The Role of Artificial Intelligence in History Education of Chinese High Schools

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Abstract. As human civilization confronts the Artificial Intelligence era, humans will inevitably face a society dominated by intelligent robots. For them, the urgency of the moment is to consider how to prepare for that day. Education is among the various factors influenced by artificial intelligence. Many fields of research have branched into the changes AI made to education systems. Simultaneously, the enhancement of social competition in China in recent years has brought test-oriented education to people's attention. Studies have shown that although beneficial in some respects, such a way of educating kids has not only threatened their physical and mental health, but also impaired the development of their individuality. In fact, from the past to now, Chinese students engage more in superficial learning than deep learning, which is suggested partly by the way history is being taught and learned in high schools. However, scholars have suggested that in an intelligent machine-dominated future society, creativity and independent thinking skills gained from deep learning will be crucial for an individual's survival. As AI is gradually being introduced in history learning, there rises a question of how its use in history education may influence the way students view this subject. This paper begins by briefly introducing artificial intelligence's stages of development and its current state in China. Then, it will state such technology's application in historical education and will set a comparison between the millionaire generation and the 70 generation's view on high school history education. The participants of the interview were also been encouraged to share their opinions on AI's role in teaching and learning history. This evidence, therefore, helps to bring out the advantages and disadvantages of such an application of this technology.

Keywords: Artificial Intelligence; History Education; Highschoolers.

1. Introduction

As time passes, technology develops along with the pace at which human society develops. Gradually, humans come to the end of the digital era. Without a break, they hurry toward the AI era, illustrating a world dominated by intelligent robots. Since AI is currently being designed and used as a powerful tool, academia is particularly interested in examining its influence or predicting its potential influence on human society: transportation, medical care, entertainment, economy, and government [1]. AI's influence on education has gradually become a hot topic in academia. Many present papers tend to offer general outlooks and evaluations. For instance, Joseph E. Aoun predicted in his book "Robot-Proof: Higher Education in the Age of Artificial Intelligence" that AI will force humans to develop a new model for higher education, one that deals more with creativity [2]. Still, some papers dive into AI's impact on a particular field or session, such as academic advising in college [1]. However, only a few discussed AI's influence on history education.

Due to the Chinese test-oriented education system, while studying history, Chinese high schoolers tend to engage in superficial learning. Instead of understanding the cause and effect of historical events, and practicing deductive reasoning when analyzing historical figures, they are simply being put to recite everything. This way of teaching and learning history restricts students from fully excavating the value of this subject, which is not beneficial in the long term [5]. However, time yields to the development of high technology. In the beginning, people learn from books and teachers; years later, they learn from the internet; decades after, they start to learn with the help of AI. Studies have shown that AI can be a good assistant in learning history. In "A Review of Augmented Reality Applications for History Education and Heritage Visualization," Jennifer Challenor and Minhua Ma indicated that an augmented reality learning environment promotes active learning and supports

environment immersion. These provide teachers with a potential way to optimize history teaching [3, 4]. Holding an overall optimistic view toward AI's use in history education, the researchers, however, did not consider much about the possible disadvantages of this technology.

Based on the same topic, this paper features a wider range of subjects and will provide a relatively comprehensive view of the way artificial intelligence (big data matching, Virtual Reality, and Augmented Reality in particular) impacts present Chinese high schoolers' study of history. It will give a brief introduction to AI's current state as well as its' possible form in the future according to experts' predictions. Then, it will display several applications of it in history learning and will evaluate students' attitudes toward this subject either with or without the aid of AI while learning based on a survey and an interview. However, one important notification is that due to the difficulty of controlling variables, limitations with the findings do exist. In the end, the paper will offer a two-sided view into AI's influence on the history learning of Chinese high schoolers and will take a glimpse at the future of such technology's use in high school history education.

2. Stages of development of AI and its current use in history learning

When talking about AI, the first thing that appears in one's mind may be Siri, the voice-activated assistant on computers and smartphones. It is being programmed to respond to simple orders such as opening up an APP. However, there is more to this kind of technology. In general, artificial intelligence is a type of powerful machine that simulate humans in many areas: from problem-solving to emotion interpreting. Since it is still a new field waiting for exploration, researchers have come up with many predictions for the future of AI. One proposed 7 stages of development of AI. It was suggested that AI will start from the "Rule Bases System," during which machines are programmed to interact with humans in certain ways. In this way, it mimics human intelligence. Then the technology will come to the "Context Awareness and Retention" stage, in which machines can respond to changes in the physical environment according to pre-programmed information. Later, AI steps into the stage of "Domain Specific Expertise," where the machines, with narrowed-down uses, can exceed humans in one particular area [1]. Until then, artificial intelligence is under the control of humans to a certain extent. However, as technology continues to refine itself, AI will soon reach the "Reasoning Machine" stage. There the machines will develop reasoning systems and become truly interactive. With stunning speed, the once tool-like AI will be transformed into what's called Artificial General Intelligence (AGI), then Artificial Super Intelligence (ASI) that outsmarts humans. Eventually, AI may end up in the stage of "Singularity and excellency," where it stretches human potential and gives rise to more powerful human beings [4]. Overall, artificial intelligence is predicted to go from weak AI (artificial intelligence that mimics human intelligence but doesn't develop cognitive abilities) to strong AI (artificial intelligence that acquires similar cognitive abilities to humans) in the following decades.

Today, there are many ways in which weak AI is being applied in daily life. Voice-activated digital assistants such as Siri and search engines are probably the ones people are most familiar with. Besides this, chatbots and automated vehicles are also forms of weak AI [3]. Besides helping people with their daily life, such technology also aids them in history learning. This is mainly achieved by big-data matching and VR/AR (Virtual Reality/Augmented Reality). When people search for Historical documentaries or history-related movies on YouTube, they are likely to find similar videos on the home page when they reenter the website. This is because their search records were collected backstage. From these data, the "intelligent" machine quickly learned the user's interests and matched them with other videos that contain similar elements. Also, when people are visiting the Chinese Museum of Gardens, the VR headsets can walk them into the restored Yuan Ming Garden and appreciate the spectacular works of ancient Chinese architecture. Furthermore, AR and VR technology fosters the growth of heritage preservation projects. For example, researchers involved in the "Zamani Project" (a heritage protection program conceptualized by Professor Heinz Rüther of North Cape Town College in 2001) have documented 65 sites, including over 250 structures in 18

countries of Africa, the Middle East, and Southeast Asia [4, 5]. After collecting data from the world's most remote sites, they use computers to generate VR models of them. In this way, every inch of the sites will be preserved online, and the images are crystal clear at any spot.

3. Compare and contrast the way history is being taught and learned in the past and the present

3.1 The past and present teaching methods of high school history

Throughout decades, due to technological development and the gradual emancipation of thoughts, the ways history is being taught at Chinese high schools changed drastically [6]. In the seventies, many history teachers tended to lecture students for a whole 40 minutes of class with poor visual aids: words written on a blackboard. The teaching materials were organized in clear, fixed structures. For instance, if a teacher was going to talk about World War Two, he or she would divide the event into cause, course, and results. During the lecture, he would also introduce several important historical figures which students are required to remember. Besides that, there were no more extensions on the topic. In fact, in the seventies, students with a good memory stood out on history tests, because reciting is a skill being greatly emphasized. However today, some aspects of history class have changed dramatically. For example, the use of PPTs and videos as visual aids makes the class more engaging. Furthermore, the class becomes more interactive as teachers analyze historical events together with their students instead of pressing conclusions into their minds. The emergence of the internet and AI plays a huge role in such transformation: 5G speeds up the flow of information while big data matching expands one's range of knowledge in a short time.

3.2 Past and present Chinese highschoolers' views on history and AI's influence on history education

To study the influence of newborn technologies, one has to get access to feedback from the crowd. This study includes a survey of past and present Chinese high schoolers' altitude toward history courses. The sample size is 66, with 42 participants from the 70 generations (people ages from 42 to 51) and 24 participants from the 00generation (people ages from 12 to 21) respectively. The participants were randomly sampled. The questions feature students' level of understanding of history, overall attitude toward history and reasons, ways they get access to history education out of school, and the likeliness for them to pursue careers related to history (or whether or not they have already worked in history-related fields). The data collected by the survey were eventually calculated in percentages. The percentage of those who dislike history is 7% among the 70 generations and 21% among the 00 generations. The portion of the 70 generation who holds an average feeling toward history is 41%, while those of the 00generation is 37%. Those from the 70generation who reported that they like history weighted up to 52%, and those from the 00gernation are 42%. This shows that past high schoolers like history better than today's high schoolers. The 70 generations suggested that the main reason they like history is that history helps to cultivate one's personality; the 00 generations, however, stated that their appreciation toward history was primarily based on their interest. Such a result partly reveals the difficulty of controlling variables in this survey, and partly suggested that besides technology, time also played a great role in one's view of history. However, the 00generation did report that they had a good time learning history through diverse media: blogs, videos, museums, and so on. Moreover, 20.83% of the 00generations reported that they were planning to pursue jobs related to history, while none of the 70generations reported that they are currently working (or have been working) in history-related fields.

Similar results were achieved through the interview. Each of the two participants was selected from the participants in the survey and is from the 70generation and the 00generation respectively. They shared the same major of science and engineering, and both hold an average view of history. The man of the 70generation said that since history is just a passport for him to pass Gao Kao and

enter university, he did not have many feelings about it. However, the reason he still appreciates high school history is that throughout the years, it induced a sense of patriotism in him and enhanced his humanistic qualities. On the other hand, the girl of the 00generation said that she did not like high school history much at first, because the content is similar to that of middle school history, which she knew already. "There wasn't anything new," she complained. "Thanks for the accompany of videos and text comparison training while learning," she adds, "If not for them I will probably end up falling asleep in class and will have a hard time keeping up with the course." The above evidence shows that with little experience and eagerness to explore new things, young people may not value history as much as elderlies did, who have gone through challenges throughout their life and prefers to reflect on the past. Although the introduction of big data matching and VR/AR does not lead to fundamental changes in students' views toward history, they do act as a guidance that motivates students to explore the subject more. Even so, the results would have been more complimentary if the sample size were larger and extraneous variables such as culture and ideology could have been studied thoroughly.

When being asked their opinion toward AI's (big data matching and VR/AR's) application in history education, both agree that they aid people in understanding historical events by making history less distant. Yet the man also expressed concern with such technology's involvement in history education. "Humans will eventually pay the price for their momentary convenience," He said, "In the past, we needed to do the 'matching' work by ourselves. Though the process was boring and time-consuming, it powered our brains to do the work. Nowadays, kids rely heavily on machines and lose the freedom of interpretation." This then leads to the questioning of AI's value in history education, advantages or disadvantages.

4. AI's impact on current high school history education and its future use in this field

4.1 Advantages

Technology is a double-edged sword. Likewise, AI both benefits and sets back the historical education of Chinese high schoolers. Firstly, because big data matching enhances the speed at which information travels and extends the range of knowledge one can access, it helps students to save energy during research and enhances the sustainability of their interest in the subject. Just like what the man said in the interview, in the seventies, information is mainly spread in paper format. If a student wants to research the impact of the Xin Hai Revolution on Chinese tradition, he will have to flip through hundreds and thousands of books piled up in the library just to find relevant essays and reviews. Such a process of randomly pulling a book from the shelf, reading it, and then throwing it back costs not only time but also interest. Stressed about finding sources will make him more likely to quit halfway. On the contrary, in the year 2022, students can find relevant papers on Xin Hai Revolution on the "Baidu Document" with a click. The machines will quickly pick out the keywords in their searching history and matches them with texts on the website. In this way, students will instead focus on analyzing materials provided by AI. This helps them to maintain their passion for the matter and allows them to dig deeper into it.

Secondly, VR and AR help to make history learning more acceptable for high schoolers. Just like Jennifer Challenor and Minhua Ma argued in "A Review of Augmented Reality Applications for History Education and Heritage Visualization," virtual reality enables one to have an immersive experience while augmented reality allows one to interact with virtual elements [6]. For example, in certain museums, figures in the drawing "come to life" when viewers move a special lens equipped with AR technology over the "Qing Ming Downtown Trip": camels and horses that carry tons of exotic goods were heading downtown; people crowding to the bridge to see the boats on the river; merchants yelling at the crowd, promoting his products. At school, students are told that "Qing Ming Downtown Trip" reveals the prosperity of the North Song Dynasty as well as the danger hidden beneath, but with AR technology in museums, they can have a deeper understanding of the artwork

by experiencing the event it depicted. In fact, the animated images help to make the ideas straightforward, and the interaction engages the viewers in the process of learning.

4.2 Disadvantageous

The two purposes of studying history are that this subject enables people to learn from the past and practice independent thinking. Emperor Taizong of the Tang Dynasty once said: "Use history as a mirror, you can predict the rise and fall of a country." Also, Dan Nuttall suggested in the article "What is the purpose of studying history? Developing students' perspectives on the purposes and value of history education" that history gives people an idea of how things influence each other on a cause-and-effect level [7]. It thus teaches people what to do or what not to do under certain circumstances to achieve a desirable outcome [8]. Moreover, it is said that history can be perceived horizontally and vertically. In other words, historical events can be analyzed in chronological order or spatial layout order. Because of the various dimensions through which it can be viewed, interpreting the meaning and value of historical events requires a lot of brain power. As a result, students can develop their voices by evaluating history. Although big-data matching and VR/AR aid students in history study, to some extent, they may cause them to detach from the initial purposes of learning history. Different from textbooks, AI as teaching equipment can be potentially distractive for students. The machine's highly interactive quality poses a "gaming effect" on learning. Even though this is initially designed to interest students, it may eventually cause them to engage in playing with the effects rather than focusing on what is being taught through the images [6].

Also, as what the man from the 70generation addressed in the interview, though convenient, the "point-to-point" information matching will reduce students' attempt to solve problems by themselves. In the past, students are used to raising questions, reading widely, and using the knowledge they extract from what they read to answer their questions. Even though this process will take up much time and may bore them a lot, they still rely on their sense of judgment. On the contrary, by relying too much on big-data matching, students today are becoming lazier: they prefer snatching the answer directly from the internet than trying to figure it out by themselves [6]. Weak AI today only follows the instruction being programmed, therefore its' ways of organizing materials are relatively monotonous compared to the human brain. As a result, it is unlikely for the machines to give out every possible matching of historical records. Consequently, students may miss the precious opportunity to explore connections between historical events based on their interpretation of them.

4.3 AI's future in history education

In the future, as weak AI gradually transform into strong AI, their ability will be greatly enhanced [9]. Since the more advanced version of this technology is more flexible, it can better adapt to an individual's needs in education. China currently has experimented with AI-dominated courses. During class, the machine tracks students' attention and gives instant feedback to the teachers, who reward and warns students on time. Such a way of learning strengthens students' concentration in class, therefore enhancing their performance. If this can take a step further in the future, the strong AI can demonstrate their current state of learning: their strength and weaknesses, their overall feelings toward the class, and formulate a unique studying plan for each student [9, 10]. If under proper regulation, such technology is likely to promote a sturdy rise in education quality. Besides this, if AR and VR technology are utilized as a piece of supplementary teaching equipment in class, they will induce more energy into the students and may have a chance to push them from passive superficial learning to active deep learning.

5. Conclusion

To conclude, big data analysis and AR/VR today have a positive impact as well as a potential negative impact on the history education of Chinese high schoolers. Although currently not being widely used in classrooms, people can see the trend of these intelligent machines blending into school

life, and gradually changing high schoolers' opinions toward history. In the future, it may act as a guide for Chinese students who will encourage them to pursue deep learning. However, to achieve desired results, students should be aware of the potential benefits as well as losses. In all, AI is a powerful tool that has to be used wisely.

References

[1] Assiri A., Al-Ghamdi, A., Brdesee H. From traditional to intelligent academic advising: A systematic literature review of e-academic advising. International Journal of Advanced Computer Science and Applications, 2020, 11(4), 507–517

[2] Aoun J. Robot-Proof: Higher Education in the Age of Artificial Intelligence. The MIT Press Cambridge Massachusetts London England, 2017.

[3] Anand A. Weak Ai, Definition, Applications, and Limitations. Analytics Steps, www.analyticssteps.com/blogs/weak-ai-definition-applications-and-limitations.

[4] Zamani Project, About the Zamani Project, retrieved from zamaniproject.org/.

[5] WANG Chen Xiao. A Brief Discussion of the Problems, Causes, and Countermeasures of China's Test Oriented Education. Exam Weekly, 2013, no. 27

[6] Challenor J., MA Minhua. A Review of Augmented Reality Applications for History Education and Heritage Visualisation. MDPI, Multidisciplinary Digital Publishing Institute, 2019.

[7] AN Fu Hai. Research on Teaching Theory in the Era of AI: Focusing on Deep Learning. Journal of Northwest Normal University (Social Sciences), 2020, vol. 57, no. 5.

[8] Nuttall D. What is the purpose of studying history? Developing students' perspectives on the purposes and value of history education. History Education Research Journal, 2021, 18 (1), 89–108.

[9] "The 7 Stages of the Future Evolution of Artificial Intelligence - Recode || Blog." RECODE, 28 Feb. 2021, retrieved from recodeminds.com/blog/the-7-stages-of-the-future-evolution-of-artificial-intelligence/.

[10] LI Jian, XU Deng. The evolution and future of the artificial intelligence movie. Journal of School of Chinese Language and Culture Nanjing Normal University, 2021.