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# The Effectiveness of Generative AI in Learning History: Evidence from Interviews

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## Abstract

The development of Generative Artificial Intelligence (GAI) technology in education has brought its pedagogical functions into sharp focus. Previous studies have mainly employed quantitative approaches to measure the influence of GAI, whereas there has been very little focus on a qualitative approach among secondary school students who use GAI in their humanities subjects. This paper provides a qualitative analysis of the effectiveness of teaching GAI for history learning by conducting semi-structured interviews with 20 seventh-grade students at a secondary school in Shenzhen, China. This study evaluates the impact of applying ChatGPT and DALL-E 3 in history learning on students' comprehension, learning motivation, and cognitive load. Thematic analysis reveals that GAI is an effective tool for learning and substantially reduces students' external cognitive load.

**Keywords:** Generative Artificial Intelligence, History Education, Qualitative Research, Learning Motivation, Cognitive Load

## 1. Introduction

With the fast-paced development in technology, especially the advent of Generative Artificial Intelligence (GAI), there has been much attention globally on how technology is changing different aspects of life at a rate never seen before. The rise in the use of GAI technology has made its use in education even more widespread. GAI refers to a form of artificial intelligence that leverages unsupervised or self-supervised machine learning models to generate new content by pre-training on existing data. In history education, traditional instruction typically follows a teacher-centered model, limiting students' opportunities for active participation and contextualization and, consequently, impairing their learning experience and outcomes.

To counter this, educators have explored approaches like Arts-Based Learning (ABL), which integrates the arts into the teaching and learning process to foster student understanding and reflection. Nevertheless, conventional ABL approaches bring certain limitations since students might be intimidated by a lack of knowledge or experience in making art, thus hindering the process of exploring and lowering their confidence. The implementation of GAI technology could serve as an appropriate solution in this regard. First of all, GAI would help students to lessen their load of art-creating activities, focusing on learning and gaining new knowledge.

Second, the systematic review showed that there was a substantial deficit in studies concerning the implementation of generative AI in K-12 settings. Moreover, the majority of existing studies were based on the application of quantitative research designs. In order to fill in the identified research gap, this paper will apply a qualitative research design, interviewing middle school students about their experiences of using GAI in their history courses in Shenzhen, China.

## 2. Literature Review

### 2.1. The Evolution of Generative AI in K-12 and History Education

The rapid advancement of technology, particularly exemplified by GAI tools, has garnered significant global attention and is transforming various sectors of society at an unprecedented pace. The emergence of GAI has further broadened its application in education, which is currently undergoing a profound transformation (Lang et al., 2025). Multiple studies have shown that GAI has enormous potential in education, especially in personalized learning (Gunawan & Wiputra, 2024; Jiang et al., 2025; Wei et al., 2025). GAI can provide tailored learning support through technologies such as natural language processing and image generation, thereby improving students' learning motivation and efficiency. Despite these advantages, recent studies have revealed a significant lack of research and discourse on generative AI in K-12 education, alongside a limited exploration of its impacts through empirical methodologies (Marzano, 2025).

Learning history is not merely about memorizing facts, but about developing historical thinking, which is the ability to source, contextualize, and corroborate complex narratives, alongside fostering historical empathy (Firmansyah et al., 2025; Lévesque & Clark, 2018; Seixas, 2017; Thorp & Persson, 2020). Novel strategies such as ABL are well-respected as an appropriate pedagogy (Kisida et al., 2020). However, ABL faces numerous challenges, primarily because students may feel overwhelmed due to a lack of skills, experience, or tools related to art creation. GAI can alleviate the burden on students in art creation, allowing them to focus on knowledge construction and deep learning (Lee et al., 2024).

### 2.2. Human-AI Co-creation, AI Literacy and Learning Motivation

One application of artificial intelligence in education lies in human-machine collaborative creation, where learners and AI collaborate to produce creative works (Agboola & Yassin, 2025; Khalid & Nadeem, 2025; Yang et al., 2025). This collaborative creation not only lowers the barrier to artistic participation but also enhances students' creativity and confidence, ultimately increasing their learning motivation and engagement (Attaluri & Mudunuri, 2025; Chen, 2025). Motivation is a complex aspect of human psychology and behavior, influencing how individuals allocate their time, the energy they invest in tasks, and their perseverance in completing them (Lens & Vansteenkiste, 2020).

In education, motivation guides and sustains students' goal-oriented behavior, which is crucial to their learning process and academic achievement (Talbi & Ouared, 2022). According to self-determination theory, an individual's motivation to learn is fostered by satisfying three basic psychological needs: autonomy, competence, and relatedness (Niemiec & Ryan, 2009). Indeed, GAI tools contribute positively to such intrinsic motivation, as they provide students with the opportunities to learn independently, receive individualized instructions, and gain customized help that matches their ability levels through dynamic and interactive feedback (Derakhshan, 2025; Elhag et al., 2025). Besides, the interactive learning platforms made possible through

human-AI collaboration enable students to engage with AI, explore novel concepts, and create original content (Chiu & Rospigliosi, 2025; Dhanasekaran, 2025).

However, co-creating with AI also demands foundational frameworks for K-12 AI literacy (Casal-Otero et al., 2023). AI literacy encompasses the competencies required to critically evaluate AI technologies, communicate effectively with them, and understand their ethical implications (Chiu, 2025; Choi et al., 2025). In history education, this is particularly vital, as depending too much on AI-generated content can deprive students of the chance to cultivate independent critical thinking, and introduces risks related to the authenticity, bias, and appropriateness of the generated historical narratives (Alit & Mursidi, 2025; Dumančić & Stickle, 2025).

### 2.3. Cognitive Load Management

Apart from enhancing motivation, the regulation of cognitive load is equally important for facilitating effective learning of challenging topics such as history. Cognitive load theory proposes that working memory capacity is restricted, hence when learners have heavy cognitive loads while learning, the entire learning process will be affected negatively (Sweller, 2011). The intrinsic load depends on the difficulty level of the learning content (Huang, 2018), whereas the extraneous load results from poor instructional designs and learning environments (Klepsch & Seufert, 2020). AI-based interactive guidance plays an important role in managing cognitive load during complex learning. For example, visual illustrations, language prompts, and structured content provided by AI can help understand difficult concepts, thus focusing cognitive load on key information (Fang et al., 2023). However, applying AI to education has also raised some issues. It has been observed that depending too much on the AI generated content can deprive students of the chance to cultivate critical thinking and creativity (JAYARON, 2024; Suryanto et al., 2025). Dependence on AI can demotivate students from becoming involved in actual processes and therefore impairing their creativity. Also, there are some ethics associated with AI generated content regarding its authenticity and appropriateness (Labajová, 2023).

## 3. Method

Using a qualitative research design through semi-structured interviews, the purpose of the study is to probe into the richness of student experiences regarding their perception, emotions, and cognition during their interactions with generative AI technologies. The interpretivist approach adopted here enables an extensive analysis of the impact of human-machine co-construction on the motivational aspect, historical knowledge, and cognitive efforts. Recognizing that the researchers' backgrounds might influence data interpretation, continuous reflexive bracketing was employed throughout the study. The research team maintained reflexive journals to consciously separate their enthusiasm for AI tools from the participants' authentic lived experiences.

The research was conducted in a public middle school located in Shenzhen, China. A purposive sampling method was used where twenty students in the seventh grade were recruited for the research based on their age between twelve and fourteen years. They had been through an intense eight-week history module, using a generative artificial intelligence system such as ChatGPT and DALL-E 3 (the example shown in Appendix A). Prior to the commencement of the data collection, rigorous ethical protocols were followed. Ethical approval was sought and granted by the school authorities. All the participants, along with their respective parents or guardians, received comprehensive information related to the objective and methodology of

the study and its confidentiality. Informed consent was taken from all individuals involved in the study.

Data was collected through interviews, with researchers conducting one-on-one conversations with each participant. Interviews were held in a quiet, undisturbed meeting room on campus. Each interview lasted approximately 30-45 minutes and was recorded with the participant's consent for accurate transcription later. Interview questions aimed to guide participants in fully articulating the key concepts studied, based on the ARCS motivational model and cognitive load theory. All questions were open-ended, guiding participants to discuss their feelings about visualizing historical events and the significance of collaborating with an AI chatbot to write these historical narratives. To ensure the questions were clear and developmentally appropriate for the students, two students not involved in the study were asked questions beforehand as a pilot study.

Researchers transcribed qualitative data collected from interview recordings and then conducted thematic analysis. Following a familiarization phase, two independent coders trained on a subset of three transcripts developed a codebook using a hybrid inductive and deductive approach. Deductive codes were drawn from established theoretical frameworks, while inductive codes emerged directly from the data (the details shown in Appendix B). Inter-coder reliability was established at a Cohen's Kappa of 0.85, indicating strong agreement. Any coding discrepancies were resolved through consensus meetings. Data saturation was confidently achieved by the 17th interview, though all 20 transcripts were fully analyzed to ensure comprehensive rigor.

## 4. Results

Thematic analysis of the 20 student interviews gave rise to some very insightful understanding about the experience of the learners with the GAI supported history learning system. Four broad themes emerged from the analysis with regard to the impact of GAI: (1) Scaffolding for Knowledge Construction, (2) Increased Intrinsic Motivation and Engagement, (3) Decreased Extraneous Cognitive Load, and (4) Critical Understanding of AI Capabilities.

### 4.1. Theme 1: Scaffolded Knowledge Construction

A recurring theme was that of viewing GAI as a flexible scaffolding system that supported the gradual building of historical knowledge. The participants would usually observe that their use of ChatGPT helped them decode the intricacies of historical literature through DALL-E 3.

It was evident that many students appreciated how the AI conversation format permitted them to pose repeated or fundamental queries without criticism, which significantly contributed to their understanding of Chinese dynasties.

Student C (Male, 13):

> *"While reading about the political reforms that took place during ancient dynasties, I found the textbook quite boring and not easy to remember. However, when I asked ChatGPT to provide information on the reforms taking place in an imaginary village, everything became clear and understandable for me. Moreover, the conversation was similar to communicating with a lecturer who will never tire of answering my inquiries. In case I did not understand some terms, I could ask ChatGPT to explain them to me".*

Furthermore, the integration of image-generation tools allowed students to visualize historical contexts, transforming abstract textbook descriptions into concrete realities.

Student L (Female, 14):

> *"Looking up information about Tang Dynasty architectural designs is one thing, but generating images with DALL-E 3 and seeing them in front of me is a completely different experience."*

Student A (Male, 12):

> *"In order to make a time line about a merchant traveling along the Silk Road, I used the AI to get help. It helped me determine which goods were exchanged along the route. Eventually, by concentrating solely on accuracy, I learned the history, geography, and economy of the period."*

### 4.2. Theme 2: Heightened Intrinsic Motivation and Engagement

Data from the interviews clearly supported the idea that collaborative creativity between humans and AI substantially reduced the barriers to artistic expression, creating an unparalleled sense of motivation. Students appeared to feel highly satisfied, autonomous, and empowered during the entire process of learning.

For many participants, the traditional method of history learning, characterized by rote memorization, was entirely disrupted by the creative agency afforded by the GAI system.

Student H (Female, 13):

> *"I usually hate history because it's just memorizing dates and names for a test. But using the AI to write a script from the perspective of a commoner, and then generating pictures of his life... it felt like I was directing my own movie. I actually spent an extra hour at home working on my history story just to see how it ended. It didn't feel like homework at all."*

This sense of ownership was a recurring sub-theme. By acting as "co-authors" with the AI, students felt deeply invested in the final product.

Student H (Female, 13):

> *"Normally, I just submit my worksheet and forget about it. But this time, I printed out the storybook I made with ChatGPT and DALL-E and showed it to my parents. I was really proud of the characters I created. The AI did the drawing, but the ideas were mine."*

Student E (Male, 13):

> *"It is just fun. You type something, and the AI gives you an idea back. Sometimes it gives you a plot twist in the history story that you didn't think of, and then you have to research if that plot twist actually could have happened in that dynasty. It turns learning into a game."*

### 4.3. Theme 3: Reduction of Extraneous Cognitive Load

Students often mentioned how useful the AI software was in helping them cope with the complexity of the task, highlighting the impact of reduced extraneous cognitive load. The AI made it easier for students to concentrate on historical material associated with pictures.

Similarly, students found that the AI helped break down overwhelming historical narratives into manageable, bite-sized tasks.

Student P (Female, 13):

> *"Writing a whole essay about a historical event is overwhelming. But the AI system breaks it down. First, it asks me to design the character. Then, the setting. Then, the conflict. Because it guided me step-by-step, my head didn't feel like it was going to explode with too much information at once."*

### 4.4. Theme 4: Critical Awareness of AI Limitations

Despite the overwhelmingly positive feedback regarding engagement and support, the interviews also uncovered a critical, developing awareness of AI limitations among the students.

Several students recounted instances where they had to actively correct the AI to maintain historical integrity.

Student F (Female, 13):

> *"Sometimes the AI gets confused. Once, it generated an image of an ancient Chinese soldier, but his armor looked like it was from a European knight."*

Student R (Male, 14):

> *"As I was writing a story using ChatGPT, it got confused with the years of two separate emperors. Had I not been aware of textbook, I would have ended up adding wrong facts to my assignment. This helped me understand that even though the AI can be very helpful, it is prone to making mistakes."*

Additionally, some students felt that the AI's tone could sometimes undermine the historical immersion.

Student S (Female, 13):

> *"The chatbot might come up with contemporary language. In my attempt to write an epic script based on an ancient war, the chatbot came up with lines written in a way that a contemporary teenager would speak."*

## 5. Discussion

The primary objective of this qualitative study was to explore the lived experiences of middle school students using generative artificial intelligence tools within an arts-based history curriculum. The findings suggest that integrating tools like ChatGPT and DALL-E 3 fundamentally transforms the history learning experience from a passive reception of facts into an active, highly engaging process of knowledge construction. The thematic analysis revealed that GAI serves as a powerful pedagogical scaffold, significantly heightens intrinsic motivation, actively reduces extraneous cognitive load, and inadvertently fosters early stages of critical AI literacy among young learners. These insights not only corroborate existing theories on multimedia learning and motivation but also provide novel empirical evidence regarding the subjective impact of AI in actual classroom settings.

GAI's purpose is to overcome difficulties in learning by minimizing the cognitive load. Combined with cognitive load theory, conventional learning methods used for teaching art may result in high cognitive load among learners with no prior knowledge of art, thereby diverting their focus away from grasping concepts to learning art skills. Interview results indicate that the application of GAI effectively reduces cognitive load. By automating the visual presentation process and providing narrative structure, GAI offers students more opportunities for engagement, such as understanding historical context and figures, and ensuring that the

prompts are historically accurate. In fact, recent research also shows that GAI can enhance the learning experience by simplifying multidimensional processes into interactive stages (Lang et al., 2025; Yao et al., 2025).

Moreover, the findings that there is enhanced motivation for learning among middle school students clearly indicate the efficiency of implementing the SDT approach in AI-powered learning. The interviews showed the distinction between conventional textbook learning and interaction through AI platforms. The increased intrinsic motivation stemmed from students' autonomy. Students had the opportunity to become authors of historical stories and generate images using DALL-E 3, ultimately engaging in autonomous learning activities. Students no longer saw themselves as recipients of history but as producers of historical content. This approach not only maintained their learning interest using ARCS model of motivation but also helped them overcome the frustration associated with historical memorization.

However, despite these substantial benefits, the findings emerging from the qualitative analysis also demonstrated the essential need to introduce AI literacy education in tandem with the history class. Indeed, the way students recognized AI's errors shows an essential junction between utilizing the technology in learning and applying critical thinking skills required by the discipline. While scholars have been raising the alarm about the possibility that too much dependency on GAI could make students less inclined to think independently and blindly accept biased facts (Koroleva & Jogezai, 2025; Wrench & Elmoudden, 2025), the interview data indicate that when incorporated into the academic setting, AI could be beneficial. In this case, rather than accepting any output from AI unconditionally, students cross-checked their findings provided by the tool with their trustworthy sources of information, such as the course textbooks. This process, thus, resulted in stimulating higher-order thinking skills related to the discipline and improved students' knowledge of history.

## 6. Conclusion

This study proves that the implementation of GAI in middle school history classes improves intrinsic motivation, promotes active knowledge generation, and decreases extraneous cognitive load. Moving away from conventional memorization and employing an interactive interaction between humans and AI technology, GAI becomes a tool that helps overcome the challenges of arts-based activities. As a result, learners can channel their cognitive capacities toward engaging in historical empathy and ensuring information accuracy. From a practical point of view, it means that GAI has the potential to revolutionize humanities education in K-12 settings through promoting creativity and, as a side effect, digital literacy since students have to detect errors committed by AI technology.

However, this study also has limitations. First, the purposive, single-site sample limits the generalizability of the results. The future study should be conducted using samples that are larger and more diverse across different grade levels. Second, because of the short-term nature of the experiment (the duration of eight weeks), there may be a phenomenon of a novelty effect. This means that the level of motivation in the participants can be attributed to their curiosity toward a new kind of technology used in the study. Third, the study based on only qualitative data does not allow to objectively measure the levels of decreased cognitive load and actual learning outcomes. Future research should adopt rigorous mixed-methods approaches, combining in-depth interviews with standardized achievement tests and objective cognitive load metrics to triangulate the findings and provide a holistic evaluation of GAI's educational impact.

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## Appdenix A. Examples of students using AI to study history

### Task Design: Voices of the Tang Dynasty

- Objective: Students were tasked with conceptualizing a historical narrative from the perspective of an ordinary citizen (e.g., a merchant, soldier, or artisan) during the Tang Dynasty, rather than focusing solely on emperors.
- Workflow:

- Research the socio-economic conditions of the chosen profession using the course textbook.
- Collaborate with ChatGPT to draft a 500-word historical fiction narrative.
- Use DALL-E 3 to generate 2-3 visual artifacts representing scenes from the narrative.

**Sample Student-AI Prompting Iteration (ChatGPT)**

- Student Initial Prompt: Write a story about a merchant in the Tang Dynasty traveling on the Silk Road.
- ChatGPT Output: Provided a generic story about a merchant named Li traveling with spices.
- Student Refined Prompt: Make the story more historically accurate. The merchant should be trading silk for horses. Include a specific stop at the Dunhuang oasis, and describe the political tension during that specific era.
- ChatGPT Output: A detailed narrative describing the perilous journey across the Taklamakan Desert, arriving at the vibrant Dunhuang oasis where silk was traded for sturdy Ferghana horses, accurately reflecting the economic exchanges and geography of the period.

**Sample Image Generation Prompt (DALL-E 3)**

- Draft Image Prompt: An ancient Chinese merchant trading on the Silk Road.
- Refined Image Prompt: A realistic historical illustration of a bustling marketplace at the Dunhuang oasis during the Tang Dynasty. The scene features a Sogdian merchant in traditional attire inspecting a strong Ferghana horse. In the background, traders are unloading rolls of patterned silk from Bactrian camels. The architectural style includes traditional mud-brick structures and curved roofs. The art style should resemble a high-quality, historically accurate educational textbook illustration.

*Figure 1. An ancient Chinese merchant trading on the Silk Road*

## Appendix B

*Table 1. Codebook*

| — | Code Name | Approach | Description | Example Inteview Quote |
|---|---|---|---|---|
| Knowledge Construction | Conversational Decoding | Inductive | The AI conversation format allows students to | *"Moreover, the conversation was similar to communicating with a* |

| — | **Code Name** | **Approach** | **Description** | **Example Inteview Quote** |
|---|---|---|---|---|
| | | | ask fundamental queries repeatedly without facing criticism. | *lecturer who will never tire of answering my inquiries."* (Student C) |
| Knowledge Construction | Visual Contextualization | Inductive | The use of image-generation tools transforms abstract textbook descriptions into concrete visual realities. | *"Looking up information about Tang Dynasty architectural designs is one thing, but generating images with DALL-E 3 and seeing them in front of me is a completely different experience."* (Student L) |
| Increased Intrinsic Motivation and Engagement | Intrinsic Motivation | Deductive | Generating motivation through creative agency, allowing students to feel highly satisfied, autonomous, and empowered. | *"I actually spent an extra hour at home working on my history story just to see how it ended. It didn't feel like homework at all."* (Student H) |
| Increased Intrinsic Motivation and Engagement | Human-AI Co-authorship | Inductive | Fostering a deep sense of ownership and investment in the final product by having students generate ideas while the AI executes the drawing. | *"I was really proud of the characters I created. The AI did the drawing, but the ideas were mine."* (Student H) |
| Increased Intrinsic Motivation and Engagement | Gamification | Inductive | Using AI to suggest unexpected plot twists that require students to research historical possibilities, turning learning into a game. | *"Sometimes it gives you a plot twist in the history story that you didn't think of, and then you have to research if that plot twist actually could have happened in that dynasty. It turns learning into a game."* (Student E) |
| Decreased Extraneous Cognitive Load | Extraneous Load Reduction | Deductive | Helping students cope with task complexity so they can focus their cognitive efforts on historical accuracy rather than other tasks. | *"Eventually, by concentrating solely on accuracy, I learned the history, geography, and economy of the period."* (Student A) |
| Decreased Extraneous Cognitive Load | Step-by-Step Task Decomposition | Inductive | Breaking down overwhelming historical narratives or essays into manageable, bite-sized tasks. | *"Because it guided me step-by-step, my head didn't feel like it was going to explode with too much information at once."* (Student P) |
| Critical Understanding of AI Capabilities | Identifying AI Hallucinations | Inductive | Actively correcting the AI to maintain historical integrity when it presents wrong facts or confused timelines. | *"As I was writing a story using ChatGPT, it got confused with the years of two separate emperors. Had I not been aware of textbook, I would have ended up adding wrong facts to my assignment."* (Student R) |
| Critical Understanding of AI Capabilities | Critiquing AI Tone and Immersion | Inductive | Recognizing that the AI's use of contemporary language or tone can undermine the historical immersion of the narrative. | *"In my attempt to write an epic script based on an ancient war, the chatbot came up with lines written in a way that a contemporary teenager would speak." (Student S)* |