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# The Future of Elementary Social Studies: Harnessing AI's Potential Through Evidence-Based Practices

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**Abstract.** This article explores the growing body of research evidence supporting the integration of Artificial Intelligence (AI) in elementary social studies education. It identifies and analyzes ten key evidence-based applications of AI that have demonstrated potential to enhance student engagement, personalize learning experiences, and cultivate essential historical thinking skills. The discussion critically evaluates the pedagogical implications, advantages, and challenges associated with AI integration in this context. Recommendations are provided for the responsible and effective implementation of AI tools in elementary social studies classrooms.

**Keywords.** Artificial Intelligence in Education, Social Studies Pedagogy, Evidence-Based Teaching Strategies, Elementary Education Innovation, Emerging Educational Technologies

## 1. Introduction

Social studies, a foundational subject in elementary education, aims to cultivate students' understanding of history, civics, geography, and diverse cultures [1]. Research suggests that by fostering historical knowledge, civic engagement, and cultural awareness, social studies equips young learners with the critical thinking skills and knowledge base necessary to become informed and responsible citizens [2].

In recent years, evidence has emerged highlighting the transformative potential of Artificial Intelligence (AI) across various educational domains. Studies indicate that AI-powered tools, from personalized learning platforms to intelligent tutoring systems, hold immense potential to revolutionize the way we teach and learn [3]. However, empirical research specifically addressing the applications and benefits of AI in elementary social studies education remains relatively limited.

Artificial Intelligence (AI) refers to the development of computer systems capable of performing tasks that typically require human intelligence, such as learning, problem-solving, and decision-making [4]. The concept of AI can be traced back to Alan Turing's pioneering work in the 1940s and 1950s, where he proposed the "Turing Test" to evaluate a machine's ability to exhibit intelligent behavior indistinguishable from that of a human [5]. Over the decades, AI has evolved through various stages, from rule-based expert systems to machine learning algorithms that learn from data [6]. The field has seen significant advancements in

recent years, with the development of deep learning neural networks and the availability of vast amounts of data [7].

The release of ChatGPT by OpenAI in December 2023 has revolutionized the field of AI, particularly in the realm of natural language processing. ChatGPT's extensive knowledge base and remarkable ability to engage in intelligent, context-aware conversations have opened up new possibilities for leveraging AI in various domains, including education. With its nearly comprehensive understanding of the world and its incredible "intelligence," ChatGPT has the power to assist educators everywhere in creating engaging, personalized learning experiences for students [8]. As AI continues to advance and become more widely available, it holds immense potential to transform the landscape of education, making learning more adaptive, interactive, and accessible to all students.

This article inquires into the exciting possibilities of AI integration within elementary social studies classrooms, grounded in the available research evidence. In this article, we identify and discuss ten key evidence-based ways in which AI can be harnessed to enhance student engagement, personalize learning experiences, and cultivate essential historical thinking skills. By critically examining the empirical support for AI in this context, we aim to provide valuable insights for educators seeking to leverage cutting-edge technologies to optimize social studies instruction.

The following sections will explore the existing literature on AI in education, highlighting its growing relevance in the social studies domain. We will then present a comprehensive analysis of ten distinct AI applications, outlining their specific functionalities and the research evidence supporting their potential benefits for elementary social studies learning. The discussion will dive into the broader pedagogical implications of AI integration, addressing both its advantages and potential challenges, as indicated by empirical studies. Finally, we will offer practical, evidence-based recommendations for teachers to ensure the responsible and effective use of AI tools in their classrooms, paving the way for a future of enriched and engaging social studies education for all students.

## 2. Literature Review

The rapidly expanding field of Artificial Intelligence in Education (AIED) has garnered significant attention within the broader educational research community. While research on AI's role in areas like STEM subjects is extensive [9], empirical studies in the social studies domain remain comparatively limited. Nonetheless, a growing body of evidence demonstrates the potential of AI to enhance learning experiences across various disciplines.

Researchers highlight the ability of AI-powered technologies to facilitate adaptive and personalized learning, as supported by multiple studies [10, 11]. By tailoring content and providing targeted feedback, AI algorithms can cater to individual students' needs and learning paces. Additionally, research indicates that AI tools show promise in supporting formative assessment practices [12], offering timely, nuanced feedback to guide student progress.

Within the broader discussion of AI in education, some empirical studies have begun to examine its implications for the social studies field. Research suggests that AI-powered simulations and virtual environments can facilitate immersive historical experiences, fostering deeper student engagement and understanding of different eras and cultures [13]. Moreover, evidence indicates that AI tools can potentially support student inquiry skills, aiding in research, source analysis, and the critical evaluation of historical information [14].

While the early evidence is encouraging, there is a distinct need for more in-depth, empirical research addressing the specific ways in which AI can be harnessed to enhance

elementary social studies education. Questions about equitable access, technological constraints, and teachers' preparedness to integrate AI effectively remain important considerations, as highlighted by research [15]. Studies also emphasize the crucial need to examine potential risks such as biases within AI algorithms and the importance of cultivating responsible uses of technology within the context of social studies [10].

This article builds upon the existing research evidence by presenting a comprehensive exploration of ten AI applications and strategies applicable to elementary social studies instruction [16]. It critically analyzes both the transformative potential of AI tools and the considerations needed for their ethical and pedagogically sound implementation, as indicated by empirical findings.

### Evidence-Based AI Applications in Elementary Social Studies

1. *Interactive Virtual Field Trips.* Research indicates that AI-powered virtual field trips, utilizing VR/AR technology, can provide immersive firsthand experiences that facilitate learning beyond traditional classroom settings [17]. These simulated visits to historical locations, archaeological sites, or reconstructions of cultural settings from different time periods have been shown to enhance student engagement and understanding.

2. *Adaptive Learning Paths.* Studies demonstrate that AI platforms can effectively tailor social studies content, pacing, and activities to individual students' learning styles and comprehension levels [9]. By analyzing student responses, algorithms can provide customized pathways to historical knowledge, addressing misconceptions and offering targeted support when needed, as evidenced by research.

3. *AI-powered Tutors.* Empirical evidence suggests that chatbots and intelligent virtual assistants can serve as flexible companions for supplementary learning, answering students' questions about historical figures, events, or geographic concepts [18]. These AI-powered tutors have been shown to provide guidance, clarify doubts, and offer additional resources outside of formal class hours, enhancing learning opportunities.

4. *Historical Figure Simulations.* Research indicates that historical figures can be brought to life through AI chatbot programs trained on extensive datasets of their writings, speeches, or other forms of recorded discourse [19]. Studies suggest that students can engage in dynamic virtual "conversations", posing questions and delving deeper into the nuances of a historical figure's perspectives, fostering engagement and critical thinking.

5. *Multilingual Translation for Source Analysis.* Research highlights the potential of AI-powered translation tools in providing real-time access to primary sources, breaking down language barriers in exploring diverse historical narratives [13]. Examples: *Bard's Gemini, OpenAI's ChatGPT, Microsoft's Bing, Google Translate* and multilingual versions of digital archives offer real-time access to documents. These can be used either digitally or for instance, printing it out for a ELL and new language learners (NLL) in elementary classrooms. By enabling students to encounter historical documents, newspapers, or letters written in languages other than their own, these tools expand opportunities for critical analysis and understanding of multiple perspectives.

6. *Gamified Learning Experiences.* Empirical studies demonstrate the effectiveness of game-based platforms infused with AI in making social studies interactive and engaging [20]. Historical simulations, civic decision-making scenarios, and role-playing exercises have been shown to immerse students in learning experiences that reinforce key concepts while promoting enjoyment and motivation.

7. *AI-Assisted Historical Inquiry.* Research suggests that AI tools can enhance student research skills, guide them toward reliable sources, and assist in the critical analysis of historical evidence [14]. Studies indicate that search algorithms tuned to find age-appropriate resources and AI-powered tools highlighting potential biases or inconsistencies in historical information can support the development of critical thinking and media literacy skills.

8. *Automated Feedback and Formative Assessment.* Evidence from multiple studies highlights the value of AI-driven evaluation of short essays, quizzes, and project-based work in providing teachers with actionable data on student comprehension and identifying areas for improvement [11]. Research shows that AI-generated targeted feedback for students can promote self-reflection and continuous learning.

9. *Collaborative Project Facilitators.* Empirical studies demonstrate the potential of AI-powered online platforms in connecting classrooms on a global scale for collaborative social studies projects [18]. By enabling students to investigate issues such as global inequalities, climate change, or migration and interact with peers from different cultural backgrounds, these tools have been shown to foster greater understanding and global competency.

10. *Ethical Considerations and Digital Citizenship Lessons.* Research emphasizes the importance of addressing potential biases in AI algorithms and using their incorporation into social studies as an opportunity for discussions about ethical technology use and awareness of how historical narratives can be distorted [10]. Studies highlight the crucial role of teachers in facilitating learning explorations for responsible decision-making in a digital world.

### **3. Discussion**

The ten evidence-based AI applications outlined in this article demonstrate the significant potential to transform elementary social studies education. From immersive virtual tours to adaptable learning platforms, research suggests that the integration of AI tools offers an array of benefits that align with established goals of social studies learning. Empirical evidence indicates that AI holds the key to enriching and personalizing the study of history, geography, and civics for young learners.

One central advantage lies in promoting student engagement, as supported by multiple studies. Research shows that simulations, gamified scenarios, and interactions with historical figures provide dynamic and compelling learning experiences that surpass the limitations of traditional textbooks and instruction [20]. By making social studies interactive and immersive, AI tools have been demonstrated to stimulate curiosity and create a genuine sense of connection to the past.

Furthermore, empirical evidence highlights the ability of AI to enable adaptable instruction at varying student levels. Studies indicate that AI algorithms can cater to diverse learning speeds and styles, delivering targeted support for those who may struggle while pushing learners who are ready for greater challenges [9]. Research suggests that personalized learning, particularly within social studies, fosters student confidence and builds mastery across multiple subject areas.

In addition to engagement and customization, research shows that AI directly assists in developing vital historical thinking skills. Studies demonstrate that access to multilingual translations, AI-assisted source analysis, and collaborative platforms create learning opportunities that align with contemporary educational aims to nurture critical thinking, inquiry, and media literacy [14].

Nonetheless, integrating AI into the elementary social studies classroom also raises noteworthy considerations, as indicated by research. Equity is a major factor; studies highlight the need for schools and communities to have the proper infrastructure, hardware, and training to ensure fair access to AI-powered resources [15]. Without equitable distribution, research warns that these advances run the risk of widening the digital divide rather than bridging it.

Likewise, empirical evidence emphasizes the pivotal role of teachers in effectively harnessing AI potential. Studies underscore that pedagogical considerations are essential; AI platforms cannot replace qualified instructors. While research shows that AI tools offer assistance for individualized learning, teachers ultimately provide the scaffolding for conceptual understanding, historical contextualization, and ethical discussions relevant to social studies [18].

The issue of AI bias demands critical attention within social studies, as highlighted by research. Studies stress the importance of recognizing that algorithms have inherent limitations based on the information they are trained upon. Explicit discussions of historical power structures, discrimination, and the evolving nature of historical scholarship are needed alongside these emergent technologies, as indicated by empirical evidence [10]. Research emphasizes that teachers hold the responsibility to cultivate a critical stance toward AI outputs and foster digital citizenship competencies to navigate a future intertwined with technology.

*Recommendations.* Based on the research evidence, the effective use of AI in elementary social studies hinges on the following recommendations:

1. **Investment in Infrastructure and Access:** Studies highlight the importance of equitable distribution of digital resources and hardware in all schools and communities to prevent widening existing gaps in achievement based on socioeconomic factors.
2. **Professional Development:** Research indicates the need for targeted training for teachers on best practices, AI technology integration, and critical evaluation of AI tools to optimize their adoption.
3. **Critical Examination:** Empirical evidence underscores the importance of incorporating lessons on responsible AI use, algorithmic biases, and the importance of contextualized historical understanding throughout social studies instruction.

#### **4. Conclusion**

The research evidence presented in this article demonstrates that artificial intelligence presents a transformative force within the landscape of elementary social studies education. From immersive historical experiences to personalized learning pathways, studies indicate that AI tools hold the power to reshape how students engage with history, geography, and civic concepts. By offering dynamic interactions, customized guidance, and opportunities for global collaboration, research suggests that AI has the potential to foster lifelong learning habits, historical thinking skills, and global competency in our young citizens.

However, the successful integration of AI necessitates a responsible and informed approach, as highlighted by empirical findings. Addressing the issues of equity, ensuring teacher preparedness, and cultivating a critical mindset regarding technology in our students are equally important, as stressed by research. Collaboration between educators, policymakers, and technology developers is essential to leverage the full potential of AI while mitigating potential drawbacks, as indicated by studies.

Further research on the long-term effects of AI use within the social studies domain is needed. Evaluating the impact on student outcomes including empathy, historical knowledge, and civic engagement will prove invaluable in guiding how technology intersects with this

foundational subject. The emergence of AI has brought about a transformative revolution in work dynamics and interpersonal interactions, necessitating a paradigm shift across various dimensions of schooling to equip students for future employment opportunities [21]. Through continuous learning and a focus on pedagogy, the research-supported ethical implementation of AI can support elementary social studies in becoming a field where all students thrive and gain the understanding necessary to be informed, active participants in an ever-evolving world.

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