

The Challenge and Response of Generative Artificial Intelligence to Teachers' Curriculum Design Leadership

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Abstract. The rapid development of generative artificial intelligence is profoundly reshaping the education ecology, which poses a systematic challenge to the professional role and core competence of teachers. In this technological change, teachers' curriculum design leadership is facing unprecedented impact. This paper systematically analyzes the multi-dimensional challenges of generative AI to teachers' curriculum design leadership. This paper proposes that teachers should change from "passive response" to "active remodeling", and reconstruct curriculum design leadership under the new paradigm of human-computer cooperation. By innovating the teaching mode and realizing the "blank" and "value-added" of curriculum design, the focus of the classroom will shift from knowledge coverage to deep learning. By constructing the "just transformation" ecology of teachers' professional development, we can provide systematic organizational support for teachers' digital intelligence growth. According to the research, the fundamental way to deal with the challenge of AI is not to compete with the efficiency of knowledge transfer with machines, but to return to and strengthen the essential pursuit of "making people human" in education. This paper has important academic value and practical significance for deepening the understanding of human-computer collaborative education and promoting the positive transformation of teachers' role.

Keywords: generative artificial intelligence, Teachers' leadership in curriculum design, Human machine cooperation, Professional role remodeling, Value leading.

1. Introduction

In recent years, the rapid development of generative artificial intelligence technology is bringing profound changes to the field of education. From chatgpt to various multimodal large models, these technologies have been gradually integrated into all aspects of education and teaching with their powerful content generation ability, natural interaction mode and efficient knowledge processing efficiency. This technological change has not only changed the way of knowledge transfer, but also raised fundamental doubts about teachers' professional roles and job responsibilities.

Among the many impacted teachers' professional abilities, curriculum design leadership deserves special attention. As an important part of teachers' core quality, curriculum design leadership is reflected in Teachers' professional consciousness and ability level in the curriculum system [1]. Specifically, it includes teachers' overall understanding of the curriculum, the ability to design the teaching content and the ability to grasp the implementation of the curriculum, reflecting the degree of teachers' autonomy in the curriculum work. For a long time, teachers have been playing multiple roles such as the authoritative interpreter of curriculum content, the main designer of teaching process and the planner of students' learning path. However, when generative AI can quickly complete the preparation of teaching plans, the construction of knowledge frameworks, the design of homework topics and even the customization of personalized learning programs, teachers' original professional authority and design autonomy are facing unprecedented challenges.

It should be clear that education has never been just an extension of technology. The essence of education is related to people's growth and the way people know and understand the world. As a tool of knowledge production, generative artificial intelligence has indeed changed teaching methods, but more importantly, it has prompted people to rethink the value orientation of teachers in the process of education. In this context, it has become an important topic of current educational research to deeply study the specific challenges that generative AI has brought to teachers' curriculum design leadership and explore effective coping strategies. This paper will start from the definition of the

concept of teachers' curriculum design leadership, systematically analyze the multiple challenges brought by generative artificial intelligence, and on this basis, discuss how to reshape teachers' curriculum design leadership from the perspective of human-computer cooperation, in order to provide theoretical reference and practical guidance for teachers' professional development in the era of intelligence.

2. The Definition and Role of Teachers' Curriculum Design Leadership

2.1. Connotation of Teachers' Curriculum Design Leadership

To understand the leadership of teachers' curriculum design, we first need to clarify the upper concept of teachers' curriculum leadership. Teachers' curriculum leadership refers to teachers' cognition of the curriculum system and the consequent consciousness of curriculum behavior, which reflects teachers' overall ability to grasp the process of curriculum design and implementation. According to the research of scholars Wang Qin and Zheng Youxun, the core composition of this ability includes three aspects: curriculum consciousness, curriculum design and curriculum implementation [1].

From the perspective of specific performance, teachers' curriculum leadership contains two levels of connotation. At the school level, teachers can participate in curriculum affairs in the way of equality, cooperation and sharing, put forward constructive suggestions for the development of school curriculum, and make curriculum decisions with other teachers to promote the realization of curriculum objectives. At the classroom level, teachers give full play to their professional autonomy, formulate teaching plans, design unit teaching, implement curriculum evaluation according to curriculum standards, and use the experience and wisdom accumulated in long-term teaching practice to have a positive impact on students in a unique way.

Based on the above understanding, this paper defines teachers' curriculum design leadership as the comprehensive reflection of teachers' professional judgment, creative decision-making ability and value leading ability in the process of curriculum planning, design, implementation and evaluation based on the comprehensive consideration of curriculum objectives, curriculum content, students' characteristics and teaching situation. It should be emphasized that this ability has gone beyond the technical category of "lesson preparation" in the traditional sense. It is a composite professional ability that integrates educational philosophy, professional wisdom and ethical care.

2.2. Educational Value of Curriculum Design Leadership

Teachers' curriculum design leadership plays an important role in many aspects in educational practice [2].

First of all, this ability is an important guarantee for teaching students in accordance with their aptitude. The outline of basic education curriculum reform (Trial) issued in 2001 established a three-level curriculum management system at the national, local and school levels, and appropriately delegated the right of curriculum management to schools. This reform has changed the role of teachers from a simple curriculum executor to a curriculum leader. As a result, teachers have a greater space for curriculum autonomy, and can adjust and design the curriculum according to the specific situation of the students they teach, so as to better realize the educational goal of teaching students in accordance with their aptitude.

Secondly, curriculum design leadership directly affects the quality of curriculum implementation. The effect of curriculum implementation depends largely on Teachers' understanding of the curriculum and their ability to transform the curriculum into teaching practice. When teachers have strong leadership in curriculum design, they can creatively design teaching activities suitable for students according to the requirements of curriculum standards and specific teaching situations, so that the curriculum objectives can be truly implemented in the classroom. On the contrary, if teachers only passively implement the established curriculum plan, even if the curriculum design itself is excellent, it is difficult to achieve the desired teaching effect.

Thirdly, the development of curriculum design leadership is also the internal driving force to promote teachers' professional growth. In the process of participating in curriculum design, development, implementation and evaluation, teachers need to constantly deepen their understanding of education, improve their professional judgment ability and accumulate practical wisdom. This continuous practice and reflection helps teachers gradually grow into reflective practitioners with independent consciousness and innovation ability. As some researchers have pointed out, the vision foresight, value insight and other elements contained in curriculum leadership are the core content of teachers' professional development.

Finally, in the context of today's educational reform, the value of curriculum design leadership is more prominent. With the wide application of generative artificial intelligence technology, AI has been able to efficiently complete the knowledge transfer and the generation of basic teaching content. In this case, the professional value of teachers is changing from the traditional "knowledge Porter" to "learning designer" and "value leader". And curriculum design leadership is precisely the key ability to support this role transformation. It helps teachers find their professional positioning in the environment of technology empowerment and play an irreplaceable role.

3. AIGC's Challenge to AI's Leadership in Curriculum Design

The in-depth application of generative artificial intelligence in the field of education not only brings technological innovation to teaching, but also has a profound impact on the foundation of teachers' curriculum design leadership. Researchers point out that AI technology is rapidly changing the education ecology, bringing multiple professional challenges to teachers. These challenges are concentrated in the following four levels.

3.1. Professional Role Identity Crisis

The most fundamental impact of generative AI on teachers is that it has shaken teachers' professional status as knowledge authority for a long time. When AI can instantly generate teaching content, sort out the key points of knowledge, and construct the overall framework of the discipline, the "knowledge monopoly" advantage that teachers traditionally rely on has been fundamentally questioned [3]. This identity crisis has been embodied in educational practice. Some studies have found that with the popularity of AI tools in the field of education, teachers' identity with their professional values is being threatened. When AI can quickly complete textbook compilation, homework correction, student question answering and other work, many teachers begin to worry about losing teaching autonomy in the process of human-computer cooperation. Such concerns are not superfluous. In the context of rapid technology update and iteration, teachers have to keep asking: where is their unique value in the field where AI can do faster and better? This deep questioning of the significance of professional existence constitutes the root of the crisis of teachers' role identity.

3.2. Erosion of Autonomy in Teaching Decision Making

The core of curriculum design leadership is that teachers can make independent decision and creative design based on professional judgment [4]. However, when AI can automatically generate diversified teaching plans, homework questions and evaluation methods, teachers' decision-making space is quietly shrinking. This change reveals a potential risk that teachers may fall into excessive dependence on technology. If teachers directly adopt the teaching content generated by AI without criticism, their role may degenerate from active "curriculum designer" to passive "AI content reviewer". In this case, teachers no longer need to conceive the teaching plan from scratch, but only need to make a choice among several options provided by AI. In the long run, teachers' design thinking ability will face the risk of degradation, which poses a potential threat to the sustainable development of curriculum design leadership.

3.3. Absence Risk of Curriculum Value Guidance

The fundamental mission of education is to promote people's all-round development, including value guidance, emotional connection and spiritual growth. However, the technical characteristics of generative AI may pose a potential threat to this educational essence. Research shows that the content generated by AI may hide cultural bias, wrong information or defects in language logic [5]. For example, when dealing with historical or social issues, the AI system may tend to reflect the values of a particular culture and ignore other cultural perspectives. If teachers use the content generated by artificial intelligence uncritically in the curriculum design, and give up the value judgment and ethical check on the teaching content, it may make the curriculum deviate from the fundamental goal of moral education. There is objectively a certain tension between the efficiency, accuracy and standardization pursued by technology and the holistic development, personality growth and value creation pursued by education. Some scholars summarized this risk as "focusing on application and ignoring subject", pointing out that the application of AI in education may not only bring problems such as the alignment of ethics and values, but also lead to the weakening of the subjectivity of teachers and students in the process of human-computer cooperation, especially the lack and dislocation of teachers' roles.

3.4. Human Machine Collaboration Competency Lag

From the actual situation, the current teachers are facing a significant gap in technology learning and application in the process of adapting to the development of artificial intelligence [5,6]. Some studies have found that teachers need to invest a lot of time in learning the operation and application of AI tools, which is particularly challenging for more qualified teachers. They not only need to be familiar with the basic functions of various AI platforms, but also understand how to effectively integrate these tools into the teaching process, including how to design appropriate prompts and how to select appropriate AI tools according to different teaching situations. These learning requirements often conflict with the existing heavy work arrangements of teachers.

The existence of this ability gap makes it difficult for many teachers to truly realize the role transition from "AI tool user" to "AI controller". They may fall into the dilemma of "want to use but can't use" or "can use but can't use well", which can neither fully release the educational potential of artificial intelligence, nor maintain the professional dominant position in the process of human-computer cooperation. If this problem is not effectively solved, it will directly affect the sustainable development of teachers' curriculum design leadership in the intelligent era.

4. Coping Strategies

4.1. Adhere to the Education Standard and Reshape the Professional Core

The fundamental way to deal with the challenges brought by generative AI is to return to the essence of education, that is, to strengthen the core pursuit of "making people human" [5].

This means that teachers first need to complete an important change in concept, that is, from the traditional "knowledge Porter" to "meaning builder" [7]. The focus of curriculum design should no longer be the pursuit of comprehensive coverage of knowledge points, but should turn to the design of learning activities that can trigger students' in-depth thinking and promote the construction of meaning.

On this basis, teachers also need to play the role of "AI adjuster" and "critical coach", and strengthen the value judgment and ethical control of the curriculum content. Teachers need to take a critical view of the content generated by AI, and carefully evaluate it before introducing it into the curriculum, so as to ensure that the teaching content not only conforms to the educational objectives, but also can convey the correct values.

4.2. From "Single Lecturer" to "Designer of Human-Computer Cooperation"

As generative artificial intelligence enters the field of education as a "pilot", the role of teachers in the classroom is undergoing profound changes. Teachers are no longer the only source of knowledge and teaching subject in the classroom, but need to learn to work with the "teaching partner" of artificial intelligence to optimize the teaching effect in a reasonable division of labor and cooperation [8].

To achieve this role change, teachers first need to become "embodied architects" of learning experience. This means that the focus of curriculum design is no longer simply planning how to teach knowledge, but the top-level design of the respective advantages of "human teacher" and "aircraft teacher". Specifically, teachers need to carefully determine which links can be handled efficiently by AI assistants. Which links must be led by the teacher in person.

4.3. Innovate the Teaching Mode to Realize the "Blank" and "Value-Added" of Curriculum Design

Under the background that AI can efficiently complete the knowledge-based teaching task, the logic of curriculum design needs to be adjusted accordingly, from the pursuit of efficiency "addition" to the pursuit of depth "subtraction" and "blank". With the help of AI, teachers should learn to leave space for students to think, and schools should also leave space for teachers to innovate. This means that the curriculum design should not be a dense arrangement filled with knowledge points, but should be an elaborate blank for creating space for in-depth learning. Accordingly, teachers' work is no longer to fill every minute of teaching activities, but to design the core problems and key tasks that can stimulate thinking and lead to exploration [9].

It should be noted that AI is indeed helpful to promote students' autonomous learning, but teachers need to be careful not to change from a knowledge transmitter to a bystander. In the process of AI enabled education and teaching, teachers need to play a more active role in moral education, technical governance and teaching process reengineering to ensure that teaching is always under the professional leadership of teachers. Technology is only an auxiliary means, and the core of education is still teachers' professional judgment and value guidance.

4.4. System Support

The ability of individual teachers can not be reshaped without systematic organizational support. To help teachers smoothly adapt to the educational reform in the era of artificial intelligence, the government and educational institutions should provide systematic support for the transformation of digital intelligence, and gradually familiarize teachers with the application of artificial intelligence technology in teaching through phased and hierarchical training programs.

In terms of training design, we need to fully consider the differentiated needs of different groups of teachers. Specifically, the training should be targeted at teachers of different disciplines, different stages and different technical foundations. The purpose of this is to enable teachers to not only master the basic operation of tools, but also understand the teaching principles behind technology, and gradually form professional judgment to effectively integrate artificial intelligence into curriculum design [10].

What complements the training system is the concern for teachers' technical anxiety and the bridging of the digital gap. For those teachers who are anxious about the application of AI due to their lack of technical background, schools can design support mechanisms suitable for teachers with different levels of digital intelligence literacy. The deeper support lies in the establishment of an institutional culture that encourages innovation. Schools need to reform the traditional teacher evaluation system, establish appropriate fault-tolerant mechanism and effective incentive mechanism, and encourage teachers to boldly explore the new mode of man-machine collaborative teaching [5]. When innovation is encouraged, exploration is recognized, and cooperation is advocated, teachers can try new possibilities of human-computer collaborative teaching in a relatively safe environment, and the development of curriculum design leadership has been systematically guaranteed.

5. Conclusion

The challenge of generative AI to teachers' curriculum design leadership is essentially a profound dialogue between technical rationality and educational value in the era of intelligence. From the above analysis, it can be seen that this challenge is by no means a simple obstacle to the application of technology, but a systematic impact on the foundation of teachers' Professional Identity.

The fundamental way to deal with the challenge is not to compete with machines for the efficiency of knowledge processing, but to return to and strengthen the essential pursuit of "making people human" in education. This means that teachers need to adhere to the value guidance, innovate in human-computer cooperation, make breakthroughs in the practice mode, and grow up with the support of the system, and finally redefine and consolidate their professional status as curriculum leaders in the intelligent era. When teachers sublimate from "knowledge Porter" to "meaning builder", and transform from "single lecturer" to "designer of human-computer cooperation", the logic of curriculum design will change from knowledge coverage to deep learning, and the space of classroom will change from the place of indoctrination to the garden of thought growth. This transformation process is exactly the process that the irreplaceable professional value of teachers is rejuvenated in the era of technology.

Looking forward to the future, human-computer collaboration will become the normal paradigm of teachers' professional work. The relationship between teachers and AI will move from instrumental use to partnership collaboration, forming a new working mode of showing their strengths and synergy. At the same time, the spirit of educators will become the spiritual ballast for teachers' professional development in the era of digital intelligence, ensuring that the application of technology always serves the essence of education rather than dispelling the foundation of education.

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