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Age of AI: Explore the Role of AI in Personalized Learning

Chenyue Li[1,a,*]

[1]*School of Marine Science, Guangxi University, Nanning, Guangxi, China*
a. 2310010117@st.gxu.edu.cn
**corresponding author*

Abstract: Nowadays, the relationship between artificial intelligence and learning has received wide attention. However, there is still insufficient research on the relationship and application of artificial intelligence and personalized learning. This paper analyzes the relationship between the current artificial intelligence tools and personalized learning and the future application prospects of AI tools in personalized learning. The analysis of this paper shows that the current AI tools have been widely used in the learning process of students, and the use of after-school learning accounts for a higher proportion. In addition, when students use AI tools in their learning process, the role played by AI tools is not highly related to personalization. And the current AI tools still have certain shortcomings, and further improvements are needed to promote his application in personalized learning. Based on this, this paper puts forward the following suggestions. The first step is to strengthen the use of AI tools in the classroom so that they can participate in the whole process of personalized learning. In addition, AI tool developers should improve the flexibility of AI tools and add corresponding new functions in response to the needs of the education industry. Finally, schools should guide to enable students to use AI tools more effectively in the process of personalized learning and introduce policies to avoid academic misconduct caused by AI tools.

Keywords: Artificial Intelligence, Personalized Learning, Education, Questionnaire Survey

1. Introduction

Nowadays, with the rapid development of AI technology, a variety of new AI tools are emerging in an endless stream. Due to the rising demands for AI tools, AI technology is constantly iterating, developing many new features, and being applied to various industries. Because of this phenomenon, the education industry, which is closely related to everyone's life, has also been affected in many aspects. Large quantities of studies have evaluated the value of AI in the education industry. Whether this situation is positive or negative, AI technology has already had a great impact on teaching and learning, and there is a trend of strengthening and deepening in the future.

As a key part of education and teaching, students' learning approach is a hot topic for long-term discussion and research in the education industry. At present, the traditional classroom usually has a uniform schedule and planning. Therefore, for students with different learning abilities and learning goals, the traditional teaching methods restrict students' academic development to a certain extent. As a new computer technology, AI can comprehensively collect, organize, and generate information

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according to different scenarios. Thus, AI technology can provide personalized support for students at different levels, and meet the individual needs of students with different abilities.

Artificial intelligence today is a broad concept with many specific definitions. A range of functions such as neural networks, computer vision, and machine learning all fall under the category of artificial intelligence [1]. Personalized learning refers to the adoption of different learning styles according to the specific needs, preferences, and characteristics of different students, to better meet the diversity displayed by students in the learning process [2].

This paper mainly focuses on AI technology and students' personalized learning, comprehensively analyzes the application status of AI technology in personalized learning, evaluates the relationship between the two, and puts forward some prospects and suggestions for the future application of AI technology in personalized learning. This paper will not only summarize and analyze the existing content but also further understand students' views on AI technology and personalized learning through a questionnaire survey, to draw more in-depth and comprehensive conclusions. The questionnaire survey includes students' views on AI technology and personalized learning, students' use of AI technology in daily learning, students' evaluation of current AI tools, and evaluation of further application of AI technology and personalized learning in the future. At the end of this paper, the two research methods mentioned above will be integrated to get conclusions.

2. Related Concepts of AI and Personalized Education

2.1. The Definition of Personalized Learning

Personalized aims to promote the development of students to identify the personalized differences reflected by students. At the same time, take action to adopt different learning styles. The key to this type of learning is to recognize students' ability to learn on their own, thereby pushing them to make their own choices and express their ideas. As a result, students have a stronger enthusiasm for learning and bring more excellent learning results [2]. Within this theoretical framework, it is necessary to identify students' interests and their preferences for learning styles, approaches, and tools. It is also necessary to make students' interests and preferences serve their actual needs and difficulties in learning. Only when these two conditions are met, effective and efficient learning methods can be produced.

This paper also has to make it clear that personalized learning is not just to satisfy students' ideas, but to acquire knowledge by reasonable means in combination with different students' situations to further improve students. If the learning style was changed for individual needs, but the changes did not have a positive effect on students in the end, but only let students spread their ideas without goals and restrictions, it would reduce the efficiency of students to acquire knowledge and bring unpredictable chaos to the normal teaching order.

2.2. Relationship between AI and Personalized Learning

The relationship between AI tools and personalized learning is not unique in real-life situations. In the face of different events and situations, the relationship between the two may also have certain changes. This paper argues that the relationship between AI and personalized learning is dialectical. AI tools will affect students' academic performance, and the use of personalized learning will also bring certain changes to AI tools themselves.

As for the role of AI in personalized learning, this paper believes that there are two main aspects as follows: providing personalized learning resources and instant learning feedback. In terms of providing personalized resources, part of the role that AI tools can bring is similar to the occasions when students use traditional learning tools, such as Wikipedia or other encyclopedia sites [3]. However, students can use AI tools to search more efficiently than traditional encyclopedia tools. AI

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can be used as an aggregation tool to extract and integrate information related to student's needs and give information that meets students' needs in a shorter time. The information collected according to students' needs is often more appropriate to students' individual needs. In addition, AI also has a function that traditional learning tools do not have, which is to give instant learning feedback based on the actual situation of the student. AI's computer vision function and natural language processing function can recognize students' learning outcomes, and correct errors or give certain suggestions. For example, identify articles and tables created by students and compare them with massive cases in the database and give comments. Such similar functions can allow students to have a new understanding of their learning outcomes at any time and on any occasion, and to correct or modify them timely. This function saves the time and cost of communicating with teachers or classmates in the traditional education mode. It can also combine a large number of existing academic achievements to give more comprehensive and more suitable feedback for students, thus improving the efficiency of learning.

As for the role of personalized learning in AI, this paper believes that the problems students encounter in the process of using AI tools and the perceived defects can promote the improvement and enhancement of AI tools. At present, the advantages of artificial intelligence over humans are limited. AI tools can do what humans have trained them to do, but they're not accurate enough or broad enough [4]. However, the advancement of personalized learning can provide more support to solve this problem to a certain extent. It has been mentioned above that students have certain needs for AI tools in the process of personalized learning. In the process of using AI tools, students will feel the shortcomings and deficiencies of AI tools. In this context, students can provide certain suggestions and feedback to developers. This feedback from students has the following two advantages: First, this feedback is from the students' real ideas after using AI tools, and the purpose of students using AI tools is not profitable, their feedback is a relatively more sincere, and more practical reference. Second, students are a very large and widespread group in the world, they can provide large amounts of feedback for developers, and the student group comes from all countries and ages, giving a broader and comprehensive sample. Combining these two points, this paper believes that students will inevitably provide a lot of information with practical reference value to the developers of AI tools in the process of using AI tools, and provide more impetus for the improvement of AI tools and future applications.

3. Current Application of AI in Personalized Learning

3.1. Condition of Students' Use of AI Tools

Artificial intelligence is an emerging field in the education industry, and balancing the risks and benefits of this technology can lead to a better-personalized learning experience for students. Therefore, understanding the actual situation of AI tools, and conducting careful analysis and effective application, can support students to achieve more in the learning process [5]. First of all, to fit the theme of this paper on personalized learning, aiming at the application of AI in personalized learning, this paper tries to understand the current situation of students using AI tools in daily learning. To achieve this goal this paper has designed a questionnaire to investigate students' opinions on the application of AI to personalized learning and students' use of AI tools in actual learning. Given different problems, this paper selects corresponding samples for analysis.

This topic of the questionnaire aims to understand students' use of AI tools in daily learning and their feelings on AI tools, to comprehensively evaluate the possibility of applying AI technology to personalized education. The questionnaire survey has collected a total of 95 survey responses. Data covering both high school and college and most mainstream majors. It is worth noting that the results of this questionnaire are based on students' feelings when using AI tools. It does not mean that

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students have a professional and comprehensive understanding of current AI tools. This paper aims to understand the use of AI tools by students from three aspects: the type of AI tools, the use of occasions, and the use of frequency. According to the results of the questionnaire survey, 51.72% of the respondents use AI tools once a day or more. The remaining 35.63% of respondents will use AI tools several times a week. The above data proves that a large number of students use AI tools in their daily learning, and the frequency is high. In addition, this paper also statistics the main types of AI tools used by the respondents and the main contexts in which AI tools are used. After obtaining the frequency with which students use AI tools in their studies, this paper further investigates the types of AI tools used by students and the occasions in which these AI tools are used. Regarding the types of AI tools, 75.86% of students will use AI translation, 73.56% of students will use AI tools to do exercises, 59.77% of students will use chatbots and 25.29% use other types of AI tools. Regarding the use of AI tools, 83.91% of students use AI tools when doing homework, and 67.82% of students use AI tools when reviewing. According to the above two sets of data, this paper concludes that at present, students mostly use AI tools in after-school learning, and the types of AI tools used mostly serve to complete after-school tasks and solve problems encountered, rather than applying AI tools to acquire new knowledge.

According to the data and phenomena mentioned above, this paper concluded that at present, students have been using AI tools more in their learning. However, the types of AI tools and situations used by students are not very broad, so the role of AI tools in students' personalized learning is relatively limited. In addition, in addition to after-school learning, it is not very common for students to use AI tools in class or group cooperative learning.

3.2. Flaws and Limitations of Current AI Tools

AI technology is an object developed by humans to help humans better achieve their goals [6]. However, due to the retrospective data training of artificial intelligence itself and the inherent architectural limitations of the underlying algorithm, there is bound to be some bias [7]. The data shows that 76.84% of the respondents still believe that the current AI tools have defects. This illustrates the obvious flaws and ubiquity of today's AI tools. This article further investigates the specific flaws that users have pointed out about AI tools. After statistical analysis, this paper lists some representative defects and displays them in Figure 1. The more prominent problems occupy a larger volume in the picture.

Figure 1: Limitations of AI tools.

In the content mentioned above, this article has pointed out that the current AI tools have certain shortcomings. According to the three negatives summarized above, the first flaw of AI tools is not

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flexible enough. This means that the information provided to students by AI tools cannot match the needs of students. In this case, students need to repeatedly adjust keywords or search methods to obtain information, which takes up a lot of time for students and defeats the original intention of improving efficiency through personalized learning. The second defect is not accurate enough, which means that the provided results are not reliable. Therefore, students need to verify the accuracy of these results through other means. These repetitive tasks can lead to AI tools not being needed in personalized learning. In addition, if students believe the wrong content is edited by AI without verification, it will also lead to students learning wrong knowledge, which will affect the learning effect of students. The third flaw is that AI tools are not intelligent enough, which means the content generated by AI tools is very rigid, easily overlaps with students' existing cognition, and can not bring further learning effects. Long-term absorption of this kind of limited information will restrain students' creativity and divergent thinking, and weaken students' learning ability.

3.3. The Impact of AI Tools

Next, this paper analyzes the influence caused by the characteristics of AI itself on students' behavior. Due to the endless emergence of AI tools today, students have a large number of convenient channels to obtain AI services, which leads to the tendency of students to rely on AI tools. Long-term dependence will inevitably lead to the addiction of students to AI, when the willingness and ability of students to learn independently will be greatly reduced, which directly leads to the loss of the basic conditions for students to learn, and personalized learning is naturally difficult to promote in this situation. Second, the misuse of AI tools may exacerbate academic misconduct. Although the phenomenon of academic misconduct was discovered before the birth of AI tools, the development of AI technology has objectively brought more convenience to the occurrence of academic misconduct [8]. The appearance of this phenomenon is not conducive to the cultivation and personalized development of students.

4. Development Direction of Applying AI to Personalized Learning

4.1. Demand for AI Tools

The development of personalized learning requires AI to create content suitable for learners and ensure that the learning content is relevant to users [5]. As technology advances, the possibilities presented by AI are constantly increasing. In this context, for AI tools to bring a better experience to personalized learning, developers and users must first determine the specific needs of AI tools for personalized learning.

This paper will be divided into two aspects to discuss, respectively, the use of scenarios and tool types. According to the data in the questionnaire survey, 83.91% and 67.82% of the respondents use AI tools when doing homework and reviewing, which proves that AI tools have been widely used outside the classroom. As an important part of learning, classroom time plays an unshakable role in personalized learning. With the increasing use of digital tools in the education industry, the increase in the types of tools and data collected brings more opportunities for the application of AI in the classroom [9]. AI tool developers need to build AI tools that are more suitable for serving personalized learning in the classroom according to current user needs. The content of classroom teaching is immediate and unified, in this context, the functions of AI tools should be improved for the characteristics of classroom learning. It is necessary to meet the situation of multiple users at the same time, but also to ensure that it can provide personalized content for different individuals.

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4.2. Solutions for Current Shortcomings

In part 3.2 this paper has discussed the Flaws and limitations of current AI tools. This paper has also put up some examples in detail. The appearance of this defect is not only caused by the AI itself but also depends on the user's behaviors for it [10].

AI tool developers should regularly provide users with the latest usage instructions based on background data, to help users use AI tools more smoothly and conveniently. Users need to sum up the experience they have mastered in the process of use and give priority to choosing AI tools that suit their habits. Users can also provide developers with suggestions for improvements or features. Developers and users work together to create a more efficient way of human-computer interaction. At present, the defects of AI tools are difficult to solve quickly and comprehensively, so improving the interactive relationship between users and AI tools can greatly improve the efficiency of using AI tools in personalized learning.

In addition, how to control the academic misconduct brought about by artificial intelligence and reduce students' unhealthy dependence on artificial intelligence are also urgent problems to be solved. This paper believes that the improvement of this problem needs the joint efforts of developers and users. Developers of AI tools should maintain the justice and fairness of AI tools through technical means, to generate a positive attitude towards AI among the public [11]. Developers should also use technical means to shape users who repeatedly use AI tools, or verify the identity and age of users, to give students more tips and guidance. Users, not only need their consciousness but also need appropriate external constraints when necessary in the process of personalized education, external factors should be involved to maintain the positive role of AI tools. For example, schools can launch relative policies and establish corresponding supervision mechanisms [8]. These regulatory measures should not only prepare for preventing academic misconduct but also correct the bad habits of students when using AI tools, to further play the positive role of AI tools and encourage students to stimulate creativity in the learning process.

5. Conclusions

In summary, this study finds that students have a strong demand for personalized learning at present, and there are gaps in the current teaching methods in this respect. According to the dialectical relationship between personalized learning and AI found in this paper, AI tools are suitable for further application to the development of personalized learning. It is worth noting that although AI tools have been widely used in learning, the actual application of AI tools in personalized learning is not widely used, and the scenarios used are more limited. AI tools have a limited role in promoting personalized learning in the classroom, which is worth developers and users paying attention to and finding ways to strengthen AI tools in the classroom learning aid role.

To achieve this goal, it is first necessary to identify and remedy the shortcomings introduced by current AI tools. These defects are respectively caused by the defects of AI tools themselves and the user's use habits, the main problems for AI tools themselves include AI tools are not accurate enough, not flexible enough, and not intelligent enough, while the user's bad habits include academic misconduct, dependence and inhibition of creativity. To make some changes to these phenomena, this paper puts forward the following suggestions: First, it should strengthen the application of AI tools in the whole scenario of personalized education. Secondly, it should focus on improving the defects of AI tools themselves and the difficulties caused by user habits. Developers should actively accept user feedback and innovate promptly to provide users with more reliable and diverse AI functions. Users should follow the code of ethics and various rules in the use process to avoid the occurrence of academic misconduct and excessive dependence. A good interactive relationship

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should be established between users and developers to improve the efficiency of human-computer interaction to ensure the rapid deployment of AI tools in personalized learning.

At the same time, this paper states that the current AI tools are developing rapidly, and in the face of the gap in personalized learning, AI tools will certainly play a positive role in the future. The realization of this purpose requires multi-party cooperation and long-term tracking by the academic community. In the future, more diversified and generalized research can be adopted on this issue, and these results will inevitably promote the development of AI and personalized education in the future.

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