Human-AI Cooperation in Education: Human in Loop and Teaching as leadership

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Abstract: Using the differences and complementarities between human intelligence and artificial intelligence (AI), a hybrid-augmented intelligence, that is both stronger than human intelligence and AI, is created through Human-AI Cooperation (HAC) for teaching and learning. Human-AI Cooperation is infiltrating into all links of education, and recent research has focused a lot on the impact of teaching, learning, management, and evaluation with Human-AI Cooperation. However, AI still has its limits of intelligence, and cannot cooperate as humans. Thus, it is critical to study the obstacles of Human-AI Cooperation in education, as AI plays a role as a partner, not a tool. This study discussed for the first time how teachers and AI cooperate based on Multiple Intelligences of AI proposed by Andrzej Cichocki and puts forward a new Human-AI Cooperation teaching mode: human in the loop and teaching as leadership. It is proposed that humans in the loop and teaching as leadership can solve the problem that AI cannot cope with complex and dynamic teaching tasks in open situations, as well as the limits of intelligence for AI.

Keywords: Human-AI Cooperation; Education; Human in Loop; Teaching as leadership; Multiagents; Multiple intelligences; Emotional intelligence; Social intelligence; Creative Intelligence; Innovative intelligence; Ethical and moral intelligence; Hybrid-augmented intelligence

1. Introduction

Artificial intelligence (AI) is profoundly changing people's way of production, life, and learning, and promoting human society to usher in an intelligent era of Human-AI Cooperation

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(HAC). In the field of education, HAC is constantly changing and reshaping the traditional educational theory and practical framework formed in the era of industrialization. Therefore, it is necessary to take HAC as the breakthrough of educational reform in the era of AI, actively explore the application prospect and development path of HAC in education and teaching, and promote the reform and modernization of education.

The theoretical research and practical application of HAC have been mainly concentrated in the fields of aerospace, transportation, medical treatment, logistics, and so on. The relevant research on the transformation of teaching and the construction of pictures based on HAC is beginning to sprout. The research mainly has focused on intelligent literacy under the background of HAC (Cai, Liu, & Zhou, 2021; Li, Zhuang, Nian, Liu, & Huang, 2021), teacher role (Qin & Zhang, 2020; Xu, Peng, Cao, & Yang, 2020; Yu & Wang, 2019; Zhu, Liu, Li, & Wang, 2019), classroom form (S. Wang, Fang, Zhang, & Ma, 2019; Wang, Gao, Lu, Shang, & Zhou, 2021) and experimental practice (Lu, Zhou, He, & Zhang, 2021); The construction of picture initially focuses on the discussion of the connotation and value of HAC in education (Mao & Wang, 2021), data intelligence mechanism (Peng & Zhu, 2018, 2019) and educational modeling (Zheng & Guo, 2021). Researchers have paid less attention to the intelligent limitations of AI and the obstacles of HAC in education and teaching. Therefore, this paper mainly focuses on the definition, characteristics, intelligence level, and the transformation of related roles of HAC teaching, analyzes the application prospect, development obstacles, and breakthrough path of HAC teaching, and puts forward a new HAC teaching mode.

This paper mainly answers the following three questions:

1) What is HAC teaching? What are the tasks that teachers and AI are good at in the field of education?

2) What are the limitations of AI in HAC teaching? What are the changes and challenges of HAC teaching to teachers? Why can the enhancement of humans in the loop overcome the intelligent limitation of artificial intelligence in HAC teaching? Why can teaching as leadership meet the role requirements of HAC for teachers?

3) Human in the loop and teaching as leadership proposed in this study is a new teaching model of HAC teaching. What are its organizational forms and basic principles?

The rest of this paper is organized as follows. The second part is the definition of HAC teaching. It includes the development history and connotation of HAC, the definition of HAC teaching. The third part is the obstacles of HAC teaching. Including the intelligent level limit of AI, the requirements of HAC teaching for teachers, and the enhancement of humans in the loop enhance intelligence can break through the intelligent limit of AI, and teaching as leadership can respond to the requirements for teachers. The fourth part puts forward that humans in the loop and teaching as leadership is a new teaching model of HAC teaching. Including his main concepts, organizational forms, and core characteristics.

2. Human-AI cooperative teaching

2.1 Human-AI cooperation

Human-AI cooperation is not a new concept. In the book Human-computer Symbiosis, Licklider (1960) proposed the concept of symbiotic computing. Licklider's vision is very prescient. The concept of the computer as a partner is an increasingly common metaphor. In the 1990s, experts and scholars in the fields of systems engineering, knowledge engineering, mechanical engineering, and psychology recognized the importance of human-computer cooperation and put forward their human-computer cooperation theories. Typical human-computer collaboration theories include "man-machine synergy prediction

knowledge system" of Stanford University (Boy, Burdet, Teo, & Colgate, 2002) and cooperative robots (Moore, Peshkin, & Colgate, 1999). In China, Qian Xuesen and Gu Jifa, scientists in the field of systems science and engineering, put forward the "comprehensive integration methodology" and the "human physics affair method" (Gu, Wang, & Tang, 2007) and the "human centered comprehensive integration seminar hall system-artificial society" (Cui & Dai, 2006a, 2006b). Scholars in the field of Mechanical Engineering put forward the theory of "man-machine integration" (Lu & Chen, 1994a, 1994b; Yang & Chen, 2000; Yang, Chen, & Lu, 2000). Subsequently, with the development of AI technology, human-AI cooperation has been further concerned by researchers (Eakin & Luers, 2006; Gil et al., 2014). It has become a valuable goal of science and technology to solve engineering technology, scientific research, human social activities and continuously promote social and socio-economic development. AI is an enabling technology that has brought many disruptive changes in many fields (Duan, Edwards, & Dwivedi, 2019; Minsky, 1961). Reasonable and effective use of AI technology can greatly promote valuable creativity and improve the competitiveness of humans and machines. Therefore, AI is no longer an independent, isolated, and self circulating academic system, but a part of human evolution.

Researchers have different names for cooperation between human and AI, mainly four mainstream names, namely Human-Machine Cooperation (McCaffrey & Spector, 2018), Human-Robert Cooperation (Matheson, Minto, Zampieri, Faccio, & Rosati, 2019), Human-Computer Cooperation (Tschandl et al., 2020) and Human-AI Cooperation (Wang et al., 2020). Researchers from different fields often use different names. Considering the development of AI technology, this study emphasizes the impact of agent intelligence on education and teaching. Therefore, we adopt the term of Human-AI Cooperation (HAC) and proposed that Human-AI Cooperation has the following connotation:

1) The advantages and disadvantages of humans and AI can be complementary. Human is better than AI in dealing with pioneering, subjective, unstructured, and non-procedural problems, and in adapting to the environment, emotional communication, and value interpretation. AI is better than humans in dealing with repetitive, objective, structured, and programmed problems, and in data operation, signal processing, and data-memory; The perception ability of AI represented by vision, hearing, and touch has reached or exceeded the human level, and the cognitive intelligence level requiring external knowledge, logical reasoning or knowledge transfer is in the stage of accelerated development.

2) The main goal of studying HAC is to perform their best work, learn from each other's strengths and make up for their weaknesses, jointly perceive, learn and work, understand, restrict and supervise each other, and jointly form a "super intelligent system", so as to form a "hybrid-augmented intelligence", so as to achieve the effect that neither human nor AI can complete independently.

2.2 From human-AI cooperation work to human-AI cooperation teaching

HAC system is fully infiltrating into human work and life. Pan (2018) and Zheng et al. (2017) proposed a human-AI hybrid to enhance intelligence. It refers to human-AI mixing, which provides enhanced intelligence through more effective human-AI interaction technology and system. As shown in Figure 1. There are two kinds of intelligent agents: human and AI, and three intelligent elements: human intelligence, artificial intelligence, and hybrid-augmented intelligence. Among them, the hybrid enhanced intelligence of the HAC system is distributed. HAC work is rising and will become the main activity in the future world. Similarly, HAC

teaching uses the differences and complementarities between teacher intelligence and AI intelligence to enhance the two kinds of intelligence, to produce a new teaching model.

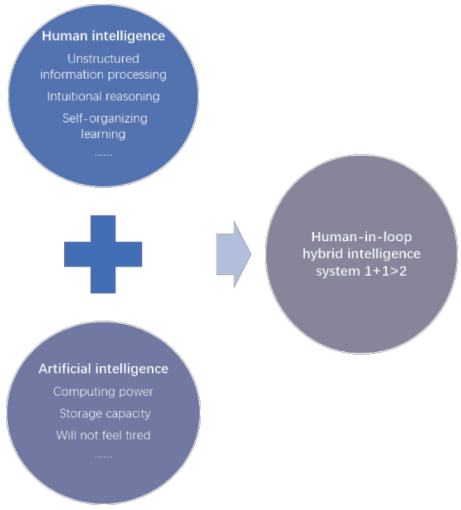

Fig. 1. Three types of intelligence in Human-AI Cooperation: human intelligence, artificial intelligence, and hybrid-augmented intelligence (Zheng et al., 2017)

Teachers can learn, speak, think and interact, and act and learn with the environment. The complexity of human intelligence means the structural complexity and connectivity plasticity of the nervous system in the human brain, as well as the inherent complexity of a series of intuition, consciousness, and thinking mechanisms. At present, there is no common conclusion about the mechanism of human intelligence. But, because of the complex structure of the human brain, teachers can better deal with incomplete and unstructured information. The evolution of human knowledge and the dynamics of learning ability make teachers better at learning, reasoning, cooperation, and other advanced intelligent activities.

Compared with human intelligence, AI has the characteristics of standardization, repeatability, and logic. At present, the structure of information can only be standardized by AI; For example, the input of a program must meet certain specifications. Repeatability refers to the machine nature of AI; Due to the powerful computing power and non-biologicalnonbiological characteristics of the computer, repeated work will not reduce the efficiency or accuracy of the machine. Logic means that AI has advantages in dealing with symbolic problems, which means that AI is better at dealing with discrete tasks rather than discovering or breaking rules by itself. Table 1 shows what teachers and education agents are good at in education. They have their advantages for different tasks and scenarios.

According to the respective fields of teachers and AI, some studies introduce hybrid intelligence into the teaching system. These technologies have been applied, and the application effect is good. For example, A primary school writing teaching model based on HAC is proposed (Huang, Gong, Yang, Wang, & Zhang, 2020; Yang, Guo, Huang, & Zhao, 2020). It weakens the way that teachers adjust

Table 1 What current are teachers and AI good at

What teachers are good at	What AI are good at
1. Ability to detect a small amount of visual or auditory energy	7. Be able to quickly respond to control signals and apply huge or slight force smoothly and accurately
2. Ability to perceive light or sound patterns	8. Be able to perform repetitive routine tasks
3. Adaptability and the ability to use flexible steps	9. Be able to simply store information and then delete it completely
4. Be able to store a large amount of information for a long time and recall relevant facts at an appropriate time	10. Reasoning ability, including computing ability
5. Ability of inductive reasoning	11. Be able to handle highly complex operations, i.e. do many different things at the same time
6. Ability to judgment	12. The ability not to be affected by physical strength, endurance, mental strength, etc

teaching based on subjective experience in traditional teaching. People and AI divide work and cooperate seamlessly. With the help of big data analysis of the platform, it can mine the key and difficult points in teaching and realize accurate teaching and personalized learning of writing skills. But for most HAC teaching. AI has many problems to be solved. For example, how to understand the nuances and fuzziness of human language in front of a human-AI interaction system, especially how to avoid the risks and even hazards caused by the limitations of AI technology in some important applications. In order to solve these problems, human supervision, interaction, and participation must be introduced for verification. This is what we will discuss in the third part, the intelligent level limitation of AI and the obstacles of HAC teaching.

3. Obstacles of Human-AI Cooperation teaching

According to AI experts and Neuroscientist, Artificial intelligence (AI) can be divided into four stages, as shown in Figure 2. Namely, Reactive AI (Narrow AI), Limited Memory AI (Flexible AI), AI with Theory of Mind (General AI), Self-aware and social-aware AI (Super AI). The current development stage of AI makes it impossible for AI to really become intelligent like humans with self-ware and social-ware. Therefore, different from Human-Human Cooperation, in Human-AI Cooperation teaching, teachers can give better play to the respective advantages of human intelligence and AI only by changing their roles and exerting more abilities lacking in AI, to achieve the effect of $1 + 1 > 2$.

First, the current AI in sprite has a strong ability to solve a single task in a specific scenario. It can not learn from experience. Not has the ability to forecast and use reasoning. Can not use memory to learn and improve its responses. Not has the ability to understand various scenarios, contexts, and behaviors. Evaluate its performance. Can not understand the needs and limitations of other agents. But in education, the scene is open, the problem is very complex, and the information changes dynamically. AI is facing an

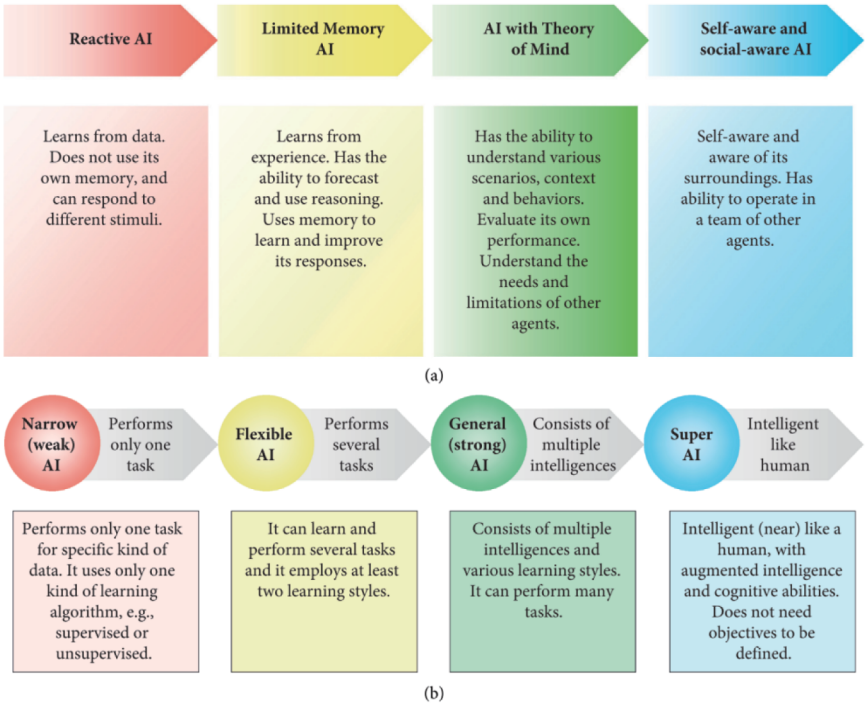

Fig. 2. The development stage of artificial intelligence (AI) (Cichocki & Kuleshov, 2021)

open problem framework. The current development stage of AI limits the function and ability of AI and is unable to deal with open problems in teaching. This requires that in the HAC teaching system, teachers to identify agents, actively construct a reasonable path of cooperation between human and education agents in the teaching process, complete the reconstruction and mutual understanding with each other in the continuous interaction and running in with AI, and undertake the active development of AI technology. Teachers play multiple roles to realize the ultimate goal of using AI to support teaching. Including how to select the appropriate artificial intelligence, ensure the communication and coordination between artificial intelligence subsystems, unify the leadership and encourage efficient cooperation between AI to jointly solve problems.

Second, referring to Gardner's multiple intelligences theory (Gardner, 2000; Gardner, & Moran, 2006), Cichocki and Kuleshov (2021) have also constructed multiple intelligences of AI, including six very important intelligence: physical intelligence (PQ), intellectual intelligence (IQ), emotional intelligence (EQ), social intelligence (SQ), creative + innovative intelligence (CINQ), and moral-ethical intelligence (MQ). The intervention of AI has changed the space-time attribute of education. The face-to-face "Human-Human" communication mode between teachers and students has gradually changed to the two dimensions of "Human-AI-Human" and "Human-AI". The current AI features multiple intelligences, as shown in Table 2. Physical intelligence (PQ) surpasses human intelligence. However, emotional intelligence (EQ) and social intelligence (SQ) are in the embryonic stage of research, while creative + intellectual intelligence (CINQ) and more ethical intelligence (MQ) are basically absent. Therefore, in the communication of "Human-AI-Human" and "Human-AI", on the one hand, due to the current AI can not effectively complete the deep semantic recognition and emotional interaction, and the lack of EQ and SQ, it is difficult to effectively implement the two-way interaction between Human-AI; On the other hand, with the advantages of AI in knowledge possession and feedback accuracy, PQ and IQ are stronger than human beings. It is easy for learners to have technical dependence, succumb to various technical rules, and gradually give up the ability of independent judgment, imagination, and thinking in the interaction with machines, even leading to the failure of CINQ and MQ to develop. Therefore, in HAC teaching, we must highlight the role of teachers in the dialogue between teachers and students, and emphasize the process of measuring the spiritual level of students' inner culture with teachers' cultural body as a tool. Teachers need empathy and self-reflection, communication and coordination with AI, innovation, and responsibility.

Table 2 Current AI intelligence level and the intelligence that teachers need

Multiple Intelligences	Teachers	AI
physical intelligence (PQ)	Weak	Strong
intellectual intelligence (IQ)	Weak	Strong
emotional intelligence (EQ)	Empathy and Self Reflection	Weak
social intelligence (SQ)	Communication and Coordination with AI	Weak
creative + innovative intelligence (CINQ)	Creative + Innovative	Weak
moral-ethical intelligence (MQ)	Responsibility	None

Remark 1:

AI with emotional intelligence (AI-EQ) is an artificial intelligence system, which has the functions of self-awareness, self-assessment, and self-regulation (or self-management). In other words, AI-EQ can evaluate its performance. It should also have the reliability and robustness of specific task performance, such as robustness to noise, damage, and incomplete data sets. AI with social intelligence capability (AI-SQ) is an artificial intelligence system, which can interact and communicate with humans and/or other artificial intelligence subsystems, exchange information and knowledge, and support each other. In addition, such AI-SQ can coordinate and cooperate with other AI subsystems (intelligent agents), and can also cooperate to perform joint complex tasks in an optimized manner. AI with computational creativity and innovation (AI-CINQ) is an artificial intelligence system that can generate, implement and evaluate novel products or outputs, such as images, music, or video. AI-CINQ (AI with creativity and innovation business cinq) is defined as an artificial intelligence system that discovers and combines ideas and methods in new ways, Ability to solve problems, and/or generate new products, processes, or outputs. AI systems with MQ not only can judge the behavior of themselves and others (whether agents or humans) from a moral point of view but also have the right to make responsible decisions to prevent "wrong" behavior. In other words, AI-MQ should not only have some self-awareness and execution to judge or evaluate what is "right" and "wrong" but also can take action and do the right thing.

4. Human in the loop and teaching as leadership: a new model of human-AI Cooperation teaching

Education agents have become the closest friend of teachers in education. The interaction and cooperation between teachers and education agents will become a part of our future education and teaching. However, many problems in teaching are often highly complex, uncertain, and open. Because teachers are the service object and arbiter of the final "value judgment" of educational agents, teachers' intervention on machines is consistent in the whole evolution process of these systems. In addition, even if sufficient or unlimited data resources are provided for the artificial intelligence system, the intervention of teachers in the intelligent system cannot be ruled out. Artificial intelligence has many problems to be solved, such as how to understand the nuances and fuzziness of human language in front of a human-computer interaction system, especially how to avoid the risks and even hazards caused by the limitations of artificial intelligence technology in some important applications, such as information cocoon room based on recommendation algorithm, the definition of students' stereotype based on portrait technology and intelligent tutors and intelligent partners who ignore emotional communication. In order to solve these problems, teachers' supervision, interaction, and participation must be introduced for verification. Therefore, on the one hand, it can improve the confidence of the intelligent system and build the hybrid of humans in the loop to enhance intelligence; On the other hand, human knowledge and leadership will be best used. Therefore, in this paper, we emphasize the concept of humans in the loop and teaching as leadership, which skillfully combines human cognitive ability and leadership ability with the ability of artificial intelligence in PQ and IQ. Specifically, it is defined as follows:

Human in the loop and teaching as leadership is an intelligent model integrating human-human interaction and human-AI interaction. In this type of intelligent system, human is not only a part of the HAC teaching system but also the leader of the HAC teaching system. Therefore, the way to affect the teaching results is that, in each specific micro-

teaching scene, as see Figure 3. for a specific single goal, teachers are included in the artificial intelligence framework, and teachers need to participate in the construction of algorithm model. If the reliability of the results given by artificial intelligence is low, teachers will make a further judgment, to improve the confidence of artificial intelligence system without iteration. On the macro level, as seen in Figure 4. more importantly, teachers are the leaders of students and the whole team of agents. By setting teaching goals, encouraging students and optimizing artificial intelligence, selecting appropriate educational agents to form teaching (learning) teams, purposefully designing, effectively implementing, and continuously improving the effectiveness of man-machine collaborative teams Strive tirelessly and morally to achieve the major goal of teaching. In addition, humans in the loop and teaching as leadership can easily solve the problem that AI can not meet the emotional needs of students.

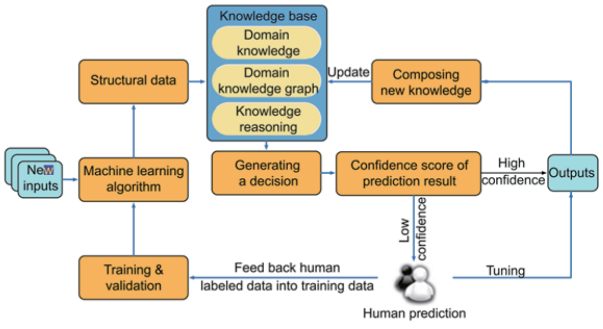

Fig. 3. For micro-teaching problems: human in the loop hybrid enhanced intelligent teaching from the perspective of HAC (Zheng et al., 2017)

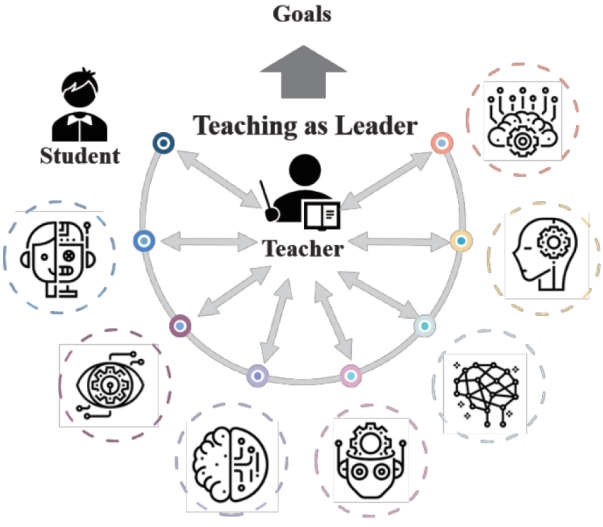

Fig. 4. For Macro oriented teaching goal: teaching as leadership from the perspective of HAC

Remark 2:

The systematic exposition of teaching as leadership can be traced back to (Norr & Crittenden, 1975) that teaching can be regarded as the behavior of leaders in groups, which can benefit all parties. It is proposed that leadership and teaching have three levels of commonality, that is, the emphasis on structure, interpersonal relationship, and motivation in teaching is the same as the emphasis on creating structure (providing working conditions), care (support), and products (results) in leadership. Of course, they are also different. For example, leadership does not emphasize homework and evaluation, while teaching emphasizes these factors. Since then, scholars have discussed leadership teaching in school leadership, principal leadership, teacher leadership, teaching leadership, and other research (Farr, 2010). However, previous studies are based on the fact that there are only two kinds of subjects in the teaching system: teachers and students, and there is only interaction between everyone. With the full integration of educational agents into all links of education and the gradual improvement of the intelligence level of educational agents, educational agents have some “human-like” characteristics. Therefore, from the perspective of man-machine cooperation, we should re-examine the connotation of leadership teaching and explore its coincidence with man-machine cooperation teaching.

Human in the loop and teaching as the leadership of HAC teaching requires teachers to play the role of team leader in the teaching (learning) community composed of teachers, students, and educational agents. We follow the framework of leadership teaching proposed by Rui & Ziwen. (Rui & Ziwen,

2014) According to the new changes brought by the educational agent based on artificial intelligence technology, the new connotation of teaching as leadership is updated, and humans in the loop and teaching as the leadership of HAC teaching is proposed. It is believed that in the context of human-AI interaction, humans in the loop and teaching as the leadership of HAC teaching: setting teaching objectives with the help of AI, identifying educational agents and establishing HAC teaching team, not giving up teacher-student interaction and encouraging students, purposeful design and effective implementation, unremitting efforts to set a moral example, and finally achieve the teaching objectives.

1) Setting teaching goals with the help of AI

Human in the loop and teaching as leadership requires teachers to play the role of leaders and help teams (including students and agents) set challenging and achievable goals. Its purpose is to help students create a learning vision, stimulate students' learning will, and guide educational agents to serve students to realize their vision. As a teaching leader, the biggest goal is that students can reach their current level, but slightly higher than their present level. Different students have different big goals. Educational agents need to help teachers collect information, diagnose learning situations and analyze objectives, and provide decision-making references for teachers. Analyze whether the main objectives are closely combined with the curriculum standards, clarify the exercises to promote learning activities and all the main standards of the curriculum so that students can clearly understand which curriculum objectives each learning activity can help them achieve.

2) Identify educational agents and establish a human-AI cooperative teaching team

In the HAC system, human is also regarded as a kind of intelligence. Humans and AI form a multi-agent system. In the HAC teaching, teachers, as leaders, are responsible for the final teaching goal. Therefore, teachers need to responsibly select educational agents to form a teaching team and determine the form of cooperation between agents according to leaders and teaching styles. Therefore, teachers need to have the ability to identify the intelligence level and characteristics of various educational agents, select appropriate educational agents according to the teaching objectives and learners, and form a multi-agent teaching team to give full play to the intelligent advantages of each educational agent in their respective fields and achieve the best teaching performance, to lead the team to achieve the teaching objectives.

3) Don’t give up teacher-student interaction and motivate students

Human in the loop and teaching as leadership, with all kinds of educational agents joining the teaching team, has changed from the traditional “human-human” interaction between teachers and students to a new type of “human-AI-human” interaction and “human-AI” interaction. Students may spend more time in the human-AI interface. HAC teaching requires teachers not to give up the interaction between teachers and students, and completely entrust the time of student interaction to the educational agent. Although this saves a lot of time for teachers, it will lead to some problems. For example, students are easy to indulge in the step-by-step adaptive scaffold set by educational agents, so they can’t exercise their meta-learning abilities such as self-reflection and self-regulation. More seriously, it even causes students to lose their autonomy and initiative and become an accessory controlled by educational agents. Therefore, people in the loop leadership teaching requires teachers not to give up the power and obligation of teacher-student interaction, pay attention to strengthening students’ internal motivation through various teacher-student interaction activities and methods, stimulate students’ awareness of “I can learn” and “I want to learn”, and convey to

students the positive message of adhering to learning and pursuing success, Create a warm environment for students to respect and appreciate different groups of students. Let teachers become the leaders of students' learning, rather than let students become learning machines under AI.

4) Purposeful design and effective implementation

Teachers are required to effectively evaluate students' learning status and goal realization in the learning process, which requires teachers to carry out reasonable teaching scheme design and evaluation design. According to the different needs and interests of students, design the learning content, learning process, and learning task requirements suitable for different groups; Moreover, due to the implementation of personalized teaching and precision teaching, the teaching workload will increase significantly. Teachers pay special attention to the decomposition and distribution of teaching work, coordinate all educational subjects to complete the corresponding teaching work, and design effective plans and accountability, to stimulate the structural grouping of all educational subjects. The effective implementation of "human in the loop" and "teaching as leadership" requires teachers to explain learning expectations to students and explain the purpose of expectations clearly, decisively, and confidently according to needs. In order to achieve the purpose of effective implementation, teachers have to track students' learning behavior and often carry out a diagnostic evaluation, formative evaluation, and summative evaluation, and let the data explain the short-term and long-term learning plans and differences, to determine the progress of students and help students understand the learning behavior based on big goals.

5) Make unremitting efforts to set a moral example

HAC teaching requires teachers to become moral models and ethical gatekeepers with teams. Unremitting efforts require teachers to face new knowledge, new content, new requirements, and new challenges, persist in facing challenges, always point to learning objectives, and fully guide the main body of education and students to gradually move towards the big goal. Establish a team of leaders and controllers (such as logical persuasion and continuous improvement of students' learning motivation), so that students can have a continuous impact on their academic performance and maintain their value of persuasion and technical support, to win their learning motivation and continuous improvement.

5. Conclusion

AI is rapidly integrated into all aspects of life and work, and HAC work is becoming the main existing form of society. Similarly, HAC teaching is also rising in the field of education. This paper mainly focuses on the definition, characteristics, intelligence level, and transformation of relevant roles of HAC teaching, and analyzes the application prospect, development obstacles and breakthrough path of HAC teaching, and put forward a new HAC teaching mode: human in the loop and teaching as leadership. It is considered that the human in the loop and teaching as leadership can solve the problems existing in HAC teaching, such as AI can not cope with the complex and dynamic teaching tasks in the open situation, the low level of EQ and SQ of AI, and the lack of CINQ and MQ. However, this study is worth looking forward to. In the future, we need to further explore the teaching demonstration and improve the theory around HAC teaching.

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