

**Simulating the Past: The Case for AI in History Pedagogy**

**Mara Danoff**

**Teachers College, Columbia University**

**MSTU 4133: Cognition and Computers**

**Chang, Yoo Kyung**

**May 6th, 2022**

What does a successful history education look like? Is it when a student knows every date and time to the exact millisecond a battle or event took place? Maybe it's when a learner can explain why a given society had a particular economic system in place. Regardless of which approach a teacher takes, one theme remains consistent: that learning history is stereotyped as boring (Tew 2014). While thematic approaches to history give students an idea as to what people at the time were thinking, it's still taking a broader and rather impersonal approach to history education. That is where AI comes in. AI has the potential to illustrate the stories that make up humanities collective history and bring to life these events. Either by embodying long-dead individuals whose stories need to be told, or by allowing individuals to see on a large scale what happens when civilizations rise and fall—AI gives a learner a better and ultimately more well-rounded understanding of this otherwise tiresome subject. Even the very processes in which AI conveys information can illustrate how different components of societies can work together to create a collective theme or knowledge that embodies their civilization.

In order to understand the role AI can play in creating an engaging and well-rounded approach to history education, the pedagogy of history must first be examined. In 1989, James Duthie wrote *The Current State of History Teaching*, urging educators to forgo spewing facts that connect in time from one to the other without any real connection between them (Tew 2014). This is a direct condemnation of the chronological approach to history that rewards students for briefly regurgitating what they learned in class before promptly forgetting about the information once the school year is done. They learn the facts, but they don't understand the contextual significance. To rectify this, historians have begun approaching history in a more thematic approach. The thematic approach of history is when a teacher posits an open-ended question at the beginning of the year and then proceeds to use specific moments in history to

expand on the idea of the theme unit (Tew 2014). This allows for students to see the bigger picture of history. Instead of saying a certain thing happened and led to another, it shows the reasoning behind individual's actions and how these beliefs came to be. Students begin to understand the "why" of given events which, theoretically, will help them contextualize their won reality as often many of the themes of the past persist in today's societies.

Yet, for all the great insights that thematic teaching provides, it is not without flaws. It can be quite difficult for students to comprehend the cause-and-effects of why specific historical events happen because event chronology is not as heavily focused on in this methodology (Tew 2014). Essentially, both chronological and thematic history have a lot to offer students, but they have major downsides. Fortunately, this is where AI comes in. Due to advancements in computer technology, students can learn both the themes of a given time period as well as understand the cause-and-effect nature of events that make these themes occur. AI can bridge the gap between chronology and thematic pedagogy by creating experiences that show the importance of a given historical event. After all, AI has become an increasingly useful cognitive tool in getting students engaged and familiar with a subject's more difficult concepts. But computers being used as cognitive tools is not unique to just artificial intelligence. There are many ways technology serves as an enhancement to a human's standard cognitive process that goes beyond intelligent agents. These assets must be considered as well to fully understand the role AI plays in education.

Computers aiding human cognition goes beyond just its ability as instructional devices. Some scholars argue that technology itself can, theoretically, enhance human cognition in never-before-seen ways. Technology does this by providing specific cognitive tools like databases, spreadsheets, and housing collaborative knowledge that learners have easy access to (Jonassen

et. al., 1995, p. 694). By having access to these tools, learners can effectively enhance their own cognitive understanding of a subject because they are not worried about having to recall or organize specific information in their own mind. This task can be off-loaded to the computer agent, thus freeing the learner to try and understand more complex questions. Of course, this is dependent on the learner knowing to use the tool effectively. That might not always be the case if they are simply trying to use a calculator to calculate simple equations. However, the potential of computer technologies to provide space for more serious cognition cannot be denied—especially when it is conversation with various AI programs that are designed to aid in a students’ understanding of a given concept.

Students using technology, and even AI, to aid in the learning process has been increasingly popular as more individuals have gained access to tools, such as cognitive tutors. These are websites like *Khan Academy* that divide up a given lesson into small chunks—combining instruction and assessment focusing on self-paced learning so that students may learn at their own pace (Ritter et. al., 2007, p. 250). The AI that assists with this format typically helps by slowing down a given lesson, or repeating some fundamental steps, if a student is unable to grasp a specific concept. Studies conducted on mathematics students showed that those who learned under a cognitive tutor instead of a standard textbook performed higher on standardized tests (Ritter et. al., 2007, p. 252). While this AI may seem simple compared to some robotics inventions, it shows how giving the student some interaction and agency over their own education can greatly enhance their learning experience.

This kind of AI is not the only one being used in educational settings. Teachable agents act as the next steppingstone in the evolution of intelligent computer technologies for educational purposes. These programs forgo the step-by-step processes of the cognitive tutor and instead

mimic the teacher-student dynamic. The learner is meant to teach the AI a given concept to help in their own understanding of a given topic (Biswas et. al., 2005, p. 364). This design is based on the central concept that students learn best when they are teaching the materials themselves (Biswas et. al., 2005, 366). In doing so, students are forced to understand why a piece of information is important to know during the explanation process. Therefore, it helps them take to heart why that information is important in the first place. This may not seem as directly linked to history learning as, say, a quizzing system that helps reinforce a particular form of information might be. But it shows how AI can help challenge a student's preconceived notions by mimicking real-world human interactions. This then leads AI to one of its greatest history pedagogy potentials: the ability to imitate real life and history as a means of educating.

Attempting to recreate life in the past is not new to AI. Living history museums teach history by having trainers, knowledgeable of how people lived in the past (copying agricultural practices, clothing, etc.), roleplay as individuals from a specific period (*ALHFAM - About Us*). In doing so, students can directly see how people lived. Maybe even churn their own bit of butter to really feel what it was like to live in that time. This concept gets expanded upon in curriculums like *Reacting to the Past* wherein students are meant to take on specific roles and allegiances of past factions in the name of embodying these characters and learning more about why people of a given time period held the beliefs they did (*Games About | Reacting to the Past*). This gamification of history is where AI can potentially change the game. For their ability to embody the likeness of historical figures and create these environments understanding why given individuals do what they do brings so much potential for AI to digitize this very experience.

While AI has yet to fully capture the environmental aspect of history (after all, does one fully understand colonial New England without smelling the scent of a bustling farm?), it can

still capture a likeness of an individual from the past in order to give nuance to a specific historical event. One notable example of this is the Shoah Foundation's *Dimensions in Testimony* project. This project takes the stories of Holocaust survivors and digitizes them using 360-degree camera angles—creating a near-perfect computer-generated image of their likeness with an advanced AI (*USC Shoah Foundation*). The AI allows individuals to ask the survivor images questions. Having anticipated the likely questions, the survivor image responds. It appears as though they were having a living conversation with a person when it was just a program. AI is, quite literally, keeping these stories and people alive, allowing learners to hear from the source what a given historical period was like. In doing so, they gain a better understanding of a specific context that would otherwise be lost to them due to time.

In this same vein, video games like *Sid Meier's Civilization* use their AI to help create historical leaders. Not just in appearance and mannerism, but also mimicking the way they led. If a particular leader was prone towards war and aggression, the AI would play that leader as aggressive, making them a major threat to the player as the game went on. To see if individuals were learning about important historical figures in this way, Matt King conducted a survey of 178 players of the game, with over half of the participants feeling as though they were more familiar with individual leaders and important people (King, 2021, p. 545). Knowing people and their importance is well and good, but that's not all *Sid Meier* or AI in history can do. The other, and arguably groundbreaking, capability of artificial intelligence and history education is its ability to show students the long-term impacts of their decisions on a game world, and how those impacts nations and ideologies. History, ultimately, is a snowballing of various events and actions taken by those within a given civilization that culminate in the modern day and how people operate today.

History education is not just events on a timeline. It's not even larger themes of capitalism, feudalism, or any other "-ism" that tends to go around the humanities fields. It shows what happens when people, challenged with having to manage finite resources and different perspectives on how to live one's life, go about making their claim on the world. In *Teaching Historical Theory through Video Games* author A. Martin Wainwright discusses the ways in which this series of games plays a role in his "Video Games and History" curriculum. *Civilization* takes a computational approach to history. It shows the player/student that the civilizations that have greater advancements technologically will become the dominant forces as they steadily march towards modern day (Wainwright, 2014, p. 584). This is an incredibly computational perspective to take, thus truly fitting the idea that the "medium is the message". But it is not necessarily a wrong message either. Wainwright goes on to say how he uses this game in his Karl Marx unit due to Marx's treatment of economics being the main drivers of history and why computers would reinforce this perspective of gaining capital equals an advanced society (Wainwright, 2014, p. 584). This is certainly one perspective on the game, and a great point on the limitations of what history can teach as well. But what Wainwright fails to mention is that it experimentally shows a student what the consequences of leadership are, and how any number of small choices can cause great nations to fall. For example, when a player neglects the people of their civilization's cities, they rebel. After all, while the students may embody great leaders of the past, it is ultimately the people of a nation that decide the civilization's fate. Despite *Civilization's* short-comings, one thing it does quite well is creating a procedural narrative and an internal history in and of itself (King, 2021, p. 549). This is the true potential of AI in history education: showing students a world where actions from the very beginning of a game influence centuries down the line. This procedural rhetoric—a form of

storytelling that combines code, game rules, and the way in which AI leaders interact with the player—shows what happens to civilizations based on a given choice. Ultimately, that’s all history is—a series of choices made by powerful people hoping for the best outcome. This series of choices is where the potential of AI truly lies, though *Civilization* may not be the best example of this kind of procedural narrative. Fortunately, there is another game that perfectly encapsulates representing the long-term impact of history on people’s lives.

*Wilderness* is not based on any historical events. It is a game about a troupe of heroes, going on adventures and growing old together as they attempt to protect their land from various nefarious forces. Once the heroes grow old, their children or heirs will begin traveling with them, intending to replace these characters down the line. This is where the game’s AI system shows potential if integrated into a program designed around teaching history. This creates an interesting narrative where one generation’s actions will directly impact and influence the next. Great heroes who were slain in battle will have statues built of them, or even appear to the younger characters as ghosts. By creating a world with history and internal logic, the grander historical themes can be seen throughout a student’s playthrough. They can begin to understand why the past events impact the current generation’s understanding of the world around them, and how innocuous decisions become permanent fixtures of the world’s lore. If the generative storytelling in *Wilderness* were to be applied to a historically accurate video game, it has the potential to show how dynasties rise and fall and why events even hundreds of years ago are important in the modern day. Thus, perfectly embodying the cause-and-effect nature of chronological pedagogy while allowing students to get to know a given leader (potentially) and, theoretically, learn why they believed and acted as they did.



History is not just a subject in school. It is an explanation as to why the world is the way it is today, with events spanning hundreds of years directly impacting policies in today's nations. If it were to continue to be taught ineffectively, it essentially would be "ignoring the fourth dimension of our experience of the world" (Ashby et. al., 2009, x). Fortunately, AI offers the potential for not only showing the sequence of events that led to modern day problems, but it also gives students a means of directly interacting with the past as a way of understanding it and contextualizing it in their own lives. Using computers to teach is not new in education, so it must be considered for all subjects. Not just those within the STEM field. Hopefully as AI begins to resemble human interactions and human flaws more closely, it will be implemented in more and more history-based simulations as a means of showing events accurately.

## References

- ALHFAM - About Us*. (n.d.). Retrieved May 6, 2022, from <https://www.alhfam.org/AboutUs>
- Artificial intelligence preserving our ability to converse with Holocaust survivors even after they die*. (n.d.). Retrieved May 6, 2022, from <https://www.cbsnews.com/news/holocaust-stories-artificial-intelligence-60-minutes-2022-03-27/>
- Biswas, G., Leelawong, K., Schwartz, D., & Vye, N. (2005). Learning by teaching: A new agent paradigm for educational software. *Applied Artificial Intelligence*, 19(3–4), 363–392. <https://doi.org/10.1080/08839510590910200>
- Chapman, A. (2013). Is Sid Meier’s Civilization history? *Rethinking History*, 17(3), 312–332. <https://doi.org/10.1080/13642529.2013.774719>
- Games About | Reacting to the Past*. (n.d.). Retrieved May 6, 2022, from <https://reacting.barnard.edu/games/about>
- Gordon, L. (2021, November 30). *Procedural storytelling is exploding the possibilities of video game narratives*. The Verge. <https://www.theverge.com/2021/11/30/22807568/procedural-storytelling-video-games-dwarf-fortress-wilderness-blaseball>
- Gültekin, F., & Berk, N. A. (2011). The topics students have difficulty in understanding and learning in history course. *Procedia - Social and Behavioral Sciences*, 15, 2803–2807. <https://doi.org/10.1016/j.sbspro.2011.04.192>
- Jonassen, D. H. (1995). Computers as cognitive tools: Learning with technology, not from technology. *Journal of Computing in Higher Education*, 6(2), 40. <https://doi.org/10.1007/BF02941038>
- King, M. (2021). The Possibilities and Problems of “Sid Meier’s Civilization” in History Classrooms. *History Teacher*, 54(3), 539–567.

- Mat Zin, N. A., Jaafar, A., & Wong, S. Y. (2009). Digital game-based learning (DGBL) model and development methodology for teaching history. *WSEAS Transactions on Computers*, 8, 322–333.
- Ritter, S., Anderson, J. R., Koedinger, K. R., & Corbett, A. (2007). Cognitive Tutor: Applied research in mathematics education. *Psychonomic Bulletin & Review*, 14(2), 249–255.  
<https://doi.org/10.3758/BF03194060>
- Roll, I., & Wylie, R. (2016). Evolution and Revolution in Artificial Intelligence in Education. *International Journal of Artificial Intelligence in Education*, 26(2), 582–599.  
<https://doi.org/10.1007/s40593-016-0110-3>
- Symcox, L., & Wilschut, A. (2009). *National History Standards: The Problem of the Canon and the Future of Teaching History*. IAP.
- Tew, D. (2014). Pedagogy of Teaching History: Comparing the Chronologic and Thematic Approaches. *Honors Senior Theses/Projects*. [https://digitalcommons.wou.edu/honors\\_theses/14](https://digitalcommons.wou.edu/honors_theses/14)
- USC Shoah Foundation. (n.d.). USC Shoah Foundation. Retrieved May 6, 2022, from <https://sfi.usc.edu/>
- Voorhees, G. A. (2009). I Play Therefore I Am: Sid Meier's Civilization, Turn-Based Strategy Games and the Cogito. *Games and Culture*, 4(3), 254–275. <https://doi.org/10.1177/1555412009339728>
- Wainwright, A. M. (2014). Teaching Historical Theory through Video Games. *The History Teacher*, 47(4), 579–612.