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AI education: The application of the AI system with children's education

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Abstract. Since the technology Since the Artificial intelligence is becoming a technology that is mature and efficient for people to use, it is efficient if using this technology at children' s education. This paper concluded two experiments that have already done. In the first experiment, they test whether can children use the application to study, and what level of the app that they can use easily. More specifically, they provided both paper and electronic devices with a simple drawing app and a complicated drawing app to children. Then they let children to draw whatever they want. Based on children' s reactions, comments, and final products, they concluded that children could do well with the application. In the second experiment, they want to test whether can children study well with AI system. For this experiment, they prepared three activities for students, which were both involved with three different AI system, and all of the AI system were presented to children as the form of robots. In these three activities, children learned about AI, trained their own AI, and finally using AI to draw. Through the whole experiment, children showed high interest in the AI, and they can learn with AI system efficiently. Both of the experiments show that children have the ability to use the new technology, and they should use it, since those technology are interesting to them, and are helpful to them.

Keywords: AI education, children education, machine learning.

1. Introduction

In contemporary society, as individuals' personal desires such as economic and living conditions are satisfied, their concerns shift from themselves to their offspring. According to the research, parents' top concerns now are their children's performance in class [1]. Especially after the COVID-19 pandemic, children need to take online classes for a period of time, which makes their grades look impressive but worthless [1]. During the research, 84% of the parents think their children get a high score, even if their children did not have any academic progress [1]. This situation is common since COVID-19 split all over the world, which forces many countries to start online courses. However, due to online courses, students start to use a different application to help their study. For instance, Chatgpt is an Artificial Intelligence (AI) app that can be used as a teacher. Students can pose any question to this app, which then performs research using the internet and responds with its findings in its own words. This potent app assists students in solving challenging questions beyond their abilities. This exemplifies one way in which AI has been integrated into the educational sector, with many other

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applications currently available. In conclusion, parental anxiety regarding their children's academic pursuits can be mitigated with the aid of AI technology, which can help students learn more effectively.

Drawing is a common activity among children, which provides a medium for the expression of their thoughts and imagination. This creative endeavor can significantly contribute to the development of children's cognitive processes, including their thinking abilities [2]. Drawing is a very direct way to show children's inner thoughts since children's mental health can showed by drawing complex pictures [3]. In the recent study of children's drawing, most of the study is about observing children's drawing and analyzing their mental state [2, 3]. Few of them are really relating drawing with education. Same to the AI education field, the study is mostly about motivating children to study more efficiently by using language [4]. In many regions, students' pressure is increasing, because they have more competitors, which leads many children to have mental diseases, which leads them to a worse living style, less social connection, and suicide [5-7].

Since drawing can show children's inner thoughts, it is very important for them to learn drawing. If children learn basic drawing skills, it will be easier for them to draw the things that they want to draw. On the other hand, AI education can help children learn things very fast by analyzing students' models and some other components [4]. Teaching children to draw by using AI applications will be very efficient and interesting for students. Since AI can produce not only words but visuals, students will feel more interested when learning with AI. This technology can enable students to learn to draw more efficiently and sustainably, leading to the creation of more complex and expressive drawings that better reflect their inner thoughts and creativity.

Safinah Ali et al. conducted an experimental study aimed at investigating the effectiveness of using artificial intelligence (AI) to enhance the learning and development of primary and middle school students [8]. Specifically, the study focused on preparing students for the challenges and opportunities of the AI era. This research uses different robots and AI systems to help children to build up a basic understanding of AI with visuals and conversion. Also, children will build up the concept of constructionism and ethic in their minds, which are thing things that are needed to thrive in the AI era [8]. Then, based on their understanding, AI can actually be trained by children. This training way is not simply talking and answering, the researchers develop a game for children. During this interesting game, children can actually build up their creativity. Through the whole experiment, children can actually learn AI, constructionism, ethics, and improving creativity, while they still feel interested.

The aim of this paper is to show that AI education for children is a very efficient way to teach children. The rest of this paper is organized as follows: Section 2 will be the description of the methods that been used by the study of AI education. Section 3 will be the results and the discussion of the study. Last the section 4 will be the conclusion of this essay.

2. Methods

In the study of Savita Yadav, in order to compare the drawing activities of children on paper, on simple drawing app, and on sophisticated app. For the simple app, they chose Baby's Drawing App (BDA). BDA is an app that can be easily used by children. The app provides few feature such as "erase", "redo", and "undo"; and the most of the instructions are not texts but interesting image, which attract students a lot. BDA can also play sound effects when the user starts to draw. SDP is a drawing app that is more complicated. It provides more drawing features such as "cut", "copy", and "paste". The app also allows the user to import photo and add text, which are the features that mainly used by adults. Moving to the experiment, they performed their experiment in a school in New Delhi in November and December of 2019. They set 5 different groups of students, and each group of students are different ages (age 2-3, 4-6, 7-8, 9-10, and 11-12). Each group have 15 female students and 15 male students. When the experiment started, they provided both paper and smart phone that was installed with both BDA and SDP on it. The students will have the chance to choose which medium that they want to use the most, and they can draw as long as they want, which means that they will have enough time for them to complete their drawing. After finishing drawing on the first medium, the student will be required to draw on another medium as well. Through the whole experiment, the

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student needs to draw all by themselves, unless they asked for help form the first author. During the experiment, the first author will collect the evaluation of the different features from the students, and they will analyze the content of the student's final pictures to compare the differences of the drawing on two different mediums. Through listening to students, they will know what features are remarkable interesting for students.

In the study of Safinah Ali, the whole experiment is basically testing the feasibility of the AI education. In this study, they combined multiple of the concepts with the AI education, such like the ethics education, creativity, and constructionism. In order to help students to learn more about those concepts, they created three different experiments with AI.

For the first concept, which is the constructionism, they created PopBots: the first robotic toolkit developed for children ages 4-6 to learn about AI. PopBots used three different activities to teach students three AI concepts: knowledge-Based systems, generative AI, and supervised machine learning. Those activities are interesting to children, such like teaching robot to play rock, paper, scissors, and adjusting the music tempo.

For the second concept, which is the ethics, they developed hands-on, largely unplugged, AI activities to teach middle schoolers about the ethical ramifications of AI. It contains three lessons, the first lesson is to introduce the AI, datasets, supervised ma- chine learning, and the notion of algorithmic bias. During this lesson, students will train cat-dog classifier, and compare the accuracy of their system with each other. The second lesson introduces two concepts of Cathy O'Neil's: algorithms as opinions and stakeholder analysis using an ethical matrix, as in 3. Students will learn this concept by making peanut jelly sandwich and evaluating it. The third lesson is a paper prototyping of redesigning Youtube recommender systems, this helps students to actually apply what they learned.

For the lest concept, which is the creativity, in order to improve students's creativity, they developed a doodle games. During the game, children collaborate with Jibo, a social robot that expresses verbal and non-verbal patterns of artificial creativity. For this activity, students and Jibo needs to work together and come out with a title of a simple, abstract drawing.

3. Application and discussion

Since the outbreak of COVID-19, online learning has become increasingly popular among students worldwide [9-11]. However, despite its benefits, online learning is still in its developmental stages. One potential solution to enhance online learning is the integration of artificial intelligence (AI) education. In the online learning, AI can be used as an assistant of teachers. It can automatically create pictures and texts, it can help the teacher to search the materials for the class quickly, and it can be used as a supervisor of the class. AI system can also be utilized by students, since most of the AI education are in the ways of apps, students can use different apps to help them to study. Despite the potential benefits of AI systems in education, concerns have been raised regarding their maturity level and the potential for overreliance on this technology. Some individuals worry that students may become overly dependent on AI tools, leading to a situation where their academic achievement is solely attributed to the capabilities of the AI system rather than their own abilities. Such concerns highlight the need for caution and continued assessment of the appropriate use and integration of AI in educational settings [1].

AI systems possess appealing features such as visuals and sounds [12, 13], which have been shown to capture the attention of students, much like robots. Research has indicated that students exhibit a high level of interest in activities featuring AI robots [8]. Students are actually training their own AI system when they play around with it, which personalized the AI. Therefore, AI education can be a connection between fun and study. The AI that students trained knows what they like the most. As a result, AI can create multiple things such as activity, story and pictures to attract students to study. However, problems still exist, AI develop in a slow speed, and it takes time for students to train their AI systems. As a result, if errors occur during the training process, students may lose interest in the technology altogether.

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4. Conclusion

This paper discussed the use of the AI system in education for children that are 4-16 years old and concluded two study of AI education. In the first study, they provided the drawing app for students to observe whether learning with app is efficient. In the second study, they used three different AI robots to help students to learn more about AI. The performance of both the studies demonstrated that children could use AI system as a study tool, and work with it efficiently. Since children that are 4-6 years old are able to use app to draw, and they can learn the basic concepts of AI and even train their own AI system, AI education shows great value in children's education. In the future, people should focus more on the overuse of the AI system, which effect children's grade in negative way. Also, the time cost for learning to use AI system is also too long, so AI system still need be more concise and more efficient.

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