Oral Memory Amidst Deepfakes: The Challenge of History Education in Strengthening Epistemological Awareness

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Abstract. The purpose of this article is to describe the challenges of oral history in history education in the deepfake era and to describe the strengthening of epistemological awareness in history learning to address the challenges of deepfakes. The method used in this research is a literature study consisting of reading, recording, analyzing, and processing library data. Data collection techniques used included literature studies at the Indonesian University of Education library and online media. Today's technological developments have reached a sophisticated stage. Technological developments have reached the stage of using the Internet of Things (IoT), big data, cloud data, and artificial intelligence. This technological influx has contributed to the proliferation of deepfakes, which threaten historical sources, including oral history sources. Historical sources in oral memory are important for documenting collective experiences and narratives of minor figures who are not widely recorded in written archives. Deepfakes, enabled by the internet, big data, and AI, threaten to cast doubt on the authenticity of digital data sources in audio, video, and writing. Therefore, this real threat can be serious when used in history education, leading to historical manipulation. The role of epistemological awareness is crucial for teachers and students, who not only achieve cognitive abilities through understanding knowledge but also need to explore the intensity and origins of historical data sources. Therefore, epistemological awareness in history education is needed primarily to trace and verify the authenticity and origins of oral history sources to address the influx of deepfakes.

Keywords: Deepfake, Epistemic Awareness, History Education, Learning History, Oral History.

1 Introduction

Deepfake technology is a form of artificial intelligence (AI)-based synthetic media used to create or manipulate multimedia content—such as audio, video, and images—to make it appear highly realistic. This technology relies on advanced deep learning algorithms; indeed, the term "deepfake" itself is a portmanteau of "deep learning" and "fake." Deepfakes utilize AI models such as Generative Adversarial Networks (GANs), autoencoders, and other machine learning techniques to generate highly realistic synthetic media. These models are trained on large-scale datasets to

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I. W. P. Utami and A. J. Abdilla (eds.), *Proceedings of the 3rd International Conference on History, Social Sciences, and Education (ICHSE 2026)*, Advances in Social Science, Education and Humanities Research 1037,
https://doi.org/10.2991/978-2-38476-624-6_15

mimic the facial expressions, voices, and mannerisms of target subjects [1],[2],[3]. Deepfake technology is an evolving field driven by AI that enables the production of realistic content.

Deepfakes can convincingly alter or fabricate content—such as swapping faces in videos, mimicking voices, or creating entirely synthetic personas. They offer positive applications in filmmaking, digital art, and advertising by enabling the creation of realistic effects or the digital resurrection of historical figures [4],[5],[6]. However, deepfakes are frequently used to spread fake news, manipulate political events, or incite social unrest [7],[8]. They erode trust in digital media by making it difficult to distinguish between authentic and fabricated content [9]. They pose a significant threat to history education, as it can lead to the fabrication of historical facts and the dissemination of misleading historical information.

Deepfake technology presents both opportunities and risks in shaping historical narratives. Deepfakes enable the digital resurrection of historical figures, allowing audiences to experience simulated narratives or reenactments of events that lack—or entirely lack—recorded documentation. That can serve as a vivid and engaging way to study history, particularly for educational purposes [10],[11]. Conversely, deepfakes sever the link between representation and reality, making it difficult for audiences to distinguish authentic historical records from fabricated ones. This ambiguity erodes trust in digital content and historical authenticity [12],[13]. Deepfakes can be weaponized to create "synthetic history" or manipulate historical records, leading to the spread of false narratives. For instance, composite deepfakes can integrate fabricated events into broader disinformation campaigns, thereby distorting public understanding of history [14]. Deepfakes pose a significant threat when applied to oral history materials that rely on audio or video recordings.

With the advent of AI, oral history faces a threat to the sustainability of its documentation. Deepfakes undermine the credibility of audiovisual content, making it difficult to distinguish between authentic and manipulated media [15]. It can have significant implications for oral history, which relies heavily on the authenticity of recorded interviews and narratives. Deepfake technology has been used to reconstruct historical figures and events for educational or artistic purposes [16]. It opens the possibility of using deepfakes to "bring back" historical figures or enrich oral history archives, although it also raises ethical concerns about misrepresentation and consent. The increasing prevalence of deepfakes underscores the importance of media literacy, particularly in fields like oral history, where practitioners and audiences must critically evaluate the authenticity of digital content [17],[18].

Deepfake technology, which uses artificial intelligence to manipulate audiovisual content, has significant implications for oral history, particularly regarding the preservation or distortion of personal testimony. Deepfakes undermine the reliability of audiovisual recordings, which traditionally serve as the "epistemic foundation" for verifying personal testimony [19],[20]. As deepfake technology becomes more sophisticated, the authenticity of recorded testimony is being called into question, triggering widespread epistemic uncertainty and declining trust in digital media [21]. Deepfakes can be used to fabricate testimony, portraying individuals as saying or doing things they never actually did. It has the potential to distort historical records and manipulate public opinion, especially if used maliciously to spread disinformation. The inability to distinguish between genuine and fake

content can trigger cognitive dissonance, anxiety, and erode trust in historical narratives, which in turn further complicates efforts to preserve authentic oral history. Previous research on deepfakes has focused on technological security in the economy, video artistry, and the use of deepfakes in data analysis. Subsequent research on deepfakes has focused on their use for video editing, creating videos and images, and artistry to realize creative ideas visually [22],[23]. To date, deepfakes have focused on preventing cybercrime in the digital economy [24],[25]. Further research on deepfakes has focused on neural networks as a tool for modern analysis [26],[27]. Meanwhile, deepfakes as they relate to history have been discussed in only one article, which focuses on the vulnerability of history to misinformation [28]. Therefore, this article focuses on discussing the real threats and challenges of oral history in the era of AI technology, specifically the development of deepfakes.

This article contributes to the discussion of the threats AI poses to oral history, particularly deepfakes. Furthermore, it discusses the challenges posed by deepfakes to oral history sources. Deepfakes offer the advantage of visually realizing creative ideas for specific purposes, such as in history, by evoking historical figures in visualizations to discuss specific topics as the creator wishes. This article's contribution can also be expanded by highlighting the paradox between educational potential and threats to the integrity of historical evidence. While deepfakes offer new opportunities in history education through compelling visualizations of past figures, this technology simultaneously carries significant risks of eroding public trust in authentic audiovisual evidence. This article highlights the threat of the liar's dividend, in which deepfake technology allows certain parties to deny legitimate historical truth by claiming that the evidence is the result of AI manipulation. In the context of oral history, this is particularly dangerous because testimonies containing bitter or controversial truths can easily be discredited, creating an era of "information uncertainty" that threatens the credibility of national archives. The purpose of this article is to describe the challenges of oral history in history education in the deepfake era and to describe the strengthening of epistemological awareness in history learning to address the challenges of deepfakes.

2 Theoretical Framework

2.1 Deepfakes

The theoretical frameworks surrounding deepfakes emphasize the interplay between technology, society, and ethics. They provide structured approaches to understanding public perception, user resistance, consumer behavior, and regulatory challenges. These frameworks collectively advocate a multidisciplinary approach that combines technical innovation, ethical considerations, and robust governance to address the evolving challenges posed by deepfake technology. Deepfake creation relies on advanced AI techniques such as Generative Adversarial Networks (GANs), Variational Autoencoders (VAEs), and diffusion models. These models enable the generation of hyper-realistic synthetic media, including images, videos, and audio [29],[30]. Issues such as consent, privacy, and the potential misuse of deepfakes for misinformation and fraud are central to the framework. Ethical governance and public awareness are emphasized to mitigate these risks. Deepfakes influence public

perception and cognitive schemas, necessitating media literacy and critical thinking to discern between real and synthetic content [28],[31].

2.2 Oral History

Oral history's theoretical frameworks are diverse and multifaceted, addressing themes of memory, subjectivity, power, ethics, and interdisciplinarity. These frameworks not only guide the practice of oral history but also position it as a critical tool for understanding and preserving human experiences. Memory is central to oral history, serving as both a source and a subject of analysis. Theoretical discussions often explore the relationship between memory and history, emphasizing how narrative memory shapes identities and serves as a documentary source. Oral history emphasizes the subjective nature of personal accounts, focusing on the interplay between the narrator's perspective and the historian's interpretation. This includes the study of self, subjectivity, and intersubjectivity in the creation of historical narratives [32],[33]. The rise of digital tools has introduced new challenges and opportunities for oral history, including online interviews and digital archiving, which require updated theoretical and methodological approaches [34],[35].

2.3 Epistimological Awarness

Epistemic awareness refers to the ability to reflect on and understand the nature, structure, and justification of knowledge, as well as the processes involved in knowing. It is closely tied to concepts such as epistemic cognition, metacognition, and reflection, and plays a critical role in learning, decision-making, and knowledge-building across various domains. Epistemic awareness is explored in epistemic logic through mechanisms like Awareness Logic, which distinguishes between explicit and implicit knowledge. This approach addresses the problem of logical omniscience by introducing awareness operators to separate what agents explicitly know from what they implicitly understand. Epistemic awareness is a multifaceted concept that bridges epistemology, logic, and cognitive science. It plays a vital role in enhancing reflective thinking, critical reasoning, and collaborative learning, particularly in education and knowledge representation [36][37][38].

2.4 21st-Century History Education

21st-century history education frameworks are characterized by a shift towards critical thinking, digital integration, and student-centered approaches, while addressing the challenges of balancing foundational knowledge with modern competencies. Modern history education aims to foster critical historical thinking by encouraging students to engage with multiple interpretations of the past. This approach emphasizes the development of historical consciousness and the ability to critically analyze historical narratives [39]. The social realist model, which focuses on disciplinary knowledge and understanding how historical knowledge is produced and validated, is a prominent framework. This contrasts with traditional and social constructivist models, which emphasize rote memorization or everyday experiences,

respectively [40]. Frameworks increasingly prioritize competencies such as critical thinking, historical inquiry, and problem-solving over rote memorization [41].

3 Methodology

This study employed the The literature review method relies on documents—such as books, journals, and other materials—to answer the research questions posed. This method aims to gather data and information, including theories, concepts, and various forms of qualitative and quantitative data, from a wide range of scholarly articles [42]. The data collection technique for this article involved a literature search in relevant scientific databases, including Google Scholar and Scopus, using the keywords "deepfake" and "oral history." The literature search was conducted in relevant scientific databases, including Google Scholar, Scopus, and academic journal databases related to history, communication, technology, and media studies. The selected articles were limited to publications that discuss oral history, deepfakes, audiovisual manipulation, and the authenticity of oral sources. Keywords used in the literature search included oral history, deepfake, audiovisual manipulation, authenticity, digital misinformation, fake audio, and synthetic media. Inclusion criteria were articles discussing oral history, deepfakes, and synthetic media, while exclusion criteria were articles that were irrelevant, duplicate, or lacked full text.

The data analysis technique employed interactive data analysis by Miles and Hubberman [43]. Interactive data analysis techniques are applied iteratively and in an interconnected manner from the beginning of data collection until the research is completed. This model consists of three main components: data reduction, data presentation, and conclusion drawing/verification. In the data reduction stage, researchers sorted relevant information with a focus on deepfakes and oral history, discarded unnecessary data, and grouped it into specific categories. This process was carried out not only at the end but also throughout the research. Next, the data was presented by organizing the reduced information to facilitate understanding and further analysis. The presentation takes the form of a narrative description that examines patterns, relationships, or trends emerging from the data. The final stage is discovering the meaning of the analyzed data, then testing whether the conclusions are consistent with the available evidence. It is not considered final from the outset, as it requires ongoing verification throughout the analysis process.

4 Results and Discussion

4.1 The Challenges of Deepfakes Against Oral Historical Sources

The rapid development of digital technology and social media today is transforming the global information landscape and erasing the traditional boundaries between producers and consumers of knowledge. Instant and widespread accessibility allows every individual to become a producer and distributor of information, including historical narratives. A significant negative consequence of this situation is the surge in the spread of false historical information (historical hoaxes or disinformation) that is produced in a planned and deliberate manner [44],[45]. In addition, another notable

development is the advancement of artificial intelligence (AI), which enables computer systems to mimic human cognitive abilities, such as facial recognition, language processing, and the generation of visual and audiovisual content. One AI product that has been widely discussed in recent years is deepfake technology a technique for manipulating audio, video, or images generated through artificial intelligence. This manipulation technique makes the resulting output whether audio, video, or images appear authentic, even though it is actually digitally fabricated [19],[46].

Deepfake technology allows someone to fabricate a person's facial expressions, movements, and voice with a high degree of precision, making it difficult to distinguish from the original. This technology utilizes artificial neural networks to generate highly realistic visual content. The deepfake phenomenon first drew public attention when manipulative videos featuring famous figures began appearing on the internet [47]. These videos caused confusion and posed a risk of disinformation. This phenomenon demonstrates that deepfakes have become a threat at the national level. This is further exacerbated by Indonesia's high internet penetration rate, which reached 79.5% or approximately 221 million people in 2024. However, this high internet penetration is not matched by sufficient digital literacy skills [48]. Deepfake technology is not merely a technical issue but also touches on psychological, social, political, and legal aspects, including historical research.

On one hand, the use of deepfake technology in creating historical narratives allows consumers to directly visualize historical figures or a historical period that appears authentic. On the other hand, however, it has the potential to create confusion between historical facts and digital fabrications [49],[50]. This, in turn, sparks debate about the impact of deepfake technology on the credibility of historical facts presented by the media. Not only that, but deepfake manipulation of historical sources has the potential to create a new history out of something that never existed. The results of deepfake manipulation do not merely alter or reinterpret existing historical facts but fabricate them from scratch. There is concern that this will obscure historical facts [51]. This issue becomes even more critical when it comes to oral historical sources. Oral historical sources are one of the primary sources obtained through interviews with historical actors or witnesses. Oral history is used to explore the experiences of ordinary people and to overcome the limitations of written historical documents [52]. Unlike written historical sources, oral history captures the interviewee's expressions, vocal intonation, pauses in speech, and even emotions. Until now, audio and video recordings from interviews have often been regarded as important historical sources. However, the emergence of deepfake technology threatens the credibility of oral historical sources.

Deepfake technology can alter or create new recordings from previously obtained audio or video recordings. As a result, the public and researchers can no longer rely on visual appearance or sound quality as the sole indicators of a source's authenticity. This situation demonstrates that technological advancements have transformed the way people evaluate historical sources. Not only does it threaten the credibility of oral historical sources, but according to research by McAvoy & Jenny Kidd [53], deepfake technology can obscure historical facts by reshaping the way people today remember and interact with their past. Deepfake audiovisual content, rich in detail and sensory elements, can serve as a powerful stimulus for the creation

of false memories, in which fictional events are mistakenly perceived as newly revealed historical facts. When deepfake content is so convincing and difficult to distinguish with the naked eye, recordings of oral historical sources are no longer automatically trusted as evidence [54],[55].

Another challenge posed by deepfakes to oral history sources is the misleading simplification of narratives. Some social media platforms tend to use deepfakes to promote sensational and emotionally charged content in order to attract public attention. As a result, complex oral history sources are often oversimplified or even presented in a way that contradicts the actual events [45],[56]. This misleading simplification of historical narratives has the potential to create powerful false memories. People with insufficient digital literacy skills will uncritically believe audio recordings that have been manipulated using deepfakes. This aligns with research conducted by Ali [57], which shows that most children are not yet able to accurately identify deepfake products or content and tend to trust visual content without verifying it.

This problem is further exacerbated by the rapid and easy spread of deepfake content across various social media platforms. The spread of deepfakes is influenced by the algorithmic characteristics of digital platforms that prioritize content with high engagement rates, such as manipulative content that evokes strong emotions like shock, anger, or intense curiosity. Such content is more likely to attract public attention and be promoted by algorithms. According to a report by VIDA (2023), cases of deepfake-based fraud have increased by 1,550% over the past two years, with the majority occurring and circulating on social media [58]. This type of content has the potential to be misused with far-reaching social impacts and can influence public opinion on a large scale even though it lacks a clear factual basis [59]. Therefore, basic skills are needed to prevent and protect oneself from manipulative deepfake content that threatens the credibility of oral history sources, so that the public can independently verify the credibility of oral history sources.

4.2 Strengthening Epistemological Awareness to Address the Challenges of Deepfakes Against Oral Historical Sources

The challenges posed by the deepfake AI era to oral historical sources cannot be resolved simply by avoiding technology. On the contrary, a more realistic solution is to equip students with structured critical thinking skills, one of which is through an epistemological approach. Epistemology, as a branch of philosophy that questions the origins, validity, and limits of knowledge, offers a relevant framework to help students assess whether a historical source is trustworthy or not [60]. In the context of history learning at the senior high school level, this approach is not abstract in nature; rather, it can be operationalized through concrete steps in tracing sources. One practical path that can be taken is by integrating digital literacy into the process of tracing historical sources. Digital literacy is not merely the ability to use technological devices, but also encompasses the ability to evaluate, select, and verify information found online [61],[62]. When this ability is combined with epistemological awareness, students not only know how to search for sources, but also understand why a source is or is not worthy of being used as a reference in building historical knowledge.

The deepfake AI era is characterized by a flood of content generated automatically by artificial intelligence, ranging from text and images to audio recordings that appear to be genuine testimonies. This condition directly threatens the integrity of historical sources, particularly oral sources, as the boundary between authentic testimonies and artificially generated content becomes increasingly blurred [28],[63]. Therefore, before students are taught how to trace sources, they must first be equipped with the critical awareness that ease of access to information does not correlate with the truthfulness of that information. Students need to understand that historical sources carry their own layers of complexity that cannot simply be overlooked. Every oral testimony raises fundamental questions such as "who is speaking?", "in what social and political context are they speaking?", and "what purpose or interest underlies their statement?". These questions are not a form of excessive suspicion, but rather part of how historical scholarship itself validates sources [64],[65]. Without this foundational awareness, students will easily fall into the trap of information that appears convincing in presentation and packaging, yet cannot actually be historically or academically justified.

Once epistemological awareness begins to take shape, the next step is to provide students with thinking tools that can be used practically in evaluating historical sources. The epistemological method in the context of history can be operationalized through three key questions taught to students in a gradual manner: where does this source come from, how was this source produced, and who benefits from the narrative within this source? These three questions are interconnected and cannot be separated from one another, as the answer to one question will influence how students understand the answers to the others. These questions are part of a long-standing historiographical tradition used by professional historians to test the validity and reliability of historical sources [66],[67],[68]. This means that when senior high school students are trained to use this framework, they are in fact learning to think in the same way as historians not merely memorizing facts, but actively and critically constructing historical knowledge [69],[70]. When the habit of raising these questions is applied consistently, students are indirectly building a cognitive defense that protects them from the traps of disinformation, false narratives, and AI-generated content that is increasingly difficult to distinguish from authentic sources in today's era.

In the specific process of tracing oral historical sources, the epistemological approach directs students not to accept a single person's testimony as a standalone truth. This is important because oral sources, despite their high historical value, are inherently subjective they are shaped by memory, emotion, perspective, and even the social pressures experienced by the narrator at the time of speaking [71],[72],[73]. In the deepfake AI era, this risk is further compounded by the fact that audio recordings or video testimonies circulating digitally cannot always be verified for authenticity without a careful verification process. To address this, oral sources must be confirmed through other mutually supporting sources, whether written documents, photographs, personal diaries, or relevant official archives. It is through this process that students learn to place oral sources in their proper position within the construction of historical narrative neither doubted to the point of losing their value, nor accepted uncritically without any form of examination. This balance is the essence of epistemological thinking in history: treating sources as evidence while understanding that every piece

of evidence has its own limits and limitations [74][75][76]. The ability to maintain this balance is what distinguishes students who merely consume information from those who are genuinely capable of thinking historically and critically.

This is where digital literacy enters as a vitally important supporting skill within the epistemological framework of history being constructed. It must be emphasized that digital literacy, as referred to here, is not merely the technical ability to operate devices or access the internet, but rather a thinking competency that enables a person to interact critically with digital information [77],[78]. In practical terms, digital literacy enables students to trace historical sources more broadly and efficiently for example, by accessing digital archives, historical journal databases, or oral history recordings stored online. Access to these sources opens up far greater possibilities compared to relying solely on textbooks available at school [79],[80]. However, this ease of access simultaneously brings a new challenge: the more sources that are available, the greater the likelihood that students will encounter inaccurate information. This is precisely where critical digital literacy becomes indispensable. Students need to be trained not to stop at the step of finding a source, but to continue on to the step of evaluating it.

Ultimately, the integration of epistemological methods and digital literacy in history learning at the senior high school level is not merely about producing students who are skilled at finding sources. More than that, the goal is to shape students who are capable of thinking independently and responsibly regarding the knowledge they receive and disseminate. In the midst of a rapid and not always easily verifiable flow of information, this ability becomes a far more valuable foundation than mere mastery of historical content alone. Students who possess epistemological awareness are students who are not easily manipulated by false narratives, while at the same time being able to appreciate the complexity of history as a field of knowledge.

5 Conclusion

Oral history sources in history education in the deepfake era face new challenges in maintaining their credibility and authenticity. Deepfake AI's ability to manipulate audio, video, and visuals makes it difficult to distinguish between genuine and fabricated sources. This situation not only threatens the credibility of oral testimony as a primary historical source but also has the potential to generate disinformation, create false collective memories, and obscure historical facts, influencing the public's understanding of their own nation's history. It is exacerbated if students cannot evaluate oral history sources in the digital world. Therefore, history instruction needs to develop epistemological awareness as a basic competency for students in evaluating historical sources. Epistemological awareness encourages students to question the origins, production process, context, and underlying interests of a source. It enables students to evaluate the credibility of oral history sources. This ability can be strengthened through digital literacy, which empowers students to access sources as needed, compare multiple sources, and verify a source's credibility.

Acknowledgments. This research is funded by the Universitas Pendidikan Indonesia through the research scheme/program of Afirmasi Dosen with Contract No. 411 /UN40.F7/PT.01.01/2026.

Disclosure of Interest. The authors declare the following financial interests: This study was funded by Universitas Pendidikan Indonesia under grant number No. 411 /UN40.F7/PT.01.01/2026. All authors has received research support from Universitas Pendidikan Indonesia within one years. All other authors declare no financial interests relevant to this work. The funding source had no influence on the study design, data interpretation, or conclusions drawn in this manuscript.

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