THE ROLE OF DIGITAL LITERACY AND PUBLIC EDUCATION IN COUNTERING ARTIFICIAL INTELLIGENCE-BASED POLITICAL DISINFORMATION

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Abstract

The rapid development of Artificial Intelligence (AI) technology, such as deepfakes and algorithm-based narratives, has disrupted political communication and threatened the integrity of democracy. This qualitative research aims to explore in depth the role of digital literacy and public education as a public defense strategy against AI-based political disinformation. A descriptive qualitative approach was used to understand how the public interprets, identifies, and responds to the threat of this information manipulation. The results reveal two main findings. First, AI-based political disinformation has been shown to create an illusion of truth. Conventional digital literacy has failed to counter because existing curricula remain stuck in basic functional skills and have not integrated aspects of AI literacy or confirmation bias mitigation. Second, current strategies for countering hoaxes have been reactive through take-down and debunking, thus being outpaced by machine replication. This study concludes that public knowledge strengthening must transition to a proactive approach through pre-bunking. The effectiveness of this downstream strategy must be supported by a collaborative multi-stakeholder governance model at the upstream level, through the implementation of adaptive regulations such as mandatory watermarking of AI content and regular algorithm audits on social media platforms to maintain a digital democracy ecosystem with integrity.

Keywords: *Artificial Intelligence, Digital Literacy, Political Disinformation, Public Education.*

A. INTRODUCTION

The development of information and communication technology has drastically transformed the global political landscape in recent years. The digital space is no longer merely a medium, but rather the primary epicenter where public opinion is formed, debated, and consolidated (Rahman et al., 2022). However, this transformation presents a significant paradox for modern democracy. On the one hand, digitalization opens the floodgates for inclusive citizen participation. On the other hand, this highly open digital ecosystem has become vulnerable to information manipulation, where the line between factual truth and falsehood has become increasingly blurred (Indrawan et al., 2023).

The challenge of information distortion has now entered a new, far more complex phase with the advent of Artificial Intelligence (AI) technology. AI is no longer used solely for industrial automation but has been widely adopted in the

production, packaging, and distribution of content (Bashori, 2018). AI's ability to process big data enables certain political actors to create messages tailored to the psychographics of their target audiences. As a result, the flow of information on social media no longer flows naturally, but is instead controlled by algorithms operating behind the scenes (Nuraida & Simanungkalit, 2023).

The most alarming manifestation of this trend is the emergence of highly sophisticated AI-based political disinformation. Technologies like deepfakes, which can accurately manipulate the videos and voices of political figures, make false content appear incredibly realistic to the public (Novyanti & Astuti, 2022). Unlike conventional hoaxes, which typically consist of amateurish text or images, AI-based disinformation directly exploits the human audio-visual sense. This creates an illusion of truth that is extremely difficult for the general public to discern, thus multiplying the potential damage it can cause to the reputations of political actors and social stability (Hassan et al., 2020).

The impact of this massive AI-based political disinformation directly strikes at the heart of democracy's defense: public trust. When the public is no longer able to distinguish between a leader's genuine statements and those of digital manipulation, the legitimacy of the political process will collapse (Haqqo & Ansoriyah, 2023). Social polarization within society will intensify as each group tends to believe disinformation that supports their personal biases. In the long term, this situation has the potential to trigger horizontal conflict, delegitimize election results, and undermine the democratic national order (Alvin, 2022).

Ironically, the rapid penetration of AI technology is not matched by the public's cognitive readiness to consume information. Most social media users in Indonesia remain trapped in a culture of low literacy and emotional rather than rational information consumption patterns (Zamroni, 2017). People tend to share content instantly simply because it triggers anger, empathy, or sectarian political satisfaction, without first verifying it. This gap between the sophistication of information manipulation tools and the critical capacity of users creates a gaping hole for the proliferation of political hoaxes (Tahir et al., 2020).

Facing this systemic threat, purely technical approaches such as blocking websites or removing content by the government have proven inadequate. Such reactive strategies consistently lag behind the pace of AI algorithm replication and innovation (Amilin, 2019). Therefore, a new paradigm is needed that focuses on strengthening the defenses from the downstream side, namely the information users themselves. Transforming society from merely passive consumers of information to critical and skeptical agents is a crucial need that cannot be postponed any longer (Iswara, 2021).

This is where the importance of repositioning digital literacy lies, no longer simply the ability to operate hardware or understand basic application features. Digital literacy in the era of artificial intelligence must be elevated to the ability to understand how algorithms work, detect computer-generated visual-audio anomalies, and understand confirmation bias. The public needs to be equipped with higher-order critical thinking skills so they can interrogate the political information they receive online before deciding to believe or share it (Ar & Apriyani, 2019).

However, strengthening digital literacy will not be optimal without a structured, massive, and sustainable public education campaign. Public education must be able to reach all levels of society, from the digitally active younger generation to the older age group, who are often easy targets for disinformation due to limited technological adaptation (Pratama et al., 2022). This education program needs to involve a solid multi-stakeholder synergy, encompassing formal educational institutions, civil society organizations, the mass media, and collaboration with digital platform providers themselves to provide inclusive literacy (Zahro et al., 2023).

Based on this phenomenon, the essence of maintaining the sustainability of democracy lies in the strength of the nation's awareness in stemming the flow of information manipulation. Examining how digital literacy and public education strategies are formulated amidst the onslaught of artificial intelligence technology is highly relevant and urgent. Through a deep understanding of these dynamics, it is hoped that effective policy formulations and social movements can be found to save Indonesia's digital political ecosystem from information destruction.

B. METHOD

This research employed a descriptive qualitative method focused entirely on secondary data analysis. Secondary data sources were obtained through a search of reputable scientific literature, policy briefs, official reports from election supervisory institutions, government regulatory documents, and analytical articles from credible fact-checking organizations. Data collection was conducted systematically using documentation techniques and a literature synthesis matrix as an instrument. Search keywords were aligned with the study's focus, which focused on political disinformation, artificial intelligence technology, digital literacy, and evaluation of existing public education programs. All collected secondary data was then analyzed to objectively map the dynamics of the phenomenon. The data analysis process included data reduction, interpreting the data, and drawing conclusion from the data exist (Clark & Buckley, 2017; Mezmir, 2020).

C. RESULT AND DISCUSSION

1. Characteristics of AI-Based Political Disinformation and the Failure of Conventional Digital Literacy

The contemporary political communication landscape is currently facing a new wave of disruption driven by the rapid innovation of artificial intelligence (AI). The forms of political disinformation have undergone a radical tactical evolution. While in the past decade, political hoaxes were dominated by narrative text manipulation and amateur image editing, the pattern has now shifted toward the use of highly capable multimedia content. The advent of generative AI allows the production of fake content on a massive scale, at low cost, while maintaining a near-perfect visual and auditory resemblance to reality (Sharma et al., 2023).

The key characteristic that distinguishes AI-based disinformation from conventional hoaxes lies in its ability to create a psychological effect known as the illusion of truth. Academic documents show that the human brain naturally trusts information presented in audio-visual form more readily than in text (Pati & Kumar, 2023). When deepfake technology can precisely mimic the face, facial expressions, and

even the intonation of a political figure, the line between objective fact and digital fabrication collapses. As a result, these documents fraud no longer merely manipulate opinion but are capable of manipulating the public's memory of a political event.

Furthermore, the primary danger of AI-based disinformation lies not only in its technical sophistication but also in the speed of its transmission (Giansiracusa, 2021). This manipulative content is automatically distributed by networks of intelligent algorithm-based bots across various social media platforms. These AI bots are programmed to detect trends in public discussion and inject hoax content into relevant digital discussion spaces. This speed of automatic replication and amplification allows political disinformation to go viral within minutes, even before the platform's content moderation system has time to detect it.

Beyond visual aspects and speed, secondary data also highlights the use of psychographic profiling facilitated by artificial intelligence algorithms (Pitt et al., 2020). Through big data analysis of internet user behavior, disinformation spreaders can map the political tendencies, fears, and emotional preferences of specific groups. AI-based political hoax content is then specifically designed to target these groups' psychological vulnerabilities. This highly personalized distribution model makes disinformation messages far more persuasive and destructive, as the content works by validating existing biases and prejudices in the audience's minds.

The detrimental impact of this highly personalized and massive penetration of disinformation directly leads to the erosion of public trust in democratic institutions (Gunawan & Ratmono, 2021; Ramadlan & Afala, 2022). Annual reports from various election monitoring institutions indicate that when the public is continually exposed to deepfake content, they reach a point of acute information apathy (Vaccari & Chadwick, 2020; Verma, 2023). This condition triggers an infodemic phenomenon, where the public chooses to distrust any information at all, including official information released by election organizers. This mass distrust poses a serious threat to the legitimacy of the political process and national security stability.

Ironically, amidst the onslaught of such sophisticated information manipulation technology, the public's literacy has stagnated. The National Digital Literacy Index consistently shows that Indonesians' digital literacy scores remain at a level that is far from ideal for facing the AI era. This secondary data confirms a major anomaly, society has a very high level of device adoption and social media consumption, but this is not matched by the capacity to think critically in digesting the content of messages they receive in cyberspace (Komdigi, 2023).

The main failure of the digital literacy model implemented so far is rooted in its functional basic focus on teaching. A review of various digital literacy modules shows that educational materials still focus on technical skills (hard skills), such as how to operate devices, communication etiquette, and creating secure passwords. This conventional approach assumes that hoaxes are simply fake news texts that can be verified by searching for comparison links in search engines (Ilomäki et al., 2023). This theoretical framework becomes completely obsolete when confronted with AI-driven disinformation that simultaneously manipulates the senses of hearing and sight.

Furthermore, conventional digital literacy tends to ignore the cognitive psychology of information users, particularly the phenomenon of confirmation bias. The literature show that individuals tend to consume and share information not based on its factual accuracy, but rather on its alignment with their political beliefs (Beam et al., 2016). Current digital literacy curricula have not yet trained people to recognize this personal bias. As a result, even if someone knows how to technically fact-check, they often neglect to do so if the provocative AI content benefits their political side.

Another weakness identified is the absence of material on digital choice and how platform algorithms work. Most social media users are unaware that their timelines are governed by recommendation algorithms deliberately designed to maximize engagement. Controversial AI-based content that provokes public outrage tends to be amplified by algorithms because it generates high levels of interaction (Khambatta et al., 2023; Saig & Rosenfeld, 2023). Without an understanding of the attention economy, people will continue to be victims of manipulation without realizing that their information choices are being steered by computer systems.

On the other hand, the generation gap also exacerbates the ineffectiveness of existing conventional digital literacy programs. Analysis of sociological reports shows that current digital literacy education programs primarily target academics and young urban populations (Rahayu, 2021). Meanwhile, older adults and people in rural areas, who are statistically the most vulnerable to believing and spreading political disinformation, are often overlooked. Limited access to relevant education makes these vulnerable groups easy targets for AI-based political manipulation.

Theoretically, this failure of conventional digital literacy confirms that approaches focused on addressing downstream symptoms are no longer relevant. Requiring individuals to manually detect deepfakes is almost impossible, given that AI generator technology is constantly improving its capabilities. Until digital literacy is reconstructed to foster a systematic, skeptical mindset and a deep understanding of the intelligent technology ecosystem, the public will remain at a disadvantage to disinformation producers.

2. Reconstructing Public Education: From a Reactive Approach to a Proactive Collaborative Approach

The increasingly sophisticated challenge of artificial intelligence-based political disinformation demands a complete overhaul of public education strategies. Based on an analysis of policy documents and periodic reports from non-governmental organizations, the current public education model is deemed inadequate to stem the flow of digital hoaxes. Most programs implemented by government agencies and literacy communities remain trapped in a conventional paradigm that emphasizes post-event management (Susilo, 2020). As a result, educational programs consistently lag behind the dynamics of innovation in information manipulation technology.

The fundamental weakness of this old model is reflected in the dominance of downstream-reactive approaches, such as content takedowns and fact-clarification (debunking). The periodic reports from fact-checking organizations shows that debunking articles are only published hours or even days after an AI-based piece of disinformation goes viral. By the time the clarification article was published, the deepfake content, or politically manipulative narratives spread by algorithmic bots. It

had already been consumed and believed by millions of social media users, rendering its recovery function highly biased and suboptimal.

The ineffectiveness of this reactive approach is further clarified by the characteristics of AI technology, which can produce millions of variations of false content in a short time at minimal cost. When a single website or social media account is blocked by authorities, disinformation producers can easily produce hundreds of new cloned accounts using automated bot scripts. An analysis of the theoretical literature confirms that relying on teams of human fact-checkers to manually filter machine-generated content is a losing strategy, like fighting a tsunami of information with a scoop (Hsu et al., 2023).

Therefore, it is crucial to have a paradigm shift involving a complete transition to a proactive public education strategy. One method now widely adopted in global digital literacy discourse is the concept of prebunking (Neidhardt, 2021). Unlike debunking, which corrects falsehoods after exposure, prebunking works like a medical vaccine. This strategy is implemented by equipping and training the public about the tactics, motives, and anatomy of AI-based information manipulation before they are actually exposed to political hoaxes online.

Through the application of the prebunking method, the public is educated about how AI video generator or voice cloning technology works and how such content is engineered for political propaganda. Research in communication psychology shows that when individuals understand the manipulative structure behind a technology, they automatically develop a healthy skepticism (Giarlo, 2006). When they encounter suspicious videos or audio of political figures on their timelines, their cognitive systems will not immediately believe them but instead activate critical defense mechanisms.

However, this reconstruction of public education will be meaningless if the learning materials are not adapted to the needs of the artificial intelligence era. The public education curriculum must be immediately elevated from merely conventional media literacy to AI literacy. The important aspects of this new curriculum include a basic introduction to the architecture of social media algorithms. An understanding of how content recommendation systems work, and practical skills in recognizing subtle visual or audio distortions characteristic of the output of generative generator technology.

Beyond technical aspects, secondary data also underscores the importance of incorporating emotional literacy into public education materials (Rusdiyanti et al., 2023; Cyntia, 2019). AI-based political disinformation creators often utilize algorithms that prioritize high engagement by exploiting negative emotions such as anger, fear, and intergroup hatred. Reconstructed public education must train the public to develop emotional awareness so that when they read or view political content that triggers excessive emotional reactions, they can refrain from immediately sharing it.

For this proactive public education program to reach all levels of society in a massive and equitable manner, the involvement of formal educational institutions is absolutely essential (Rohani, 2021; Suardi, 2017). Analysis of education policy documents demonstrates the need to integrate AI literacy materials into the national curriculum, from elementary school through university (Kang, 2022). This is crucial

so that the younger generation, who statistically represent the largest number of internet users and are first-time voters in elections, develop solid foundational competencies as responsible digital citizens who are not easily manipulated by practical political interests.

Furthermore, public education must not neglect groups outside the formal education system, such as the elderly and rural communities. Sociological reports indicate that these groups are often the most active spreaders of hoaxes due to limited technological adaptation and a lack of verification opportunities (Anthonysamy & Sivakumar, 2022; Khan & Idris, 2019). Therefore, the public education movement must be inclusive, utilizing informal channels, such as empowering local communities, religious organizations, religious study groups, youth organizations, and traditional media such as local radio broadcasts, which still have a loyal audience.

Implementing all of these public education reconstruction initiatives requires a multistakeholder governance model. The narrative emerging in various policy documents emphasizes that the government, through relevant ministries, cannot work alone to address this systemic problem. Solid, institutionalized synergy is essential between ministries, election supervisory bodies, academic institutions, community organizations, and non-governmental organizations engaged in fact-checking and digital literacy (Ramašauskaitė, 2023).

A critical component of this multi-stakeholder collaboration model is the active involvement of the social media technology platform companies themselves. Digital industry reports indicate that platform owners retain full control over the algorithmic architecture that distributes disinformation (Napoli, 2021). Collaboration with digital platforms must be directed toward algorithm transparency, AI-based automatic labeling of content suspected of being artificially engineered (AI-generated content), and funding commitments to support public education and independent research on the impact of AI on democracy.

Through this proactive, multi-stakeholder synergy, public education will transform from a sporadic and ceremonial outreach project into a sustainable socio-cultural movement. The cognitive resilience of the public will no longer be built individually, but collectively through a healthy digital ecosystem. Every element of society will strengthen each other, where individuals with high literacy can act as information filtering agents for their smaller environments, such as families and friendship communities (Jones-Jang et al., 2019; De Paor & Heravi, 2020).

From the perspective of the sustainability of digital democracy, the success of this reconstruction of public education will determine whether AI technology will be a blessing or a curse for a nation's political order. When society possesses robust cognitive capacity, cyberspace will no longer be easily contaminated by psychological warfare based on slander and audio-visual manipulation. The process of political contestation can then be returned to its substantive path: a battle of ideas, visions, missions, and work programs oriented toward the public good, not the manipulation of perceptions based on artificial intelligence.

3. Collaborative Governance Model and Adaptive Regulatory Framework in the AI Era

The successful implementation of proactive digital literacy and comprehensive public education requires the support of a robust policy umbrella through collaborative governance (multistakeholder governance). However, conventional regulatory approaches relying on sole government control (top-down regulation) have proven to be no longer adaptive to the rapid evolution of Artificial Intelligence (AI)-based political disinformation. The cross-border and dynamic nature of AI technology demand a clear division of responsibilities between the state, corporate platform providers, academics, and civil society organizations to safeguard public information sovereignty.

In this governance model, the government's role must shift from being merely a reactive censor to an adaptive facilitator and regulator. Secondary data shows that existing legal instruments are often bogged down in repressive, restrictive provisions that threaten freedom of expression rather than addressing the root causes of the technology itself (Feldstein, 2021). Therefore, academic documents recommend regulatory reforms that focus on standardizing the use of AI in political communication, such as mandating registration of campaign algorithms and transparency of digital political advertising funding to prevent covert manipulation of public opinion.

The second crucial component of this collaborative governance is enforcing accountability from the giant social media platform providers, as the rulers of the digital ecosystem A synthesis of literature on the political economy of digital media emphasizes that platforms must be legally compelled to implement the principle of safety by design. Digital platforms should no longer hide behind their status as passive infrastructure providers, but must instead be held accountable for the social impact of their recommendation algorithms. It often amplifies AI-based political disinformation content in pursuit of profit from engagement metrics (Woods, 2021; Woods & Perrin, 2021).

One technical regulation urgently needed through collaboration with platforms is the mandatory embedding of digital watermarks and anti-counterfeiting metadata on all content produced by generative artificial intelligence. Through this adaptive regulation, whenever deepfake technology or AI image generators are used to produce political content, the platform's system will automatically detect the internal code and display a visual warning to users. This policy will significantly reduce the cognitive burden on the general public, as the digital system will assist in the initial screening of the content before it is consumed.

In addition to platform regulation, secondary data also highlights the urgency of establishing an independent AI ethics board comprising technology experts, academics, and human rights activists (Pizzi et al., 2020). This independent board will serve as an external oversight body tasked with providing recommendations for regular algorithm audits of social media platforms, particularly in the lead-up to elections. The presence of this independent body is crucial to ensure that the technical interventions implemented by platforms to combat hoaxes are not misused for political censorship that benefits those in power or discredits certain opposition groups.

Meanwhile, from a law enforcement perspective, secondary data from judicial reports demonstrates the need to increase the capacity of law enforcement officers in AI-specific digital forensics (Faqir, 2023). Handling AI-based political disinformation cases can no longer be resolved using conventional cyber investigation methods. Police and prosecutors need to be equipped with sophisticated deepfake detectors and a thorough understanding of digital evidence law to prosecute the intellectual actors behind AI hoaxes, rather than simply apprehending the small, vulnerable individuals who are the first sharers.

This collaborative governance model must also position civil society organizations and the fact-checking community as strategic partners, not mere complements. Election monitoring reports emphasize that civil society has greater flexibility and public trust than government institutions in verifying information. The government and digital platforms must provide transparent and legal access to API (Application Programming Interface) data to independent researchers and journalists so they can track the spread of AI-based political disinformation in real time.

Furthermore, this integrated governance model must be realized through the establishment of a joint disinformation crisis center that operates intensively during political contestation. This multi-stakeholder crisis center will expedite bureaucratic communication channels. When the fact-checking community detects indications of a cyberattack in the form of malicious deepfake manipulation, platforms can immediately restrict the distribution of the content, security forces can immediately trace the source of the distribution, and election institutions can promptly issue official clarifications to the public.

Theoretically, the implementation of collaborative governance and adaptive regulation embodies the concept of democratic digital sovereignty. This strategy debunks the narrative that rapidly developing AI technology cannot be regulated by state law (cyber-libertarianism). Through a smart, inclusive, and flexible legal approach, the state, together with all stakeholders, can create firm ethical and legal boundaries without sacrificing the climate of freedom of expression and technological innovation, which are essential pillars of modern democracy.

In short, digital literacy and public education will never achieve maximum efficiency without being supported by a healthy regulatory and governance ecosystem upstream. Countering AI-based political disinformation requires a well-orchestrated, multifaceted effort that encompasses adaptive laws, technology platform accountability, and the critical engagement of civil society. Only through this macro-level synergy can the integrity of Indonesia's political cyberspace be saved from the threat of artificial intelligence-based information manipulation, while ensuring the continuation of a healthy and dignified digital democracy.

D. CONCLUSION

This study concludes that the escalation of Artificial Intelligence (AI)-based political disinformation such as deepfake technology and automated amplification through algorithmic bots has created a serious threat in the form of an illusion of truth that erodes public trust and undermines the integrity of digital democracy. Conventional digital literacy frameworks have proven to be dysfunctional because they still focus on basic technical skills and are not yet adaptive to artificial intelligence

technology, and ignore the aspect of user confirmation bias. Therefore, a complete reconstruction of public education is needed from its original downstream-reactive approach to a proactive-upstream approach through pre-bunking methods and strengthening AI literacy. This downstream strategy will only achieve maximum effectiveness if supported by a multi-stakeholder collaborative governance model and an adaptive regulatory framework, including enforcement of social media platform accountability through mandatory digital watermarking and regular algorithm audits, to create a resilient, healthy, and integrity-based digital political ecosystem.

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