural movements preserving or enhancing handwriting practices, including AI-powered handwriting recognition tools and applications among the younger generation.

2 THEORETICAL REFERENCE

Social Change Theory discusses transformations in norms, values, and social structures that occur as a result of technological change and innovation. Social Change theory delivers an understanding of how technological advances, particularly digital communications and artificial intelligence, influence the role and practice of handwriting in modern society. Practically social planners are engaged daily in formulating goals for the allocation of resources to change social relationships and organizations, environments, and even our beliefs and values (Weinstein, 2005). In the field of management, technological advancements influence organizational behaviour, structures, and processes. The innovations in technology lead to changes in organizational norms, values, and structures as companies adapt to new ways of operating (Daft & Marcic, 2023).

Social Change Theory can help explain how the spread of digital communications and the integration of artificial intelligence is triggering changes in behavioral and cultural patterns around the use of handwriting. An understanding of how individuals and societies evolve in adopting new technologies can be explained through the lens of this theory. Education should be focused on the needs and experiences of the individual learner, and schools should serve as laboratories for democracy (Dewey, 2015).

Social Change Theory often includes concepts such as the Diffusion of Innovations, where the adoption of technology in society is explained through specific groups and the factors that influence the acceptance of innovation. Apart from that, the concepts of structural change and social values can also be applied to analyse how handwriting is changing han in an environment dominated by technology. Understanding through Social Change theory of how

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

6

technology changes. Changes affecting cognitive, emotional, and social aspects, can provide a robust framework to explain these dynamics in the context of handwriting.

Li Wei and Zu Hua (2021) stated that the application of handwriting in urban signposting, emphasizes the value of handwritten signs, and invites readers to reflect on the significance of handwriting. This study does not investigate the management of handwriting continuity. The study of handwriting, which has potential meaning and symbolic values as a sociolinguistic phenomenon, is decreasing in use. This decrease was due in part to the increasingly widespread use of video as an important source of information for students around the world. The use of handwriting is fading. Handwriting is increasingly losing its meaning as a means of education in society (Loghin et al, 2021). On the other side, learning to write is a challenging endeavor that calls for a convergence of linguistic, physical, and mental capabilities. Some children develop their talents more slowly than other children or are unable to develop them at all. This may have a significant impact on the academic success of these children as well as their sense of self-worth, personal aspirations, and social relationships (Andrade et al, 2020).

3 METHOD

This research aims to investigate the impact of technology on handwriting practices using a qualitative approach rooted in phenomenology (Creswell & Báez, 2021). Phenomenological paradigm research is a field within management, and psychology that focuses on describing the life experiences of participants in relation to a certain event (Harjanto et al, 2023). The research design is structured to comprehensively understand the cognitive, emotional, and social implications of these changes (Creswell & Poth, 2018). Held in Jakarta from September 2023 to December 2023. The study participants were allocated into two distinct exercise groups. The initial cohort consisted of a focus group deliberation, which was subsequently partitioned into three distinct cohorts: a cohort of educators, a cohort of learners, and a cohort of guardians. These data collection methods include student observations, as well as interviews conducted with two students, two lecturers, and two high school students. Participants in the study were divided into two activity groups. Data will be collected using triangulation to ensure the validity of the data. Data analysis will use a thematic approach to identify patterns and themes in interview transcripts and group discussions. The interviews will

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

7

explore participants' attitudes, emotions, and personal experiences regarding handwriting and digital communication.

Consistency and validity will be maintained through independent coding by several researchers. Group discussions will focus on the social impact of technology on handwriting and efforts to strike a balance between traditional and digital approaches.

A quasi-experimental study was conducted to assess the cognitive benefits of handwriting compared to digital typing (Denzin & Lincoln, 2018). Participants will be randomly assigned to a handwritten or digital note-taking condition, followed by a cognitive assessment. When it comes to ethical considerations, research ethics approval will be sought from the relevant institutional review boards.

The significance of this research lies in its contribution to understanding the role of handwriting in the digital era, providing input for educational policy, and encouraging a balanced approach to handwriting and digital communication. In doing so, it is hoped that this research will open the door to further reflection on how technology has influenced and will continue to influence handwriting practice.

4 DISCUSSION

Artificial intelligence (AI) has become a powerful driver of social change, revolutionizing productivity, accessibility, and innovation. Simply write the prompt and the AI will generate the output accordingly. Just like a data scientist, AI's impact goes far beyond industry, making a profound difference in social inclusion and accessibility. AI's influence extends beyond the realm of industry, profoundly impacting social inclusion and accessibility. Through innovative algorithms and automation, AI has ushered in a new era of empowerment for individuals with disabilities. Speech recognition technologies, text-to-speech functionalities, and other AI-driven accessibility features have dismantled barriers, enabling those with visual impairments or physical disabilities to engage with digital devices and navigate the digital landscape with newfound independence and efficacy. This represents a monumental stride towards inclusivity, as AI democratizes access to technology and empowers marginalized communities to participate more fully in society.

AI catalyzes social change, transcending conventional boundaries to forge a more inclusive, productive, and innovative future. As society continues to grapple with pressing challenges, from accessibility barriers to productivity constraints, AI stands poised to offer

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

8

transformative solutions, paving the way for a more equitable and prosperous world. Social planners are actively involved in the daily process of developing objectives for the distribution of resources aimed at transforming social interactions, organizations, settings, and even our ideas and values (Weinstein, 2005).

This data-driven approach increases efficiency, accuracy, and the ability to make informed choices in business, healthcare, finance, and other sectors. AI increases user satisfaction by providing more relevant and engaging experiences. AI has revolutionized the healthcare industry, aiding in disease diagnosis, drug development, and personalized treatment plans. AI algorithms can analyze medical images, detect patterns in patient data, and help researchers discover new therapies and treatment approaches. AI support is bringing advances in virtual assistants, chatbots, and language translation services, making communication across languages and cultures more accessible and efficient. Humans possess a distinctive ability to create symbolic representations that are comprehensible to others. It is widely acknowledged that humans have engaged in writing since the emergence of cave paintings.

Symbols are employed as a means of storing and representing information, similar to their current usage. Communication is the act of transmitting and receiving signals within a specific environment, which might be influenced by external factors, have consequences (including ethical considerations), and enable the exchange of feedback (DeVito, 2019).

Communication across languages and cultures and striking a balance between taking advantage of advances in AI and preserving cognitive and personal aspects as advantages of conventional handwriting. In a world increasingly dominated by instant digital communication, handwritten notes have a unique emotional connection that digital messages often lack. Handwritten letters, cards, and notes carry the essence of the sender's personality and efforts, conveying a sense of care and concern. Tangible handwritten messages make them more cherished and sentimental, strengthening bonds between individuals and fostering a deeper sense of connectedness.

Handwriting requires a higher level of cognitive involvement, resulting in a process s deeper and more nuanced thinking (Limpo & Graham, 2020).

In a world increasingly linked to technology, writing manually is a testament to the unique capabilities of the human mind. There exists a synergistic relationship between digital typing and handwriting. Despite the ongoing transformation of different elements of our life by artificial intelligence (AI), writing still remains an excellent method for cultivating independent

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

9

thinking. Handwriting fosters a direct connection between an individual's mind and the physical world, fostering creativity, critical thinking, and personal expression without the help of AI.

Research has shown that handwriting offers unique cognitive benefits that differ from typing on a keyboard. The process of manual writing involves the activation of many brain areas, hence enhancing memory retention, critical thinking abilities, and creative thinking. The practice of handwriting in educational settings has been linked to improved learning outcomes and a deeper understanding of the subject matter. By preserving handwriting practices, we can ensure that future generations continue to reap these cognitive benefits (Cilia et al., 2021).

The presence of AI has brought major changes in everyday life, making life and living easier and more efficient. AI has made it possible to create scripts more efficiently. AI with advanced algorithms, can generate text at incredible speed, saving time and human effort. Machine learning technology has given AI the ability to create stunning images. The image will offer a point of to the audience (Nugroro & Harjanto, 2022). From digital art to illustration, AI helps bring imagination to life with compelling results. In this information age, appropriate recommendations are invaluable. AI analyses our preferences from the collected data, providing more accurate and relevant, prosperous suggestions in various fields, from entertainment to product selection. Advances in AI, especially in the field of machine learning and algorithms, have made AI capable of carrying out various prompts without requiring human critical thinking. While this provides efficiencies, it also comes with some consequences of dependence on the use of AI. Increased reliance on technology, such as on wayfinding applications, can have an impact on the way individuals interact with their environment. Users can gradually rely on this technology as it provides fast, accurate and up-to-date information. Over time, this dependency can fade a person's ability to plan and navigate independently. As technological capabilities continue to expand, some individuals may begin to trust algorithms and data presented by applications more than they do in their personal knowledge or experience. This can reduce confidence in making independent decisions.

Increased reliance on primarily AI-based technology, and easy access to information, may have consequences for individuals' approaches to learning and critical thinking. AI provides instant access to a wide range of knowledge. Individuals can quickly get information without needing to memorize or study it in depth. Understanding and knowledge are considered to be the result of a quick search rather than a deep learning experience. Individuals feel less need to engage in more traditional learning processes at school. This can reduce motivation to bother remembering or understanding concepts thoroughly.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

10

Increased reliance on technology can result in a lack of critical thinking engagement. Individuals may tend to accept information presented by AI algorithms without critically evaluating its truth or relevance.

The use of AI often produces tempting instant results. Dependence on quick results can poison habits, making users less patient to engage in deeper thought processes. With too strong a focus on the result, users can lose appreciation of the creation process. The critical thinking underlying steps and decisions is often overlooked, reducing our understanding of how things happen. Reliance on AI to provide solutions without engaging in critical thinking is resulting in a generation of users who may feel less capable of analysing information, connecting ideas, and designing complex solutions. Critical thinking and creativity are often interrelated. Excessive use of AI can hinder the development of creativity, as the courage to explore ideas or involve oneself in the experimental process may be reduced. The importance of ethics in decision-making is often marginalized when instant results become the main focus. Decisions made without ethical consideration can have detrimental long-term consequences.

Human thinking has complex dimensions, including emotional and ethical aspects. The tendency is just that relying on AI could widen the gap between human and machine thinking, with the potential to lose human sensitivity and values.

In this context, although AI brings convenience in responding to prompts, it is important to maintain critical thinking in evaluating results and understand that machines, no matter how powerful, cannot completely replace human intelligence that involves critical and contextual thinking. As a user of this technology, awareness of the potential limitations and ethical impacts of AI in processing prompts is key to optimizing its benefits while maintaining the integrity and quality of the results produced.

As the world undergoes rapid technological transformation, the impact of digital advances on traditional practices, especially handwriting, has become a topic of increasing interest. This theoretical review investigates the development of handwriting in the digital age, exploring the cognitive, emotional, and social implications associated with increasing reliance on technology.

Handwriting has long been associated with unique cognitive benefits, engaging multiple brain regions and improving memory retention, critical thinking, and creativity. Research shows that the physical act of writing by hand encourages deeper and more nuanced thought processes compared to typing digitally. This cognitive engagement, often referred to as

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

11

"cognitive dance," is thought to contribute to a richer understanding of subject matter and improved learning outcomes.

Handwritten communications have a unique emotional connection that digital messages often lack. Handwritten letters, notes, and cards convey the personality of the sender, fostering a sense of care and concern. The tangibility of handwritten messages strengthens interpersonal bonds, creating deeper connections between individuals. The cultural significance of handwriting, as highlighted by the National Handwriting Association, underscores the uniquely human aspect of creating symbols for others to understand.

The proliferation of digital communications and artificial intelligence has led to a shift in societal norms, challenging the relevance and value of handwriting. The convenience and efficiency offered by digital tools, including AI-powered applications, have reduced the need for manual writing. This raises questions about the potential consequences on cognitive processes, emotional relationships, and societal practices traditionally associated with handwriting.

Efforts to preserve and promote handwriting in the face of technological advances require a balance between traditional and digital methods. Integrating digital tools with conventional handwriting practices can create new opportunities for communication and creativity. Educational institutions are increasingly realizing the cognitive benefits of handwriting and are incorporating handwriting exercises into their curricula along with digital technology. Cultural change in education occurs through a process of inquiry and reflection. He emphasized the importance of experiential learning, where students engage in hands-on activities and problem-solving tasks that arerelevant to their lives and interests. Through this process, students develop critical thinking skills, creativity, and a deeper understanding of the world around them (Dewey, 2015)

This review recognizes the growing role of handwriting in certain sectors, such as education, health and the creative industries. Although technology has simplified the process in many fields, there is still recognition of the continued relevance of handwriting, especially in contexts that value personal touch, authenticity and unique individual expression.

Artificial intelligence plays a dual role in the context of handwriting. On the one hand, AI contributes to the automation of text production, handwriting recognition and content development. On the other hand, AI-powered handwriting recognition tools mimic human writing styles, emphasizing the collaborative nature of AI and human creativity. The potential for AI to preserve or improve handwriting practices is an area that requires further exploration.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

12

Managing the integration digital tools with traditional handwriting practices can create new opportunities for communication and creativity. Digital styluses and note-taking apps allow users to experience the convenience of digital technology while maintaining the natural flow of handwriting. Schools and educational institutions can strike a balance by combining digital and analog methods, ensuring students develop important handwriting skills as well as technological proficiency. The similar phenomena within the context of organizational management and leadership provide insights into how organizations navigate and adapt to technological change, and the broader societal implications of these transformations. They might examine how the introduction of new communication technologies affects the way employees collaborate and communicate within an organization. They could explore how the adoption of digital tools and platforms influences decision-making processes, organizational hierarchies, and the distribution of power within a company (Daft & Marcic, 2023).

Despite the challenges presented by digital communication, there are ongoing endeavors to save and advance traditional handwriting. Educational institutions strive to strike a balance between the use of digital and analogue techniques as they recognize the cognitive benefits that handwriting can provide. To ensure that students acquire the necessary handwriting skills, a number of schools include handwriting and cursive writing practice as part of their educational programs.

Various initiatives and movements The aim is to preserve the art of handwriting amidst rapid technological advances. Handwriting workshops, calligraphy classes, and letter-writing campaigns are growing in popularity, reflecting a collective desire to uphold traditions that emphasize order, neatness, patience, and eye-sight coordination skills and motor activity.

Getting children used to writing by hand has several benefits that can be gained by encouraging them to write by hand. The benefits in question include improving memory and eliminating stress. Increase the amount of creativity to produce fresh writing ideas. Maintains focus, making it easier to understand what is being studied. Improve hand-eye coordination, as each letter requires unique movements.

Writing by hand can stimulate the same parts of the brain as meditation. In fact, evidence shows that writing can reduce stress and therefore benefit physical and mental health. The creation of signs is fundamental for humans. Symbolic depictions for others to understand are uniquely human, and it is known that humans have been writing since the discovery of cave paintings. However, the formation of symbols from any writing system is not as natural as walking or jumping, for example. We cannot write without instruction, a fact that is sometimes

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

13

overlooked. Each writing system has optimal movement patterns for symbol formation, and the spatial relationships between n symbols and the rules of direction on a page must be taught across generations.

The prevalence of digital technology in contemporary society has resulted in the widespread use of digital learning methods. These practices cover everything from the early development of technology to the transformation of communication and the impact of these changes on cognitive and social processes. Additionally, this practice includes the impact of changes to the technique itself. The widespread availability of digital information has resulted in the rise of cultural practices influenced by digital technology.

The emergence of digital technology has revolutionized various aspects of life, including education. Digital tools and platforms are revolutionizing traditional teaching and learning approaches. Digital typing, characterized by its efficiency and accessibility, has become the main mode of communication and documentation in educational institutions aimed at improving the quality of education in line with Sustainability Development Goals (SDG's) no. 4.

Inclusivity is a fundamental element of SDG number 4. The utilization of digital typing technology significantly contributes to enhancing the accessibility of education for a wide range of individuals. Individuals with disabilities can effectively engage with educational information by utilizing assistive technology, such as screen readers and speech-to-text software, facilitated by digital platforms and resources. Additionally, digital typing facilitates real-time collaboration and communication, eliminating geographic barriers and fostering global connections between students and educators.

Despite the advances in digital technology, handwriting remains an important component in education, as it offers unique cognitive benefits that digital typing cannot replicate. Research shows that the act of handwriting stimulates neural activity in a way that typing does not, thereby improving learning retention and comprehension. Additionally, handwriting fosters creativity and critical thinking, encouraging students to develop their unique voices and expressions. In addition, handwriting is closely linked to cultural heritage, thus playing an important role in preserving linguistic diversity and historical traditions.

Rather than viewing digital typing and handwriting as competing entities, educators should recognize their complementarity and utilize both methods to foster a holistic learning experience. By integrating digital tools and handwriting practice into the curriculum, educators can cater to a variety of learning styles and preferences, fostering a more inclusive and engaging

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

14

educational environment. Additionally, combining elements of digital literacy with traditional literacy will empower students to navigate the digital landscape responsibly and ethically.

In the dynamic educational landscape, the debate regarding digital typing versus handwriting often centers on their perceived strengths and weaknesses. However, different perspectives reveal that these two methods of expression do not exist independently, but rather complement each other. By understanding and exploiting the synergy between the accuracy and speed of digital typing and the cognitive benefits of handwriting and cultural preservation, educators has the capacity to make substantial contributions towards the achievement of Sustainable Development Goals (SDGs) 4, specifically focusing on the attainment of Quality Education.

Digital typing has become ubiquitous in educational settings due to its precision and efficiency. With the emergence of digital devices and platforms, students can easily access vast repositories of knowledge, communicate with peers and educators, and produce high-quality written work. The accuracy and speed provided by digital typing simplifies administrative tasks, facilitates collaboration, and enables rapid dissemination of information, thereby increasing the efficiency of the overall learning process.

While digital typing excels in speed and accuracy, handwriting offers unique cognitive benefits that encourage deeper learning and understanding. Research shows that the act of handwriting engages many parts of the brain, including those responsible for memory retention and language processing. Through the physical act of forming letters on paper, students develop hand-eye coordination, best motor skills, and spatial awareness. Additionally, handwriting is deeply rooted in cultural heritage, serving as a tangible link to diverse languages and historical traditions.

Rather than viewing digital typing and handwriting as competing methodologies, educators should embrace the symbiotic relationship of the two to foster a holistic learning experience.

The debate between digital typing and handwriting is more than just technology preferences; This intersects with broader educational goals, especially SDG's No. 4. By embracing digital and analogue literacy, educators can harness the power of each method to promote inclusive, equitable, and quality education for all. Ultimately, the harmonious integration of digital technology and traditional practices holds the key to achieving sustainable development in education and other fields.

By integrating both methods into the curriculum, educators can take advantage of the strengths of each approach while reducing their limitations. For example, digital typing can be

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

15

used for tasks that require speed and efficiency, such as taking notes and compiling written assignments. On the other hand, handwriting practice can improve critical thinking, creativity, and cultural appreciation, thereby enriching the learning process.

The integration of digital typing and handwriting aligns with the objectives of universal and fair opportunity to get a high-quality education is the focus of Sustainable Development Goal 4. By leveraging digital technology and traditional practices, educators can cater to diverse learning styles and foster an inclusive learning environment. Additionally, incorporating handwriting practice into the curriculum will encourage cultural preservation and appreciation, contributing to the achievement of SDG's target no. 4 is related to the promotion of global citizenship and cultural understanding (Figure 1).

Figure 1

Integrating of Artificial Intelligence, Digital Typing, and Handwriting
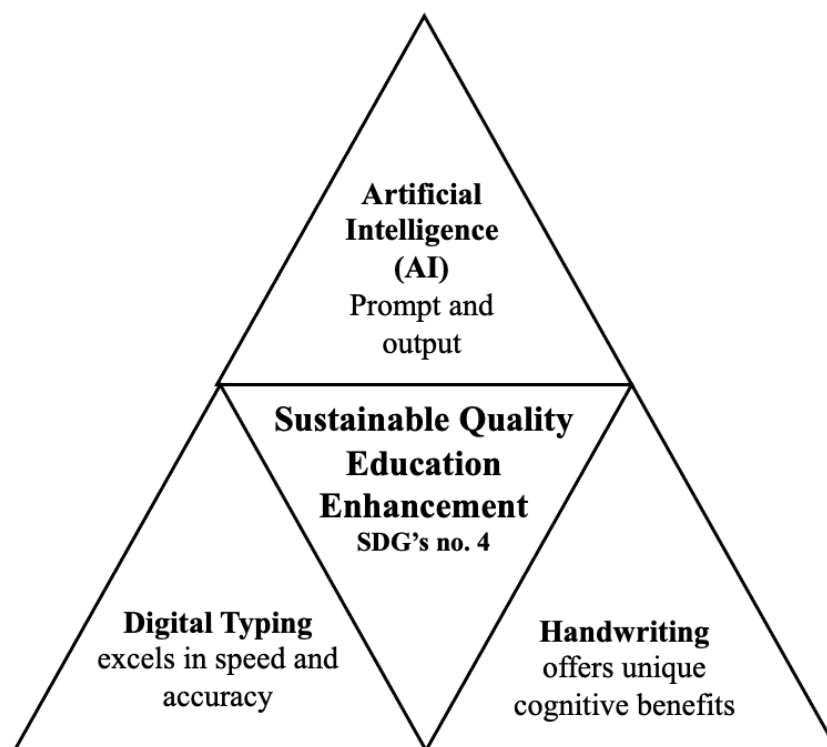
The collaboration between digital typing and handwriting demonstrates the principle of diversity in educational practice. By recognizing and exploiting the complementary nature of these methods, educators can cultivate well-rounded individuals equipped with the cognitive skills, cultural awareness, and digital literacy necessary to thrive in the 21st century. Ultimately, harmonious integration between digital and analog modalities not only enriches the educational

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

16

experience but also advances the overarching goal of ensuring quality education for all as outlined in SDG No. 4.

5 CONCLUSION

Managing the integration of artificial intelligence (AI), digital typing, and handwriting holds promise for enhancing the quality of education by leveraging their respective strengths. AI has significantly transformed various aspects of life, including education, by improving efficiency, productivity, and accessibility. It has facilitated increased productivity, provided technological accessibility for individuals with disabilities, and revolutionized healthcare while easing communication across languages and cultures. However, the use of AI also raises concerns such as increased dependence on technology and decreased involvement in critical thinking.

By integrating digital technologies like AI and digital typing with traditional practices such as handwriting, educators can create a balanced approach to learning that addresses these concerns while maximizing the benefits of each component. Handwriting, for instance, fosters cognitive skills development, critical thinking, and appreciation for the creation process. Combining handwriting with AI and digital typing allows for holistic learning experiences that cater to different learning styles and preferences, promoting deeper engagement and understanding. Overall, the synergy between AI, digital typing, and handwriting enhances the quality of education by offering a well-rounded approach that integrates technology with traditional practices

CONTRIBUTION

Artificial intelligence has made significant contributions in improving the efficiency, productivity and accessibility of technology. AI has also revolutionized the healthcare industry, communication across languages and cultures, and provided the ability to produce digital content quickly and accurately. Integration between digital technologies and traditional practices, such as handwriting, opens up new opportunities for holistic learning and cognitive skills development.

Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

17

LIMITATIONS

Although AI has many benefits, excessive use can cause p decreased engagement in critical thinking, reliance on instant results, and potential loss of human values such as emotions and ethics. In addition, relying too much on technology can reduce confidence in making decisions independently.

FURTHER RESEARCH

Additional investigation is required to delve further how to optimize the benefits of AI while maintaining the integrity and quality of the results produced. The study of how to integrate digital tools with traditional practices, such as handwriting, to create holistic and inclusive learning experiences is also important. In addition, research on the long-term impact of reliance on AI technology on human cognitive abilities and critical thinking also needs to be considered.

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18

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Intern. Journal of Profess. Bus. Review. | Miami, v. 9 | n. 4 | p. 01-19 | e04534 | 2024

19