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A Comprehensive Study: AI Literacy as a Component of Media Literacy

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ABSTRACT

The widespread use of AI-based technologies has sparked educational, social, and political interest in AI training. Education systems must prepare individuals for a world with AI. AI literacy is a cognitive and pedagogical difficulty. AI's language and intricacies need redefining literacy. Because these systems are easy to use, more individuals are utilizing them than those with limited conceptualizations (such as an inability to grasp the future relevance of these systems) or competencies (like an inability to comprehend how these systems function). The study investigates the increasing significance of artificial intelligence (AI) literacy within the context of media literacy. As AI technologies permeate various aspects of modern media, the capacity to comprehend and engage critically with these systems has become essential. The paper begins by analyzing the intricate intersection of AI and media, focusing on content creation, dissemination, and consumption. It then emphasizes the importance of AI literacy, which is the ability to comprehend, implement, and evaluate AI technologies critically, similar to traditional media literacy skills. Finally, the paper proposes that AI literacy, as part of media literacy, entails understanding how these systems function and their ethical and societal implications. The paper's conclusion offers a comprehensive framework for incorporating AI literacy into media education curricula, aiming to empower individuals to navigate, evaluate, and responsibly participate in the evolving AI-mediated media landscape.

1. Introduction

Literacy in artificial intelligence (AI), awareness of how artificial intelligence influences our lives, is becoming an increasingly significant component of media literacy. Understanding AI's consequences and workings is very necessary for a well-informed audience because artificial

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intelligence is becoming more integrated into media production, distribution, and consumption. People need to have an understanding of the role that AI plays in the production and curation of information. Artificial intelligence plays a vital part in developing and curating data. For instance, algorithms are responsible for determining the information shown in our social media feeds and the content suggested to us on streaming services. Understanding how these algorithms function, the data they utilize, and the possible biases they may have is what "AI literacy" means in this context.

Starting in the 1970s, artificial intelligence began to appear in educational environments via the use of technologies developed expressly to aid in learning, teaching, and the administration of educational institutions. Some academics argue that education in artificial intelligence should be regarded as equally vital as literacy in reading and writing because a growing number of employers are now tied to AI, and this trend is expected to continue over the next few years [1].

When it comes to media literacy, the capabilities of AI to create content provide chances to build a more thorough grasp of how narratives in various forms of media are produced. Individuals may become more skilled at analyzing AI-generated information, recognizing biases in the material, and grasping the intricacies of automated content production if they understand AI's function in developing content. In addition to gene-generating new material, artificial intelligence also plays an integral part in creating content by sifting through vast volumes of information to provide personalized results. According to research, AI algorithms analyze user behavior and preferences to make it possible to create customized content feeds on services such as Netflix and Spotify.

2. Roles and Functions

Globally, artificial intelligence is at the top of the agenda for education leaders, scientists, technologists, and policymakers when educating the next generation. In addition to using AI in everyday applications and educational tools, it is becoming increasingly essential to comprehend how AI is taught and learned. People still need to become more familiar with AI learning despite these technological advances [2]. However, children need skills in digital literacy to be able to navigate the digital world, view information critically, and reflect on the social and ethical implications of the design and architecture of AI systems due to the pervasive role that artificial intelligence (AI) plays in everyday applications such as smartphones and social media [3]. The example of AI technology is shown in Figure 1.

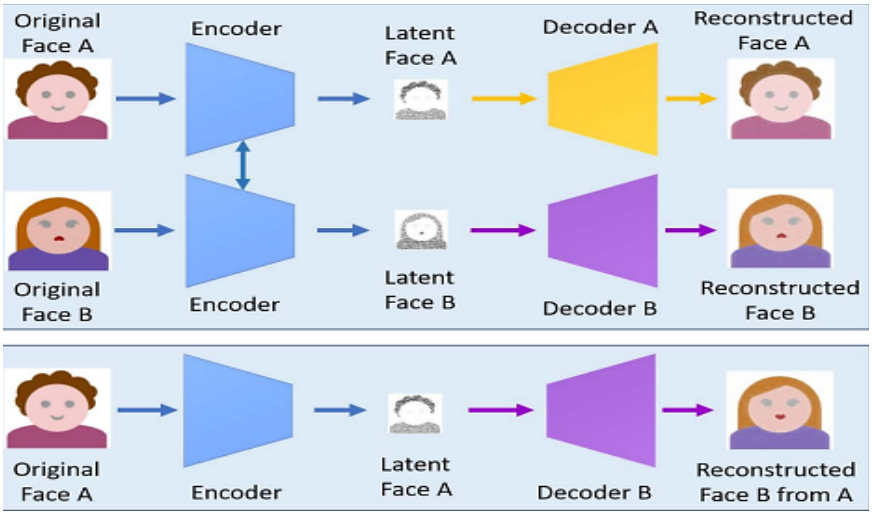

Fig. 1. A deep fake creation model using two encoder-decoder pairs [4]

Deepfakes are one example of synthetically realistic content that may be generated by AI technology. One of the essential aspects of AI literacy is the ability to critically identify and evaluate such information. In the more prominent media literacy context, identifying material created by artificial intelligence (AI) is a crucial talent, especially in an age where these technologies are increasingly being utilized to generate and transmit information [4]. In media literacy, the ability to discern AI-created content becomes critical for several reasons, including distinguishing fact from fiction, recognizing biases, understanding personalization algorithms, and interacting with AI-generated content. In addition, AI can generate various content types, from text and images to audio and video.

Therefore, identifying the information AI has created is essential to media literacy today. It is not enough to be able to determine when an AI produced material; it is also necessary to have an awareness of the repercussions of this fact. These repercussions range from the possibility of misinformation and bias to adopting a new strategy when engaging with such content. The development of these abilities will assist people in more successfully navigating the media environment and engaging with material in a more informed and critical way.

By relating the statement to these components of media literacy, we can better understand the role of digital technologies in healthcare during the pandemic and the importance of developing media literacy skills to navigate the information and issues surrounding their use [5].

I. Access and Availability: The statement highlights the importance of digital transformation in healthcare settings, which involves making digital technologies more accessible and available to healthcare providers and patients. This includes the use of AI, virtual platforms, IoT, and blockchain to improve healthcare delivery and access to information.
II. Analysis and Evaluation: Media literacy skills are crucial for analyzing and evaluating the information related to the use of digital technologies in healthcare during the pandemic. It is essential to assess the credibility, reliability, and potential biases of sources discussing these technologies and their applications.
III. Creation and Participation: The use of digital technologies in healthcare during the pandemic has enabled new forms of creation and participation, such as the development of AI-powered diagnostic tools, virtual platforms for telemedicine, and blockchain-based systems for secure data sharing. Media literacy skills are important for understanding how these technologies are created and how individuals can participate in their development and use.
IV. Reflection and Action: The statement prompts reflection on the role of digital technologies in addressing the challenges posed by the pandemic in healthcare settings. Media literacy encourages individuals to consider the potential benefits, limitations, and ethical implications of these technologies and to take action to support their responsible development and use.
V. Context and Purpose: The statement emphasizes the context of the COVID-19 pandemic and the purpose of digital transformation in healthcare settings. Media literacy skills help individuals understand the broader social, economic, and political factors that shape the development and use of these technologies in this specific context.

AI and media in Industry 4.0 enable intelligent management through data analysis, automation, and enhanced communication for modern industrial systems [6]. It has been a recent phenomenon for persuasive media to be generated using potentially dangerous technology such as Deepfakes. For years, people have been able to manipulate audio and visual media without the help of artificial intelligence. However, a few fundamental distinctions in the operation of Deepfakes make them dangerous weapons for the propagation of falsehoods and disinformation. GANs, the technique used to construct Deepfakes, produce material that is more realistic than that which can be created using conventional methods of picture manipulation [7]. Artificial intelligence-powered automated

assessment tools can help reduce the workload for instructors across all industries, particularly in the media sector, where they can streamline tasks such as content analysis, data processing, and quality control, enabling media professionals to focus on more creative and strategic aspects of their work [8].

A fundamental aspect of media literacy is making artificial intelligence (AI) systems more open to public scrutiny. Users need to be aware that AI processes they cannot directly see, or control may have impacted the material they see. Users may benefit from this comprehension by approaching material selected or created by AI with a more critical eye and being encouraged to seek out information from various sources. Digitalization opens the possibilities in our personal and professional life. New technologies are more interactive, exposing many individual and social potentials. Digital voice assistant systems, which allow users to control the device by talking to it, have risen in prominence in recent years. Although today's usage scenarios are still limited and voice-based assistants in private households are mainly used as remote controls (e.g., to play music or turn on the lights) or for web searches (e.g., for the weather forecast), future usage scenarios suggest that voice-based systems could be omnipresent and ubiquitous in our future lives [9].

Literacy in artificial intelligence (AI) is a subject of fast development [10]. We use many media tools and platforms daily using Artificial Intelligence (AI) as an essential component. It is the driving force behind everything from voice assistants such as Amazon's Alexa and Apple's Siri to search engines like Google and recommendation algorithms on platforms like Netflix or Spotify. Therefore, in media literacy, it is essential to have a knowledge of and a critical engagement with the tools and platforms powered by artificial intelligence. To begin with, the use of voice assistants. Voice assistants powered by artificial intelligence understand user orders, offer information, and conduct activities using natural language processing (NLP) and machine learning. To have productive interactions with these helpers, they must grasp their capabilities and restrictions. After that, there are search engines. Artificial intelligence (AI) is essential to today's search engines. It contributes to analyzing queries, ranking results, and customizing search results depending on user behavior. Users may benefit from understanding this to better comprehend and critically assess the results of their searches.

By enabling mass personalization via mass customization, artificial intelligence (AI) is altering communication and contributing to the fulfilment of needs (both commercial and informational) [11]. Despite the growing importance of artificial intelligence (AI) in the media (via tools like search engines, chatbots, home assistants, recommendation systems, etc.), the general public's understanding of AI still needs to be improved, leading to inaccurate portrayals. Some governments have responded by showing an interest in introducing it to their citizens as early as possible. Schools' AI education materials concentrate primarily on teaching student's technical skills. However, an interdisciplinary and critical approach is needed to tackle the ethical and social difficulties of such schooling [12]. Then there are the algorithms for making recommendations. Many social media platforms and streaming services utilize AI-based recommendation algorithms to provide content suggestions based on user's previous actions and the material they enjoy. These can assist users in finding new material. Yet, they also can contribute to the formation of echo chambers or filter bubbles, in which users are predominantly exposed to content that supports their opinions. Regarding media literacy, users should be aware of how these algorithms affect their media consumption and try to seek out a range of sources and points of view. Users should also be mindful of how these algorithms shape their media consumption.

Research on engaging with AI tools and platforms, various media tools and platforms, ranging from voice assistants to search engines, use AI. A further component of AI literacy is demonstrating an understanding of how to use these technologies efficiently and morally. Even

though AI literacy is still a relatively new area, it is abundantly evident that, currently, it is an essential component of media literacy. However, more study is required to determine the specifics of how it should be taught and how it should be included in media literacy education more generally. A discussion about bias and fairness in artificial intelligence: if the data that AI systems are trained on is biased, then such systems will reflect and perpetuate the prejudices that exist in society. An essential component of being knowledgeable about AI is being able to identify the possibility of bias and comprehend the effects that it has on the information that we take in. According to the previous study conducted by Buolamwini and Gebru [13], it helps with the capability to critically analyze and evaluate information, news, and material that AI drives. There are four groups of soft biometric taxonomy for AI technology as shown in Figure 2.

SOFT BIOMETRIC TAXONOMY WITH FOUR GROUPS: I) DEMOGRAPHIC, II) ANTHROPOMETRIC AND GEOMETRIC, III) MEDICAL, IV) MATERIAL AND BEHAVIORAL.

Demographic attributes	age, gender, ethnicity eye-, hair-, skin-color
Anthropometric and geometric attributes	body geometry and facial geometry
Medical attributes	health condition, BMI/ body weight, wrinkles
Material and behavioral attributes	Hat, scarf, bag, clothes, lenses, glasses

Fig. 2. Soft biometric taxonomy

The algorithms that make up artificial intelligence (AI) learn from vast volumes of data. They recognize patterns and use this knowledge to base their judgments or predictions on those patterns. Suppose there are pre-existing prejudices in the data that the AI model is trained on. In that case, it has the potential to learn and reproduce those biases, which might result in unjust or discriminating results. This is a significant problem in many artificial intelligence applications, including the media. Understanding the potential for bias and unfairness in artificial intelligence is essential in media literacy for several reasons, including algorithmic bias in content creation and curation. Users need to understand that the content they see, whether it's news articles, social media posts, or video recommendations, may be influenced by algorithmic biases. This is true regardless of whether the content is news articles, social media posts, or video recommendations. This realization might motivate users to seek out a wider variety of sources and points of view and assess the material they take in critically.

In media literacy, it is essential to understand the inner workings of these algorithms and be conscious of the possibility of bias. This may inspire users to question the personalized content they are shown and search for information from various sources. Therefore, understanding bias and fairness in AI is an essential part of acquiring media literacy in this day and age of digital technology. It requires not just being aware of the possibility of prejudice in material curated by AI or created by AI but also being aware of the factors contributing to these biases and actively searching out varied, well-balanced, and factual information. It is also essential to understand how AI will affect jobs. The use of AI in media creation has the potential to influence the labor market substantially. According to Arntz *et al.,* [14], it is critical to understand how artificial intelligence (AI) may alter employment associated with the media and what abilities will be required of future media workers. The labor

market and the nature of work are undergoing significant transformations due to artificial intelligence (AI) implementation across various sectors, including manufacturing, healthcare, the media, and entertainment. In the context of media literacy, grasping AI's influence on employment requires an awareness of both the potential and the obstacles that technological breakthroughs have brought.

To begin, the computerization of mundane chores. Automating every day and time-consuming work is one of AI's most essential effects on the labor market. In the media field, this may include responsibilities like editing videos, transcribing interviews, or even creating reports that are as fundamental as possible. For instance, news organizations such as the Associated Press have automated the generation of financial news items by using AI based on structured financial data. Concerns regarding job displacement are raised even though this automation can improve productivity and free journalists to concentrate on more challenging and creative endeavors. Literacy in media requires a grasp of these trade-offs and the ramifications for the kind of jobs available in the media business and the availability of those jobs [14].

Aside from that, new responsibilities, and abilities. At the same time, the development of AI is leading to the emergence of new job categories and the need for new skill sets. In the media field, this might mean filling positions connected to artificial intelligence technology, such as AI ethics officers or AI trainers that assist in educating AI systems on how to carry out specific duties. Data journalism and immersive media development utilizing techniques derived from AI are two more rapidly expanding fields. Regarding media literacy, it is essential to understand that AI is reshaping the job market and redefining the abilities necessary for professional success. This comprises the technical capabilities required to deal with AI technology and "soft skills" such as critical thinking and creativity, which are more difficult for AI to imitate.

In addition, concerns about ethics and justice in the use of AI. New ethical problems emerge about employment justice as the use of AI becomes more widespread in the workplace. These include considerations concerning bias (ensuring that AI recruiting tools do not discriminate based on race, gender, or other protected characteristics), transparency (such as how AI hiring algorithms make judgments), and accountability (who is liable when an AI makes a mistake). Individuals may navigate the AI-driven labor market more efficiently and advocate for fair employment practices if they have a better grasp of these ethical implications, which can be discussed in the context of media literacy. Therefore, knowing AI's influence on employment requires an appreciation for the possible benefits of AI, such as enhanced efficiency and new possibilities, and the potential drawbacks, such as job displacement and the need for new skills. Understanding this concept will be essential for navigating the job market and contributing to conversations about the future of work in a media-literate society. As a result, artificial intelligence will continue to advance and transform the world of work in the coming years.

3. Challenges

At this point, the difficulties associated with AI literacy call for a strategy that is both multidisciplinary and critical. A basic understanding of artificial intelligence (AI) may be used to improve one's learning of fundamental academic topics by incorporating AI into the instructional process for such issues. The literacy of artificial intelligence should be based on the transfer of AI knowledge and methodologies to core courses. This will enable education to bridge disciplinary borders while yet remaining within the framework of disciplinary core subjects. To bring about this shift, educators need to take a more in-depth look at the capabilities that AI has at present. This would allow them to determine the potential ways in which the fundamental aspects of educational

practice may be enhanced, allowing them to maximize the effectiveness of the educational process. For instance, gaining a grasp of and using word clouds is a valuable teaching method that may be used to improve instruction in fundamental fields like science [1].

Generative approaches to artificial intelligence (AI) open new avenues of digital creation. Still, they are accompanied by societal and ethical implications, such as the creation of Deepfakes and the spread of misinformation. This renews our understanding of technical AI systems as socio-technical systems. Applications and media created by generative AI methods are abundantly present on social media platforms frequented by children. However, children still need to be made aware of the presence of AI-manipulated media despite these platforms being full of such applications and media [7].

The potential of AI technology to produce Deepfakes, which are artificial pictures, sounds, and convincingly realistic movies, presents a significant problem. Because of this, people need to be able to recognize and critically evaluate these complex kinds of altered media to have adequate media literacy. This presents a unique set of challenges. Furthermore, because of the potential for deep fakes to be utilized in creating convincing falsehoods, this topic is an essential component of AI literacy [9]. Modern students often exchange ideas and information using social media sites like TikTok and Instagram. Generative AI, such as creative filters and Deepfakes, have flooded these services. Misinformation, or erroneous information regardless of motive, has been demonstrated to travel faster and farther than accurate information. Also included are the ethical implications of AI. AI introduces new ethical issues to the media industry, such as privacy concerns and accountability and transparency issues. Understanding these concerns is essential to AI literacy. Incorporating AI into media environments and content creation processes raises several ethical concerns. Privacy, accountability, and transparency are three of the most critical problems in this context.

Mertala *et al.,* [15] highlighted that when discussing media literacy, it is critical to note that just two students in their research brought up the role that AI (and data) play in personalized and predictive marketing in online media contexts. Furthermore, no students brought up deep fakes or other forms of AI-created media. In the age of machine learning and big data, several academics have emphasized that AI literacy (and extensive data literacy) cannot be (ultimately) differentiated from media literacy. A further obstacle is posed using AI in content personalization. Using personalization algorithms by online platforms may result in "filter bubbles," where users are primarily presented with material congruent with their ideas and interests. This may reduce exposure to various viewpoints, contributing to the polarization of public debate. Therefore, understanding the effects of these algorithms on the content people take in is essential to have AI literacy as part of your media literacy toolkit.

Given the rapid pace of change in AI literacy, it is challenging to make broad judgments about its prevalence in higher and adult education [16]. There is also the problem of AI's function in gathering data and protecting privacy. Many AI-driven platforms gather massive volumes of user data to train their algorithms, sometimes without the users' complete comprehension. This raises questions about privacy and permission, essential components of a well-rounded education in today's information and media landscape.

Additionally, as AI technologies advance, they become more integrated into the production and dissemination of news. This trend is expected to continue. When it comes to accuracy, prejudice, and the function of human journalists, automated journalism, in which AI creates news stories, offers some interesting problems. These newly developing applications of AI in the media environment provide additional obstacles for anyone seeking to improve their media literacy. Artificial intelligence (AI) has pushed a variety of challenges to the forefront of the conversation around media literacy, leading educators, legislators, and society at large to reconsider how we consume and comprehend

media. In addition to bridging the gap between participants with varying educational backgrounds, one of our other primary goals was to bring gender parity to technology-related education. The gender gap in technology may be reduced if more people become knowledgeable about AI [17].

With the advent of artificial intelligence (AI) technology, our lives have been profoundly altered. As more intelligent devices and AI-embedded applications become available, we are witnessing an era in which ordinary users are transitioning from AI emigrants to AI natives [18]. The proficiency required to endure and thrive in the so-called 'AI era.' The proliferation of automated material, such as news stories or social media postings authored by AI, is one source of concern since this kind of content can spread inaccurate or misleading information. This requires a new degree of critical thinking and literacy in AI to recognize and assess this material. Another growing issue is the capacity of AI to generate Deepfakes, which are movies, audio recordings, and photos that seem genuine but are fake. One further complication may be added to media literacy thanks to the usage of deep fakes in producing sophisticated forms of disinformation.

There is also a massive problem with AI algorithms' role in determining what people view on various digital sites. These algorithms cancan produce "filter bubbles," which reduce the amount of exposure to multiple viewpoints and might polarize public dialogue. Because of this, media literacy has additional hurdles in comprehending and navigating the many digital contexts [18]. Data privacy is another issue about AI's role in the media. Platforms that AI power often gather vast quantities of user data, which raises concerns about privacy, permission, and the ethical use of data. Understanding these repercussions is crucial to well-rounded media and information literacy.

Keeping up with the quick rate of breakthroughs in AI is a significant problem that must be overcome. In addition, literacy requirements are increasing with the development of AI technology, which might make it challenging for educational institutions to keep up with the rate of change. In conclusion, artificial intelligence poses numerous challenges to media literacy, including the production of automated and controlled information, the effect of customization algorithms, worries about data privacy, and the fast growth of technology. These problems underline the importance of cultivating an in-depth understanding of artificial intelligence as an essential media literacy component.

In conclusion, using artificial intelligence in the media presents several issues, including the production of deep fakes and the creation of personalized filter bubbles, as well as worries over the emergence of automated journalism. Therefore, it is essential to include knowledge of these problems in the education provided for media literacy and the more significant public debate.

4. Conclusion

Media literacy in the age of artificial intelligence necessitates comprehending how AI technology's function and an awareness of the ethical issues they raise. Users must navigate these complexities to engage responsibly and critically with digital content in an increasingly AI-driven media landscape.

To summarize, the development of AI has brought the emergence of brand-new facets in the media environment. In the context of modern media literacy, it is self-evident that having a grasp of AI's function and impact in producing and curating information is crucial. We can better equip folks to manage the intricacies of our digital world if we include AI literacy in the instruction for media literacy. In this day and age, having the ability to comprehend how artificial intelligence (AI) influences material, how to analyze and criticize it, and how to be aware of its possible hazards, such as the reinforcement of filter bubbles or the propagation of disinformation, is essential. Therefore, understanding AI should be regarded as a critical component of education concerning media literacy.

This paper offers a thorough synthesis and assessment of the existing knowledge on a particular subject, drawing from the findings of numerous research studies. This enables researchers to comprehend the context of their work and prevent unnecessary repetition. Additionally, by examining multiple studies, these papers can discern trends, patterns, and evolving themes within a specific field, offering guidance and direction for future research. Importantly, they can also expose gaps in the current literature, emphasizing areas that require further investigation. This assists researchers in formulating new research questions and promotes the progression of knowledge in their field.

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