SYSTEMATIC LITERATUR REVIEW (SLR)

THE ROLE OF LITERACY IN THE DIGITAL ERA IN IMPROVING CRITICALTHINKING ABILITIES IN SOCIETY

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ABSTRACT

The industrial revolution has experienced rapid development from the first era until now which has entered the fourth era. During this period, science and technology developed rapidly and became increasingly sophisticated. To anticipate the rapid pace of development, it is important for Indonesian people to have a strong understanding of digital literacy. Digital literacy has a vital role as a means of improving skills in understanding and using information that is widely available and can be accessed anytime and anywhere via the internet network. In addition to understanding traditional skills such as reading and writing, it is important for all individuals to immediately understand the significance of digital literacy, such as information literacy, media literacy, and information and communication technology literacy. Critical thinking skills have an important role in the process of making decisions and beliefs that are based on rational considerations, not just drawing random conclusions, but leading to the best conclusions. Various studies that have been carried out have clearly revealed that having the ability to think critically not only provides benefits during the learning process, but is also a very valuable provision for facing future challenges in order to achieve better success. Apart from that, critical thinking skills are involved in various mental activities which include making the right decisions, the ability to solve complex problems, the ability to analyze assumptions carefully, and the ability to carry out quality and trustworthy scientific research.

Keyword : *Digital Literacy; Critical thinking.*

INTRODUCTION

The Industrial Revolution, a major change that occurred throughout the world between approximately 1750 and 1850, marked a period of transformation marked by advances in sectors such as mining, agriculture, manufacturing, transportation, and technology. Referred to as the period of the industrial revolution because of its far-reaching impact on the social structure, economy, and cultural landscape globally, this momentous era changed the way societies operated and interacted with each other. The industrial revolution not only encouraged rapid technological innovation but also gave rise to new ways of production, leading to the emergence of urban centers and industrial growth. Through its far-reaching influence, the revolution paved the way for significant changes in labor practices, trade patterns, and social norms, and initiated a new chapter in human history marked by unprecedented progress and change in various fields. The Industrial Revolution fundamentally changed the fabric of society and paved the way for modern advances that continue to shape our world today (Muliani 2023).

Coverage data about the birth of the industrial revolution starts with the industrial revolution 1.0 in the 18th century, with the invention of the steam engine which minimized the process of producing goods, increasing efficiency and effectiveness. Then, the industrial revolution 2.0 emerged in the 20th century, starting with the use of electric power. Revolution 3.0, as the third series, features machines capable of automatic movement and thinking, such as computers and robots. Currently, industrial revolution 4.0 is underway, characterized by the combination of automation and cyber technology. This revolution is a project initiated by the German government, spawning advanced technology that prioritizes factory digitalization. This development leads to a more perfect and automated industrial transformation, showing the importance of technology integration to advance business continuity in the digital era (Muliani 2023).

We are currently in the era of industrial revolution 4.0 which is marked by the development of science and technology which has had many impacts on various fields and digital technology thinking in the world. Therefore, humans are required to have and master the ability to not be left behind and be able to adapt (adapt) to increasingly rapid technological developments. (Darmawan 2023)

In facing this era of industrial revolution, new literacy is also needed to accompany the old literacy which is currently used as the basis of people's lives. Literacy plays a very important role and requires great attention from every individual because this correlates with their skills in communication, critical thinking, collaboration, creativity and innovation. These aspects are the support that every individual must have in navigating a more complex life in the future. This increased emphasis on literacy stems from the recognition that the demands of modern society increasingly require individuals to have a variety of abilities in order to develop and contribute effectively. Therefore, cultivating a new literacy mindset is important to equip individuals with the competencies that are essential for success in the ever-evolving digital era landscape. It is through honing literacy skills that individuals can properly face the challenges and opportunities that lie ahead, enabling them to adapt, innovate and lead in a world that prioritizes knowledge and expertise (Muliani 2023).

In this era, information has penetrated in all directions by expanding the horizons of information that were previously limited by time and space. The current digital era has made it easy to access information in real-time, providing actual and factual data that can be relied upon. The digitalization of information has also enabled flexible access, wherever and whenever needed. All of this progress is due to the rapid and rapid growth rate of technology over time. In the past, access to information was very limited, but now with advances in technology, accurate and up-to-date information can be enjoyed at our fingertips. This development helps facilitate various aspects of life, from searching for information for research to entertainment in the midst of our busy daily lives. Thus, understanding the importance

of adapting to technological developments will provide a great advantage in following the latest information easily and efficiently. Pi-liang (2012) explains that digitalization and computing have created a new virtual space, known as cyberspace, where interaction and communication can occur easily for anyone, anywhere and at any time. Students, as the main subject in the world of education, really need access to this virtual space. With the existence of this digital space, it will be more helpful for them to gain knowledge and improve their skills. Virtual spaces present opportunities for students to study independently and collaborate with fellow students from all over the world without geographic boundaries. Through digital spaces, they can access a wider range of educational resources and support more effective learning. Thus, it is important for educational institutions to expand student access to this virtual space so that students can develop their potential optimally in the current digital era. This is in line with research conducted by Utomo and Uki (2017) and Utomo et al (2021). In an effort to improve the quality of learning, information and communication technology (ICT) is the main key applied in developing interactive learning media. This approach also includes the preparation of e-books as part of digitalization in the learning process. In this way, students will be able to easily access various learning materials via digital platforms. This makes it easy for them to study anywhere and anytime, without being constrained by time and space. Through the use of this technology, ICT-based interactives enable learning to be more interesting and intensive. The main goal is to provide maximum accessibility for students so that they can acquire knowledge efficiently and effectively. In this way, the learning process is no longer limited to a classical environment, but opens the door to more dynamic, modern and affordable learning for all parties involved in the world of education (Muliani 2023).

Literacy

According to Sulzby (1986) in (Sevima, 2019), Literacy is a very essential skill which is not only limited to language aspects, but also includes an individual's ability to communicate effectively. This literacy process involves a number of activities ranging from reading, speaking, listening, to writing, all of which are aimed at facilitating interaction and exchange of information between individuals. With literacy, a person can be more skilled in expressing their thoughts and ideas, so they are able to contribute positively in solving problems, analyzing various information, and understanding the content provided better. Thus, literacy has a central role in human life, both in the individual context and also in the sustainability of society as a whole. This can provide broad benefits, from improving the quality of life to opening up opportunities to further develop and innovate in various aspects of life (Sentoso 2021).

However, amidst these conditions, there are still a number of people who tend to underestimate the importance of literacy and have little interest in reading, especially seen in Indonesia. Data revealed by The World's Most Literate Nations places Indonesia in a less than encouraging position, namely ranking 60th out of a total of 61 countries in terms of literacy ability. This raises concerns about the level of public awareness of the importance of reading habits and fostering a high interest in literacy at various ages. Joint efforts are needed from various parties, such as the government, educational institutions, and society itself, to increase awareness of the importance of literacy and foster a better reading culture in Indonesia, so that more individuals can benefit from the world of literacy and are able to contribute more. meaningful in the progress of the nation. In fact, according to UNESCO, Indonesia is ranked as the second lowest country for interest in reading (Maeludin, 2021). Judging from the social reality currently taking place in the daily lives of Indonesian people, it can be concluded that literacy in the digital era of the nation's next generation is experiencing a significant decline. The current generation tends to be more focused on activities in cyberspace which often have no real substance, for

example by spending their free time accessing social media platforms such as Instagram, TikTok and various other similar applications. Interest in reading is increasingly declining because the current generation is too attached to the hustle and bustle and excitement offered by the virtual world. This can be a common concern that literacy and interest in reading are two things that need more attention to ensure that Indonesian youth remain connected to deeper knowledge and do not lose their critical abilities due to addiction to digital content (Sentoso 2021).

In this era, our lives are very connected to the internet and social media. Both have become the main instruments in disseminating information, carrying out daily life, and carrying out promotions. Therefore, it is very important for the current generation to increase digital literacy. With good digital literacy, a person can be more skilled in evaluating various information and communication technologies in an intelligent, critical, wise and appropriate way. The hope is that they will be able to distinguish information that is accurate and useful for dissemination from information that may be questionable. Misunderstanding or disseminating incorrect information can result in various undesirable consequences. Therefore, the ability to sort the right information is an important skill for every individual in this digital information era (Lifia Yola Putri Febrianti and Oviolanda Irianto, 2017). It is easy for all irresponsible elements to spread incorrect information in this digital era, the consequences of which can trigger divisions in the nation, the emergence of provocations which ultimately lead to riots and result in great damage, both in the form of destructive demonstrations. facilities and the morals of the nation's children are tarnished as a result of a lack of digital literacy which makes information disseminators and recipients not wise, careful and critical in disseminating and receiving information that is not necessarily true, placing society at a high risk of social chaos which has the potential to trigger conflict. detrimental both economically and socially, because the impact of widespread manipulation of information is a serious threat to peace and unity in a country, so that joint efforts are needed to provide a deep understanding of digital literacy and the ability to filter information in order to maintain collective security and safety. (Zuhri, 1967).

In today's rapid development, scientific and technological progress is progressing at an unprecedented speed. This rapid growth creates intense competition, requiring individuals to have the ability to quickly grasp and master various fields of science and technology. Without this ability, individuals risk being left behind and losing out on competition in various sectors. It is important for each individual to continue to learn and adapt in order to keep up with developments in knowledge and technology. A strong foundation in literacy, which includes reading and verbal communication skills, is critical to understanding and navigating the complex fields of science and technology. By honing high-level literacy skills, individuals can push scientific and technological progress to higher levels, driving innovation and progress towards new horizons (Oktariani 2020).

According to Wells (in Heryati, et al, 2010) in the context of literacy, there are four levels known, each of which has its own characteristics. First, performative literacy, which is the basic ability to read and write. Second, functional literacy, where someone applies language skills in everyday life situations such as reading instructions or filling out forms. Then, informational literacy, which encourages someone to be able to access wider knowledge. And the last one is epistemic literacy, which involves the individual's capacity to transform the knowledge they have. Becoming skilled in literacy not only provides a personal advantage, but also brings great benefits in social interactions and survival. Literacy is not only about technical abilities, but also about how that knowledge and skills can be applied effectively in everyday life, thereby enabling humans to participate fully and beneficially in society (Oktariani 2020).

This can make a significant contribution to the formation of individuals who have an optimal level of literacy which is really needed by the progress of the Indonesian nation. This is the main key so that Indonesia is able to improve its conditions and be able to compete globally, and be able to live on an equal footing with other more advanced countries. Awareness of the importance of literacy will also play an important role in helping someone overcome various challenges faced in everyday life. By having comprehensive literacy skills, a person will be able to become an agent of change who can advance this nation in a better direction. How individuals can contribute to national development is also influenced by their level of literacy, thus encouraging the importance of investing in literacy development from primary education level to adult life. Literacy does not only include the ability to read and write, but also reflects an understanding of modern technology, critical analysis of political issues, and sensitivity to the environment and sustainability. Thus, efforts to increase literacy in society will have a positive impact on Indonesia's competitiveness and sustainability amidst global competition (Oktariani 2020).

This was also mentioned in an article published in the Kompas newspaper in the June 1 2016 edition. The article emphasized that the ability to read and write is an inseparable strategic key for a nation that wants to progress. Literacy skills do have a very important role in determining a person's success. This is where it is important to have good literacy skills, because this will enrich a person's understanding of various information, whether presented orally or in writing. In various aspects of life, mastery of literacy has a major role in supporting the growth of a person's competence. For example, good literacy skills can help someone hone their analytical skills and assist in the process of making important decisions. Therefore, it is important for every individual to be able to obtain adequate literacy so that they can continue to develop themselves and achieve success in various aspects of life (Oktariani 2020).

In connection with this, a capable individual needs to have literacy competence. This means that a person's literacy skills (reading and writing) must be prioritized over oral skills (listening and speaking). Being literate involves not only the ability to decode written texts but also the ability to understand and analyze the various forms of information that one encounters on a daily basis. Furthermore, literacy is more than just reading and writing; it includes critical thinking, problem-solving skills, and the capacity to express oneself coherently. Therefore, individuals who prioritize improving their literacy skills tend to develop a deeper understanding of the world around them, engage more effectively with diverse perspectives, and communicate their ideas more convincingly. Ultimately, literacy empowers individuals to navigate the complexities of modern society, access knowledge from various sources, and actively participate in intellectual discussions and societal dialogue (Oktariani 2020).

Hasan (Farihatin, 2013) It is important to emphasize that basic literacy skills play an important role in a person's academic success. Because literacy skills are the main key; this forms a solid educational foundation for future generations. Proficiency in reading, writing and comprehension has a very important meaning, because it not only helps academic achievement but also becomes the foundation for one's personal and professional development. This literacy ability not only influences a person's academic success, but also plays a role in forming a more advanced character and mindset. Therefore, it is important for the Indonesian people to pay special attention to developing literacy from an early age to ensure that every individual has adequate provisions to face future challenges. Currently, the literacy problem is not just a local issue, but has also become a global challenge that must be addressed seriously. In this era of globalization, literacy is the main foundation for the progress of a

nation, so that strong literacy skills will strengthen the competitiveness of the Indonesian nation on the world stage. Therefore, the government, educational institutions and society as a whole need to work together to increase literacy at all levels of society in order to build a generation that is superior and able to compete globally (Oktariani 2020).

This reality is reflected in the comparison of the Human Development Index (HDI), which is an indicator used to measure the level of development of a country based on factors such as life expectancy, education level and living standards. By comparing the HDI, it can be concluded that this indicator plays an important role in explaining the extent to which a country can achieve progress and prosperity for its population. Through research conducted, it can also be seen that HDI is often a reference for development policies taken by the government to improve the quality of life of society as a whole. Thus, it can be concluded that the HDI provides a clear picture of the extent to which a country has succeeded in improving the quality of life and education level of its people, so that it becomes an important benchmark in evaluating a country's development. Tjalla (2011) Several international studies have been conducted to describe the condition of Indonesia in terms of language literacy. One of them is research conducted by the Program for International Students Assessment (PISA). PISA evaluated the literacy abilities of individuals from various countries respectively in 2003, 2006, 2009, and 2012. The focus of this research was on literacy abilities in mathematics, science, and language. In 2003, Indonesia was ranked 39th out of 40 countries in terms of individual reading literacy achievement. However, its position declined significantly in 2006, ranking 48th out of 56 countries investigated. This downward trend continued until 2009, when Indonesia fell to 57th position out of 65 countries involved in this research. This change shows that there are challenges that must be overcome in increasing language literacy in Indonesia. Finally, in 2012, Indonesian language literacy achievement fell to 64th place out of 65 countries included in the assessment (Oktariani 2020).

Digital literacy

In the changing era of globalization, encouragement is needed to follow the nation's culture, prepare the nation's next generation, and meet the demands of the times. Various forms of educational activities are carried out to prepare conditions for future generations of a competitive nation. Literacy is a form of activity that can later become a provision for the nation's generation to face the demands of the times now or in the future (Suryanti & Ikawati, 2020).

Digital literacy is a derivative of the definitions of 'literacy' and 'digital'. Literacy here is defined as the ability to read and write. Meanwhile, digital means a reading and writing format that is on a computer, laptop or other technological device. In full, the meaning of digital literacy is the ability to read and write which can be done by operating a technological tool in digital format (Irhandayaningsih, 2020).

Meanwhile, another opinion is that digital literacy is the knowledge and skills to apply digital media, communication tools or networks in finding, evaluating, using, creating information and utilizing it in a healthy, wise, intelligent, careful, precise and law-abiding manner in order to foster communication and interaction. in everyday life. (Novitasari 2022)

Digital literacy can also be interpreted as an individual's ability to apply functional skills on digital devices so that he can find and select information, think critically, be creative, collaborate with other people, communicate effectively, and remain aware of electronic security and the developing socio-cultural context (Payton & Hague, 2010). In its development, digital literacy is defined as the

practice of communicating, associating, thinking and becoming connected with digital media (Jones & Hafner, 2021). Digital literacy is of course also influenced by several factors including; a) use of online media, b) academic grades, c) role of parents/family, and d) reading intensity (Nai Cheng, 2016).

Digital literacy is currently a necessity for the realization of educational operations (Sumiati & Wijonarko, 2020). The role of digital literacy can enable teachers and students to communicate effectively even though they are not face to face. Furthermore, building digital literacy which includes information literacy and computer technology literacy, is aimed at improving the quality of human resources who have competitive capabilities in the 21st century digital literacy.

Gilster (2012) stated that digital literacy is the ability to use technology and information from digital devices effectively and efficiently in various contexts such as academics, careers and everyday life. Gilster's opinion seems to simplify actual digital media which consists of various forms of information at once, such as sound, writing and images.

Therefore, Eshet (2002) emphasizes that digital literacy should be more than just the ability to use various digital resources effectively. Digital literacy is also a form of thinking pattern of digital users. Bawden (2001) offers a new understanding of digital literacy that is rooted in computer literacy and information literacy. Computer literacy developed in the 1980s when microcomputers were increasingly used not only in the business environment but also in society. Meanwhile, information literacy spread widely in the 1990s when information became easier to organize, access, and disseminate through social networking information technology.

Critical thinking

Critical thinking skills, which involve the ability to analyze information objectively and draw logical conclusions, are a skill that cannot be underestimated. In all aspects of life, whether in academic settings, the world of work, or personal relationships, critical thinking plays an important role in helping individuals make good decisions and solve problems effectively. Therefore, building critical thinking skills from an early age is a valuable investment for the future. At school, teachers can help students develop these abilities through learning that encourages questioning, critical analysis, and evaluation. At home, parents also have an important role in cultivating critical thinking skills by encouraging open discussions and stimulating deep consideration. Meanwhile, in society, a culture of critical thinking can be encouraged through constructive communication tools, such as debates and discussion forums. Overall, honing critical thinking skills is not only a necessity, but also a promising step to create individuals who are able to face the complex challenges of modern life (Oktariani 2020).

In the learning process to achieve optimal results, active thinking is required which involves in-depth analysis and evaluation of the information received. Active thinking is the main key that helps students develop their cognitive abilities and understand lessons better. Critical thinking helps students question information, identify assumptions, and seek alternative solutions to solve problems. Thus, critical thinking is not just swallowing information without considering it, but rather about building strong arguments and looking at a concept from various points of view. When someone is able to think critically, it will be easier for them to solve complex problems and achieve deeper understanding. Therefore, awareness of the importance of critical thinking in the learning process helps students become more effective and independent learners in an era full of information and challenges (Oktariani 2020).

In the critical thinking process, individuals make deliberate efforts to involve themselves actively in processing information. They use a systematic approach that is structured and based on strong logical principles. Apart from that, this ability also involves observing from various different points of view in order to gain a comprehensive understanding. The main goal is to be able to evaluate the information received carefully, then make a decision whether the information is worth accepting, should be rejected, or even needs to be suspended for further study. Thus, critical thinking becomes the main key in exploring and explaining various concepts, and allows individuals to form more informational and rational views. Apart from that, critical thinking skills also play an important role in strengthening the learning process and careful decision making in various situations of daily life (Susanto, 2013).

Furthermore, according to Zubaidah in Susanto (2013) critical thinking is a skill that is not only possessed by individuals, but is also a complex process that involves the ability to analyze information carefully, identify the assumptions underlying a statement or situation, and be able to evaluate various arguments. or existing opinions. These skills can be learned and improved through practice and opportunities to continue developing rational and logical thinking patterns. In addition, critical thinking also involves the ability to consider other people's perspectives, respect different opinions, and accept criticism constructively.

Individuals who have critical thinking skills are not only able to think outside the box, but also have the courage to take risks when faced with challenges. They are accustomed to being firm in questioning the information they receive, while still being able to maintain sensitivity to other people's feelings. In addition, this skill makes them always ready to provide useful insight or direction, and can accept guidance and input well from other individuals. Critical thinking is not just a matter of analysis or problem solving, but also underlines the importance of ethical and moral values in every social interaction. In the critical thinking process, a person actively assesses the quality of the information and decisions he takes, using his skills appropriately and effectively according to the relevant context. In this case, critical thinking involves the use of reflective, independent, clear, and rational thought processes, which overall form the basis for positive and productive interactions in society (Oktariani 2020).

According to Halpen (in Achmad, 2007), critical thinking is a thinking process that involves empowering essential cognitive skills and strategies in setting goals to be achieved. This process occurs after the goal setting stage, where the individual carefully considers all the aspects involved, and directly refers to the target goal. In this context, critical thinking is considered a fundamental type of thinking that requires continuous development in order to overcome existing problems, formulate appropriate conclusions, and identify various possibilities that may arise in a situation. Basically, critical thinking skills are an important attribute that can help individuals face complex challenges, create innovative solutions, and improve their overall analytical abilities. By enriching critical thinking skills, a person can broaden their horizons of thinking, increase their critical power, and hone their intuition in making more informed decisions. Critical thinking, as an ability, requires consistent and diligent efforts from individuals to carry out in-depth analysis, develop sensitivity to truth, demonstrate perseverance, and demonstrate determination when facing complex challenges. In the context of people who have critical intelligence, it is important to show an inclusive attitude towards new opinions in order to broaden one's horizons. There are obstacles that can come in the way, but with strong determination and commitment, the development of critical thinking skills must still be prioritized as a positive step in improving cognitive abilities (Fisher, 2008).

By developing critical thinking skills, individuals are expected to be able to adopt a scientific approach in solving various problems they face. Critical thinking skills are very important in the problem analysis process because they allow someone to explore different points of view and develop effective solution strategies. In addition, individuals who are skilled in critical thinking do not stick to just one answer; they tend to engage in the process of exploring alternative options based on careful review and collected data. Thus, critical thinking involves in-depth analysis that leads individuals to essential questions about the reasons and methods for solving problems holistically. The critical thinking process not only demands logical thinking, but also hones evaluative skills that help individuals identify the best ways to overcome complex challenges more effectively (Oktariani 2020).

The characteristics of critical thinking according to Wade (in Setiawan, 2005) are further explained: when individuals are able to answer questions critically, formulate and identify problems carefully, and carry out in-depth investigations of the facts at hand. Apart from that, this ability also involves the ability to analyze the assumptions underlying judgments, as well as errors that may occur in the thinking process. Another integral part of critical thinking is the ability to avoid reasons that are too emotional and subjective, and reduce the unconsciousness of oversimplification. Individuals who are able to think critically are able to involve themselves in considering various interpretations, and have the ability to see a concept from different points of view. No less important, this ability also includes the willingness to tolerate the double meaning of an event or information received. The overall ability to think, especially critical and creative thinking, plays a very important role in an individual's educational process, because it can show clear indications of meaningful learning transfer (Oktariani 2020).
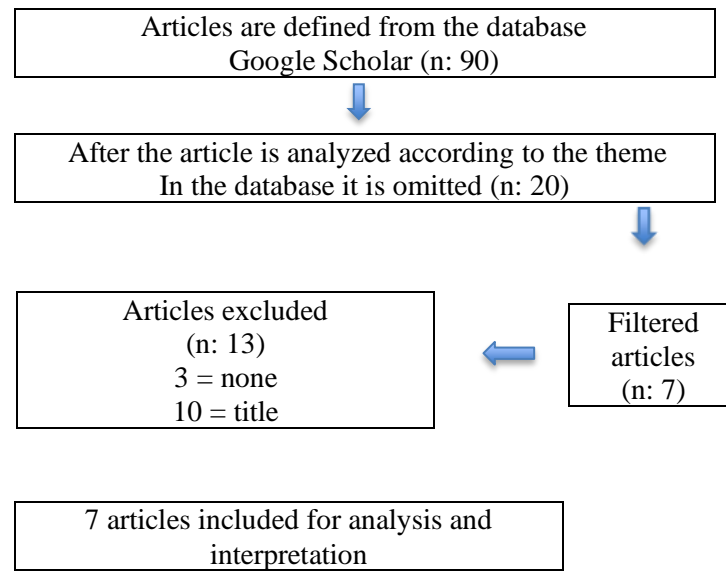
RESEARCH METHODS

This research is an exploration carried out in the field of literature using the Systematic Review (SR) method or more commonly known as Systematic Literature Review (SLR). This method is a systematic approach used to collect, critically evaluate, integrate, and compile results from various studies that are relevant to the research question or topic being researched. The research process begins with identifying articles related to the study topic that will be analyzed in detail. By conducting a systematic review, researchers can develop a well-structured framework for analyzing specific problems. Research questions are directed to be solved clearly based on previously established criteria. In addition, this research also refers to high-quality research studies that were previously conducted and are relevant to the research questions asked. The Systematic Literature Review (SLR) method was chosen as the main basis for preparing this research to ensure the completeness and quality of the information obtained.

First, the question is what is the role of literacy in the digital era.

Second, the data population in this study consists of journals that specifically highlight the importance of literacy for improving critical thinking skills. The process of searching for literature studies begins by accessing various data sources, mainly through the Google Scholar platform, using the Publish or Perish application. The selection of the keyword "literacy in the digital era for critical thinking" is focused on articles published between 2019 and 2024 to ensure the relevance and up-to-dateness of the information obtained.

After obtaining various articles, researchers found 90 articles related to the theme of the role of literacy in the digital era to improve people's critical thinking skills through a Google Scholar database

search. Furthermore, from this collection, 20 articles were selected for further investigation regarding the research topic. These selected articles were then studied carefully to align them with digital literacy material that can improve critical thinking skills in society according to the research focus. From this analysis, there were 7 articles deemed worthy of discussion, while the other 90 articles were deemed irrelevant for research. The seven articles that match the research theme will be presented in the discussion and conclusion section. A flow diagram of the exclusion and inclusion process for a Systematic Review will highlight this selection process.

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│ 7 articles included for analysis  │
│         and interpretation        │
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RESULTS AND DISCUSSION

In this era of the industrial revolution, the impact of significant changes, especially in aspects of human life, including the revolution in the world of education, is increasingly felt. In facing the Covid-19 pandemic, digital learning activities have become a necessity. This requirement has the potential to make the use of digital media a routine in the educational process, which will ultimately spur improvements in the quality of learning. With this new learning approach through digital-based learning methods, students can develop critical skills and adapt to technology which is increasingly crucial in this era, thus providing a solid foundation for a more effective and efficient educational future (Septina Alrianingrum, 2020). In following the development of information technology, its influence on the world of education is becoming increasingly clear. Especially in the current era of the industrial revolution, there is an urgent need for three key aspects of literacy, namely data literacy, social literacy and technological literacy. By adopting a hybrid/blended learning and case-based learning approach, the learning process can be carried out more adaptively and effectively in accordance with the needs of the times which continue to change and develop (Faulinda Ely Nastiti, 2020). With the ongoing industrial revolution, transformation in the world of education is increasingly felt. The increased focus on skills development brings about significant changes in the way of learning, ensuring that the learning process in the future becomes more adaptive and keeps up with the times (Darmawan 2023).

Barpul (2020) In the Covid-19 pandemic situation, engaging in online learning requires the ability to use various digital media. This discipline allows access to websites, searching for learning information, sharing knowledge, and the ability to create your own content. This active activity plays an important role in the teaching and learning process, especially in conditions that do not allow physical meetings. The community is expected to be able to contribute effectively and continue to be involved in mastering learning materials, even though the pandemic is still ongoing. The ability to collaborate and be independent in the digital world is an added value that must be mastered, considering the major changes in the way of learning that are being faced today. A proactive role in continuing to actively learn will have a positive impact, not only for individuals, but also for the learning community as a whole (Muliani 2023).

The government and policy makers in Indonesia are increasingly realizing how crucial the use of digital technology is in the educational context. To stimulate understanding of this importance, the authorities plan to launch a national literacy campaign aimed at further promoting education in the country. Digital literacy, which includes an understanding of information and communication technology, is an integral part of efforts to improve public education. As an important indicator, digital literacy has a strategic role in driving the evolution of the education system. Seeing the rapid growth of digital resources and the expansion of access to information offered, the essence of this openness is as an important indicator that shows an effective drive for improving the overall quality of education. Through strengthening digital literacy components, the hope in the future is to see a significant increase in developing the quality of Indonesia's human resources in the education sector (Altınay et al. 2016). The rapid technological changes and information explosion that have occurred recently have had a significant impact on the dimensions of the learning process. Technological transformation brings new innovations in teaching and learning methods, opening up opportunities to create more dynamic and interactive learning environments. In addition, the explosion of information enriches available learning resources, allowing students and educators to access a variety of information more easily and quickly. This development also gives rise to new challenges in the learning process, such as the need to develop digital and critical literacy for students so they can filter valid and relevant information. Therefore, education must continue to adapt to technological advances and changes in the flow of information to ensure that students can exploit the full potential of these developments. Thus, it can be concluded that technological changes and the explosion of information not only change, but also expand the dimensions of the learning process, opening the door to new possibilities that support improving the quality of education in this digital era (Çam and Kiyici 2017). This encourages many people, including the millennial generation, to improve their digital skills to be better able to manage efficiently in a digital landscape that continues to change rapidly and becomes increasingly complex. Rapid technological developments require individuals to continue learning and perfecting their skills in facing various challenges in this digital era. Millennials in particular must be agile in generating creative ideas and competing amidst increasingly fierce competition. With strong digital capabilities, they can be better prepared to face changes and seize opportunities that arise in various aspects of life. Various digital platforms and tools provide great opportunities for millennials to explore their potential and develop professionally and personally. Therefore, it is important for them to continue to hone and expand their digital insights and skills in order to remain relevant and competitive in this dynamic digital era (Kirchoff 2017).

Digital literacy is an important skill in today's digital era. This includes not only technical abilities such as the use of computers and specific software, but also skills that span broader aspects. For example, digital literacy involves the ability to think critically about online information, analyze multiple sources carefully, and manage data efficiently. Apart from that, digital literacy also involves understanding online ethics, digital security, and how to interact with digital platforms positively. The importance of digital literacy lies in its ability to empower individuals, enabling them to more effectively participate in a society that is increasingly connected through technology. Although digital literacy is often defined as purely technical skills, it actually involves complex skills and is invaluable in facing the challenges of an ever-evolving digital world (Gruszczynska et al. 2013). Literacy progress not only includes a continuous process of learning, but is also an effort to ensure that each individual is able to achieve his goals by expanding his knowledge, optimizing his potential, and actively participating in all aspects of society and community life. With continued collective efforts, literacy can become a strong foundation for personal and social development, open doors to new opportunities, and empower individuals to make positive contributions in creating an inclusive and cultured society. By paying attention to the importance of literacy in everyday life, both individually and collectively, sustainable and competitive development will be increasingly realized, creating a harmonious balance between the progress of individuals, society and the country as a whole (Çam and Kiyici 2017). Digital literacy opens the door to broad access to various customs and cultural riches which can be studied, understood and applied through various digital platforms and electronic devices. With digital literacy skills, one can explore ancient traditions, diverse cultural practices, and rich historical knowledge through the features available in digital devices. In addition, understanding digital literacy also enables the integration of cultural values into a modern technological context, thereby encouraging harmonization between old traditions and digital innovation. Digital literacy skills are the key to a more inclusive and effective use of cultural resources, enabling people to stay connected to their cultural roots while advancing knowledge and creativity in the rapidly evolving digital realm (Hague and Payton 2010). In the ever-evolving digital era, having the ability to generate creative ideas and share them clearly through various patterns and formats has become invaluable. Additionally, the ability to collaborate with others effectively and communicate openly can make someone more successful in today's work environment. Not only that, understanding how and when to use digital technology has become a necessity in facing increasingly complex global challenges. Therefore, these skills are not only important for individual success, but also for the success of teams and organizations as a whole. By sharpening these skills, a person will be more adaptive to change, more innovative in solving problems, and better able to compete in a global realm that is full of dynamics and competition (Son, Park, and Park 2017).

In an era of ever-growing mobility, digital devices have taken an increasingly integral role in people's daily lives. It cannot be denied that three main factors have experienced significant improvements along with advances in this technology. First, speed is an aspect that is increasingly taken into account, enabling access to information quickly and efficiently. Second, virtuality brings new immersive and varied experiences for digital device users, presenting a virtual world that is very real. Meanwhile, the third factor, network, has become an important foundation in maintaining connectivity between devices to optimize the performance and use of digital devices. Overall, the role of digital devices in everyday life has created a significant transformation in various aspects of modern society,

reflecting how technology has become an integral part of human existence in the 21st century (Ozdamar-Keskin et al. 2020). Digital products have made a significant positive contribution in changing the educational landscape by enabling more adaptive, innovative and effective teaching practices. The use of digital tools such as online learning platforms, interactive applications, and digital learning resources has been widely accepted and implemented in various educational institutions. With this technology, teachers can collaborate more easily, facilitate more engaging discussions, and provide more timely feedback to students. Not only that, digital products also enable personalization of learning, enabling a more individual and holistic approach according to each student's needs and learning pace. In this digital era, technology products not only facilitate knowledge transfer, but also inspire creativity, self-directed learning, and the development of relevant skills in an ever-changing world. Thus, digital products not only change, but also enrich the way we learn and teach (Robertson et al. 2004; Wang 2008). Students in the digital era are now increasingly accustomed to and adept at using digital technology as the main tool in the learning process. They actively utilize various applications and platforms, such as reading course materials, interacting via sending messages, logging in to the learning management system to access important information, exploring e-books and electronic magazines as additional learning resources, and engaging in online discussion forums to collaborate with classmates and teachers. All of these are concrete steps that show how important the role of technology is in supporting the educational process today. With easy access and sophistication of these features, students can be more involved, obtain information effectively, increase understanding, and broaden their horizons in various fields of study. All of this reflects a positive transformation in traditional learning methods towards more modern, dynamic and adaptive learning patterns (Jones et al. 2010). Although today's students are generally believed to have a good understanding of technology because they are familiar with the use of various digital devices, many of them still find it difficult to apply this knowledge effectively in academic or professional terms. This can be caused by a lack of adequate provision regarding the use of technology for educational or work purposes, so that sometimes confusion arises in using the technology as expected. A proactive attitude in learning technology also determines students' success in overcoming these obstacles, by continuing to deepen their knowledge and skills in navigating various relevant digital applications and platforms. As assistants, we are always ready to help students overcome these challenges by providing the necessary guidance and support so that they can optimize the potential of available technology to effectively support the achievement of their goals (Tang and Chaw 2016). As the most active users of digital products, students not only spend a lot of time using technology, but they also have a higher level of ignorance when it comes to digital security. Although students are often proficient in using various technical tools, they are vulnerable to online threats due to a lack of awareness of proper cyber security practices. Students' intensive involvement in digital products also exposes them to privacy risks and personal data vulnerabilities. Therefore, the use of technology must be accompanied by a deep understanding of how to protect their personal information. Providing education about digital security to students is critical to mitigating risks related to the use of digital products. Thus, bridging the knowledge gap between technology use and awareness of cyber security threats is an important step in ensuring students' safe and sustainable digital experiences (Gruszczynska, Merchant, and Pountney 2013).

According to Douglas A.J Belshaw (2012), in a thesis entitled "What is 'Digital Literacy'?", the author explains the development of digital literacy which consists of eight key elements that encourage

a deep understanding of digital literacy. These elements include cultural aspects, where individuals gain an understanding of the context of use in the digital era; cognitive aspect, which involves the individual's thinking power in evaluating information; constructive aspect, where individuals are able to create something together with other people with actual expertise; communicative aspects, which enable individuals to understand the importance of performance and communication in developing digital literacy; strong sense of self-confidence; the ability to be creative by doing something unique and innovative; ability to think critically when filtering new information; as well as awareness of social responsibility in the use of digital literacy. These elements are the main basis for developing a comprehensive understanding of digital literacy in this study. The use of digital media for educational purposes is considered an important step in preparing and improving the abilities of the younger generation so that they can compete well in the era of globalization which is marked by the rapid development of information technology (Ismail 2015). In this digital age, it is important for students at primary, secondary and higher education levels to have a strong understanding of digital literacy, media literacy and information literacy. This capability will provide a solid foundation in facing the demands of a modern world that is increasingly connected through technology. Digital literacy refers to the ability to use digital technology effectively and wisely, while media literacy relates to the ability to understand and analyze messages conveyed by mass media. Meanwhile, information literacy allows individuals to evaluate information obtained from various sources, so as to filter valid and reliable information. Thus, through developing this literacy, students will be able to become intelligent, critical and ethical users in consuming and interacting with widespread information in this digital era (Koltay 2011). To achieve this goal, various skills are needed, especially literacy skills. Literacy skills play a key role in the education systems of various countries. This can be seen from his ability to formulate a curriculum, set educational goals, and achieve the targets that have been set (Çam and Kiyici 2017). As a result, the positive response to the importance of digital literacy has encouraged education departments in various parts of the world to progressively incorporate this aspect into their curricula. This reflects growing efforts to prepare students with relevant skills to face the challenges of the digital era. These steps prove that knowledge about the digital world is no longer considered a secondary complement, but is a core element in comprehensive modern education. In addition, driven by the emergence of new technologies and the need for greater literacy, many countries have also launched specific initiatives and programs to increase public understanding of digital literacy. Thus, through the integration of digital literacy into the curriculum, the education department hopes to provide a strong foundation for future generations in managing information, collaborating digitally, and becoming more skilled in using technology wisely (Chan et al. 2017).

One important aspect in this case is the pillar of digital literacy which must be strengthened. Apart from these main keys, the government plays an important role in ensuring that public awareness of the importance of digital literacy increases. They need to take concrete steps to educate the public regarding a deep understanding of the wise use of social media and the appropriate way to express oneself in the digital realm. Apart from that, the level of education is also a crucial factor in improving an individual's ability to carry out critical analysis, evaluate information, and summarize the latest news and issues well. In an era where information is spread so quickly and widely through digital platforms, the ability to differentiate between truth and lies, between useful and harmful content, becomes increasingly essential. Everyone who is involved in interactions in the digital world or uses social media,

from young to adult, needs to have these skills as a foundation for maintaining the integrity of information and avoiding the spread of false or detrimental information. In this way, it is hoped that society in the digital realm will become safer, smarter and more responsible (Yuniarto 2021).

Someone who develops literacy activities continues to support individual success in dealing with various aspects of life. Literacy skills not only provide access to knowledge, but also broaden horizons that help individuals function optimally in society. As a person's literacy skills increase, they will become more effective in solving problems independently, honing critical thinking skills, and forming solid arguments. Thus, literacy is not just reading and writing skills, but rather a key foundation in cultivating mental and emotional intelligence, as well as preparing individuals to face complex challenges in everyday life. Therefore, awareness of the importance of literacy not only enriches oneself, but also has a positive impact on the surrounding environment, creating a society that is more skilled, critical and adaptive in responding to changing times (Yuniarto 2021).

Fundamental critical thinking is a process that involves the use of logic and in-depth evaluation in assessing the quality of each thought. Thinkers involved in this process tend to rely on reflection and the courage to think independently, allowing them to view problems more clearly and rationally. According to Halpen (in Achmad, 2007), critical thinking is a mental process that involves in-depth evaluation of information, opinions or ideas to achieve a deeper and more accurate understanding. It involves the application of various intellectual skills such as analysis, reasoning, proof, and explanation that help a person in making better decisions. By using appropriate cognitive strategies, a person can recognize and overcome biases or perceptions that may influence his or her objective judgment. Thus, critical thinking is not just about determining goals, but also improving an individual's ability to solve problems, explore various points of view, and build strong and relevant arguments. In today's fast and complex information era, critical thinking skills are becoming increasingly important in helping individuals face diverse challenges and situations. Therefore, developing critical thinking skills not only empowers individuals personally, but also makes a positive contribution to society in terms of more effective and responsible decision making.

The processes involved in problem solving, decision making, and formulating conclusions depend on initial goal setting, careful consideration of options, and direct alignment with goals; it is a form of thinking that must be cultivated to address problems comprehensively, draw appropriate conclusions, explore possibilities, and ultimately make decisions by effectively utilizing all relevant skills in a relevant context and appropriate framework. This methodical approach not only guides individuals in resolving conflicts and achieving logical outcomes but also encourages honing critical thinking skills, enhancing the ability to navigate challenges, discern patterns, and strategize well in a variety of scenarios and circumstances, encouraging holistic problem solving. a problem-solving mindset that can be appli   ed in various fields and scientific disciplines where there are many complex problem-solving and decision-making processes, this shows the importance of adopting a systematic and strategic mindset to deal with and resolve complexity well (Oktariani 2020).

Critical thinking skills play a very vital role for a person because this ability provides freedom for individuals to make wise decisions, identify problems better, and create innovative and effective solutions. Someone who is skilled in critical thinking will tend to be active in self-reflection, ask critical

questions to develop solid arguments, and be able to evaluate information critically without being influenced by emotions alone. In addition, individuals who have strong critical thinking skills also tend to be able to recognize & respond to various situations with a rational attitude, integrating critical thinking principles into values, morals and norms in everyday life, so that attitudes This can be reflected in all aspects of life (Oktariani 2020).

Critical thinking is an essential ability that can play a role at various stages in the evaluation process, decision making, and general problem solving. Every time someone tries to explore aspects that require belief, as well as seeking clarity on the reasons behind something, this process will be carried out in a way that requires effort and reflection. From reading, writing, speaking, to listening, all forms of activity can be done with a critical approach. Critical thinking has a significant impact on the optimal achievement of individuals' cognitive potential, enabling them to produce intelligent decisions that are in accordance with existing reality. The practicality of critical thinking results in increasing a person's capacity in dealing with complex areas of life around them, helping to develop analytical skills which are the key to success in solving difficult problems (Oktariani 2020).

The ability to improve critical thinking skills through practice is essential for personal and professional development. There are eight key steps that can help individuals improve their critical thinking skills effectively. First, it is important to pinpoint the original problem, project, or decision that requires critical analysis. Second, identifying the main viewpoints involved is critical. Justifying why these points are the target of criticism is the third step. Fourth, making the necessary assumptions is necessary in the critical thinking process. Using clear language to articulate thoughts and arguments is the fifth step. Basing arguments on compelling facts is the sixth commandment. Drawing conclusions based on the analysis is the seventh step. Lastly, determining the implications that arise from the conclusion strengthens the critical thinking process. By following these steps diligently, a person can significantly improve their critical thinking skills and become a more analytical and effective thinker (Oktariani 2020).

CONCLUSION

The revolution known as the Industrial Revolution is a significant transformation that aims to push the world towards progress. This occurred between approximately 1750 and 1850, impacting various sectors such as mining, agriculture, manufacturing, transportation, and technology. This era of innovation and progress is producing profound changes in society, economics, and culture on a global scale, changing the way people live, work, and interact with each other. The immense influence of the Industrial Revolution paved the way for modernization and laid the foundation for the technological advances that continue to shape our world today.

In the scope of data that reflects the birth of the industrial revolution, starting from the period of industrial revolution 1.0 around the 18th century with the revolutionary invention of the steam engine which provided the ability to optimize the goods production process to make it more efficient and effective. The next series, namely the industrial revolution 2.0, occurred around the 20th century. The 3rd revolution, also known as industrial revolution 3.0, introduced machine innovations that could move and think automatically, such as computers and robots. Now, we are in the era of the industrial revolution 4.0, characterized by the integration of automation and cyber technology, realizing an

innovative project originating from Germany with a focus on factory digitalization. The era of industrial revolution 4.0, which is guided by the development of science and technology, has had a major impact in various fields and has spurred the development of digital technology thinking throughout the world.

Therefore, it is critical for individuals to continuously develop and improve their skills to stay abreast and effectively adapt to the rapidly evolving technological landscape. As we navigate the era of the Fourth Industrial Revolution, there is an urgent need for new literacies that complement existing skills, turning them into valuable assets for communal life. Literacy has an important role that requires careful consideration in each individual, because literacy is related to a person's skills in communication, critical thinking, collaboration, creativity and innovation. These attributes are important pillars that every individual must have in facing increasingly complex future challenges.

Pi-liang explained that digitalization and computing have created new virtual spaces that allow interaction and communication to be carried out flexibly by anyone, anywhere and at any time. Students as the main object of education really need the existence of this virtual space, because with digital platforms, they can access information and learning resources more efficiently. Support for digitalization in the learning context is also reflected in research conducted by Utomo, Uki, and their colleagues, who applied this concept in the development of ICT-based interactive learning media and the preparation of e-books. This easy accessibility provides wider opportunities for students to utilize learning resources effectively.

According to Sulzby, literacy in the modern context is a person's ability to communicate through various language activities such as reading, speaking, listening and writing, which can be done with an approach tailored to certain goals. Thus, the integration of literacy in the digital era is an important part in improving the quality of learning and bridging access to information for all parties involved in the education process. However, there are still many people who underestimate literacy and even have low interest in reading, one of which is Indonesia. Based on social facts that occur in the daily lives of Indonesian people today, it shows the low level of literacy in the digital era among the nation's future generations who are too immersed in an unreal virtual world. In the current development of science and technology which is very rapid and competition is very tight, it requires individuals to be able to learn to master various sciences and technologies quickly. Humans can learn science and technology by using adequate literacy skills.

High literacy skills have an important role in accelerating scientific and technological progress to a higher level. By having good literacy, a person will be able to contribute optimally to society, helping advance the Indonesian nation from the various adversities it faces. Literacy is an essential life skill that can make someone a valuable asset for the country, so that they are able to compete and develop at the international level. As highlighted in an article published in the Kompas newspaper, reading and writing skills are included in the list of strategic abilities that must be possessed by every individual who wants to participate in advancing their nation towards sustainable progress.

In everyday life, literacy mastery is essential in supporting the various competencies needed. Related to this, one of the key competencies that every individual who wants to be successful must have is to be a person who has a deep understanding of literacy. This indicates that proficiency in reading, writing and understanding various types of text must be a top priority, more than oral speaking ability.

Strong literacy mastery not only supports personal development but also provides a competitive advantage. Therefore, literacy skills must be encouraged from an early age and instilled in the mindset of future generations, especially in Indonesia.

Nowadays, the issue of literacy is one of the problems that must receive special attention from the Indonesian people. Tjalla presented several international studies that illustrate this condition, such as the results of research from the Program for International Students Assessment in 2003, 2006, 2009 and 2012 which highlighted the literacy abilities of people from various countries around the world. In the midst of changing times, the need to increase literacy becomes increasingly important because literacy plays a vital role in advancing civilization and encouraging the social and economic progress of a nation. Various forms of educational activities are carried out to prepare conditions for future generations of a competitive nation. Literacy, as a fundamental skill in reading, writing and understanding various information, is the main foundation for individual progress in the era of globalization. Technological developments also encourage the importance of digital literacy, where the ability to use and sort information from various digital platforms becomes a very necessary skill. By increasing the level of literacy, it is hoped that the next generation will be better prepared to face the challenges of changing times and the various complexities of modern life.

The role of digital literacy can enable teachers and students to communicate effectively even though they are not face to face. The ability to think critically is an irreplaceable key in understanding the world and making wise decisions in various situations in everyday life. These skills are not only important in an academic context, but also play an important role in the world of work and social interactions. When someone is able to think critically, they can evaluate information more carefully, face challenges more maturely, and explore new thoughts and ideas more openly.

According to Zubaidah, in Susanto's view, critical thinking is not just an ability, but is also a characteristic that individuals have in facing and solving various problems. These critical qualities and talents are manifested through high curiosity, the ability to reason imaginatively, and resilience in facing challenges from diverse environments. People who have critical thinking skills also tend to dare to take risks in order to achieve optimal solutions, while still respecting the rights and views of others, and accepting direction and guidance from others. Thus, critical thinking is not just an individual skill, but also an attitude that reflects awareness of the importance of collaboration and tolerance in dealing with the dynamics of everyday life.

Critical thinking is an intellectual thinking process that involves the ability to deliberately evaluate the quality of each decision taken, using all the skills possessed effectively according to the context and type of situation faced. When carrying out a critical thinking process, a person uses the ability to be reflective, independent, have clarity of thought, and be rational in dealing with all problems that arise. This process usually begins after establishing the objectives to be achieved, investigating various relevant considerations, and referring directly to the targets to be achieved. Critical thinking is a form of thinking that is very necessary to be able to solve problems, formulate appropriate conclusions, and collect various possible solutions that may be available. Critical thinking requires serious effort, sensitivity to the accuracy of information, a willingness to learn and develop, and an attitude of never giving up when faced with challenging tasks.

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