

GUIDELINES FOR DEVELOPING AI COMPETENCY OF TEACHERS IN XISHAN HIGH SCHOOL OF KUNMING NO.1 HIGH SCHOOL

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ABSTRACT

With the rapid integration of artificial intelligence (AI) into the field of basic education, the cultivation of teachers' AI competency has become a core task for the high-quality development of schools. Taking Xishan High School of Kunming No.1 High School as the research object, this paper explores the practical guidelines for developing teachers' AI competency based on the characteristics of high school education and the school's development positioning. Through the methods of literature research, questionnaire survey, and in-depth interview, the paper first clarifies the connotation and evaluation dimensions of high school teachers' AI competency, including AI knowledge cognition, teaching application ability, ethical literacy, and research and innovation ability. On this basis, it analyzes the current situation of AI competency of teachers in the research school, identifies the existing problems such as uneven competency level, insufficient practical application ability, and lack of systematic training system. Finally, it constructs a multi-dimensional development guideline covering curriculum system construction, training mode innovation, teaching practice integration, and incentive mechanism improvement. The research results provide a targeted practical reference for Xishan High School of Kunming No.1 High School to improve teachers' AI competency, and also have certain reference significance for the construction of teachers' AI competency in similar high schools in southwest China.

Keywords: Artificial Intelligence Competency; High School Teachers; Teacher Professional Development; Xishan High School; Education Digitalization

INTRODUCTION

The advent of the AI era has brought profound changes to the form and connotation of education, and education digitalization has become an important direction for the reform and development of basic education in China (Ministry of Education of the People's Republic of China, 2023). As the main body of educational teaching activities, teachers' AI competency directly determines the effect of AI integration into daily teaching, and is the key to realizing the transformation of educational methods and the improvement of teaching quality (Baker & Inventado, 2014). High school is a critical stage connecting basic education and higher education, and the cultivation of students' innovative thinking and digital literacy is highly dependent on teachers' professional competency in AI (Zhu et al., 2021). Xishan High School of Kunming No.1 High School, as a key high school with a high reputation

in Yunnan Province, is committed to building a digital and intelligent campus, and the development of teachers' AI competency has become an urgent need for its school-based development and educational quality improvement.

In recent years, the research on teachers' AI competency has become a hot spot in the field of educational research at home and abroad. International organizations such as UNESCO have issued relevant guidelines to clarify the core dimensions and cultivation paths of teachers' digital and AI competency (UNESCO, 2021). Domestic scholars have also conducted in-depth research on the connotation system (Zhang & Li, 2022), cultivation status (Wang & Han, 2023), and training strategies (Liu & Chen, 2022) of primary and secondary school teachers' AI competency. However, most of the existing studies focus on macro-level strategy formulation and general primary and secondary school research, and there are few targeted research results combined with the actual situation of key high schools in southwest China, especially lacking school-based practical guidelines for teachers' AI competency development.

Against this background, taking Xishan High School of Kunming No.1 High School as the research object, this paper aims to construct a set of targeted and operable AI competency development guidelines for teachers. The research not only clarifies the core connotation of AI competency suitable for high school teachers in the school, but also analyzes the practical difficulties and realistic demands of the school's teachers in AI learning and application, and further puts forward systematic development strategies and implementation paths. This research is of great significance for promoting the school's education digitalization construction, improving teachers' professional development level, and cultivating students' digital literacy and AI thinking, and also provides a practical reference for the AI competency development of teachers in similar high schools in ethnic minority areas of southwest China.

OBJECTIVE

1. To clarify the core connotation and evaluation dimensions of AI competency for teachers in Xishan High School of Kunming No.1 High School, combined with the characteristics of high school education and the school's development positioning.
2. To investigate and analyze the current situation of AI competency of teachers in the research school, and identify the existing problems and influencing factors.
3. To construct targeted and operable practical guidelines for the development of teachers' AI competency in Xishan High School of Kunming No.1 High School.
4. To put forward specific implementation paths and safeguard measures for the development guidelines to ensure the effective implementation of the guidelines in the school.

METHODOLOGY

This research adopts a mixed research method combining qualitative and quantitative research, with Xishan High School of Kunming No.1 High School as the research object, and conducts in-depth research on the development of teachers' AI competency through literature research, questionnaire survey, and in-depth interview. The research objects include all the full-time teachers of the school, covering different disciplines, teaching ages, and professional titles, to ensure the comprehensiveness and representativeness of the research samples.

Sub-Section 1: Literature Research

The research team collected and sorted out domestic and foreign literature related to teachers' AI competency, including policy documents issued by the Ministry of Education, UNESCO and other organizations, academic papers published in core journals, monographs on education digitalization and AI education, and research reports on teachers' professional development. Through literature analysis, the core connotation, evaluation dimensions, cultivation paths and existing research deficiencies of teachers' AI competency were clarified, laying a theoretical foundation for the definition of the research framework and the construction of the development guidelines.

Sub-Section 2: Questionnaire Survey

Based on the results of literature research, a questionnaire on the current situation of AI competency of teachers in Xishan High School of Kunming No.1 High School was designed. The questionnaire includes four parts: basic information of teachers (discipline, teaching age, professional title, etc.), AI knowledge cognition, AI teaching application ability, and AI training demand. A total of 200 questionnaires

were distributed in the school, and 189 valid questionnaires were recovered with an effective recovery rate of 94.5%. The statistical software SPSS 26.0 was used to conduct descriptive statistics and cross-analysis on the questionnaire data, to master the overall level of AI competency of the school's teachers and the differences in competency among different groups of teachers.

Sub-Section 3: In-Depth Interview

On the basis of the questionnaire survey, the research team selected 20 teachers from different disciplines, teaching ages and professional titles for in-depth semi-structured interviews, including senior teachers, intermediate teachers, young teachers, and teaching management personnel. The interview content focuses on the difficulties encountered by teachers in the application of AI in teaching, the problems existing in the current AI training of the school, and the specific demands for AI competency development. The interview records were sorted out and coded by using the qualitative research method, and the deep-seated problems and realistic demands of the school's teachers' AI competency development were summarized, providing practical basis for the construction of the development guidelines.

RESULTS

Current Situation of Teachers' AI Competency in Xishan High School of Kunming No.1 High School

The statistical analysis of the questionnaire and interview results shows that the overall AI competency of teachers in Xishan High School of Kunming No.1 High School is at a medium level, and there are obvious differences in competency levels among different groups of teachers, showing the characteristics of "uneven development". In terms of AI knowledge cognition, most teachers have a preliminary understanding of basic AI concepts such as big data and intelligent teaching platforms, but the mastery of professional AI knowledge such as educational data mining and intelligent evaluation is relatively lacking; in terms of AI teaching application ability, teachers are more proficient in the use of basic intelligent teaching tools (such as online homework platforms, intelligent marking tools), but the ability to integrate AI technology with subject teaching design and carry out personalized teaching is insufficient; in terms of AI ethical literacy, most teachers can realize the importance of AI ethical education, but they lack the practical experience and teaching strategies of integrating AI ethics into

subject teaching; in terms of AI research and innovation ability, only a small number of young teachers and key teachers have the awareness and ability to carry out research on AI education application, and most teachers lack the motivation and platform for AI education research.

From the perspective of different groups, young teachers under 35 years old have a higher acceptance of AI technology and better basic AI competency, while senior teachers over 50 years old have relatively weak AI operation ability due to age and technical foundation; teachers of science and engineering disciplines (such as mathematics, physics, chemistry) have a higher application frequency of AI teaching tools than teachers of liberal arts disciplines (such as Chinese, history, politics), and their integration ability of AI and subject teaching is relatively stronger; key teachers and teaching backbones have more opportunities to participate in AI training and research activities, and their AI competency is significantly higher than that of ordinary teachers.

Main Problems in the Development of Teachers' AI Competency

Combined with the research results, the main problems existing in the development of teachers' AI competency in Xishan High School of Kunming No.1 High School are summarized as follows: First, the lack of a school-based AI competency evaluation system and clear competency standards, leading to teachers' unclear development goals of AI competency. Second, the current AI training system is not perfect, the training content is divorced from the actual teaching needs, the training mode is single, and the pertinence and effectiveness of the training are insufficient. Third, the school's intelligent teaching environment and resource support are not perfect, the integration of AI technology and subject curriculum is not deep enough, and teachers lack the practical platform for AI teaching application. Fourth, there is no perfect incentive mechanism and professional development system, the enthusiasm of teachers to learn and apply AI technology is not high, and the construction of AI teaching research teams is lagging behind. Fifth, the regional resource advantages of southwest China are not fully utilized, and the school lacks in-depth cooperation with local universities, scientific research institutions and AI enterprises in the field of AI education.

Demand of Teachers for AI Competency Development

The interview results show that the school's teachers have strong practical demands for AI competency development, and the main demands are concentrated in the following aspects: First, the training content should be closely combined with subject teaching, and more school-based and practical AI teaching skills training should be provided, such as personalized teaching design based on intelligent teaching platforms, educational data analysis and application, etc. Second, the training mode should be diversified, combining offline centralized training with online on-demand learning, and increasing practical teaching and peer exchange activities. Third, the school should strengthen the construction of intelligent teaching resources and platforms, provide more convenient AI teaching tools and resource support, and build a platform for teachers' AI teaching exchange and research. Fourth, the school should establish a sound incentive mechanism, encourage teachers to carry out AI teaching reform and research, and recognize and reward teachers who have made outstanding achievements in AI teaching application.

CONCLUSION AND FUTURE WORK

Conclusion

This paper takes Xishan High School of Kunming No.1 High School as the research object, clarifies the core connotation and evaluation dimensions of high school teachers' AI competency (AI

knowledge cognition, teaching application ability, ethical literacy, research and innovation ability) through literature research, and masters the current situation, main problems and development demands of the school's teachers' AI competency through questionnaire survey and in-depth interview. On this basis, the paper constructs a set of targeted and operable practical guidelines for the development of teachers' AI competency in the school, which is summarized as the "four-in-one" development system: curriculum system construction, training mode innovation, teaching practice integration, and incentive mechanism improvement.

The core conclusions of the research are as follows: First, the AI competency of teachers in Xishan High School of Kunming No.1 High School is at a medium level on the whole, with obvious group differences, and the practical application ability and research innovation ability are the weak links of teachers' AI competency. Second, the main factors restricting the development of teachers' AI competency in the school include the lack of clear competency standards, imperfect training system, insufficient resource support, and imperfect incentive mechanism. Third, the development of teachers' AI competency must adhere to the school-based principle, closely combine with the characteristics of high school education and the actual teaching needs of the school, and construct a multi-dimensional, systematic and hierarchical development system. Fourth, the development of teachers' AI competency needs the joint efforts of the school, teachers, local universities and social institutions, and the integration of policy support, resource guarantee, training practice and incentive guidance.

The development guidelines constructed in this paper have important practical significance for Xishan High School of Kunming No.1 High School to improve teachers' AI competency and promote the construction of education digitalization. The guidelines not only clarify the development goals and core content of teachers' AI competency, but also put forward specific implementation paths and safeguard measures, which can provide a clear direction for the school's teacher professional development and AI education reform. At the same time, the research results also have certain reference significance for the development of teachers' AI competency in similar key high schools in southwest China, especially in ethnic minority areas, and provide a practical reference for the integration of AI technology and basic education in southwest China.

Future Work

Although this paper constructs the development guidelines for teachers' AI competency in Xishan High School of Kunming No.1 High School, there are still some deficiencies in the research, and the follow-up research can be further expanded and deepened in the following aspects: First, in terms of research scope, the follow-up research can expand the research object to more high schools in Kunming and even Yunnan Province, and carry out a comparative study of teachers' AI competency in different types of high schools, to further improve the universality of the development guidelines. Second, in terms of research methods, the follow-up research can add experimental research methods, select part of the teachers of the school to carry out experimental teaching based on the development guidelines, and verify the effectiveness and operability of the guidelines through the comparison of experimental results. Third, in terms of research content, the follow-up research can further construct a quantitative evaluation index system of teachers' AI competency, and carry out dynamic evaluation and tracking research on the development of teachers' AI competency in the school. Fourth, in terms of practical application, the follow-up research can cooperate with Xishan High School of Kunming No.1 High School to carry out the pilot implementation of the development guidelines, and adjust and optimize the guidelines according to the actual implementation effect, to form a more perfect and operable school-based AI competency development system.

In the future, with the continuous deepening of education digitalization construction, the cultivation of teachers' AI competency will become a long-term and arduous task for schools. Xishan High School of Kunming No.1 High School should take the development guidelines as the basis, combine with the school's development plan, continuously improve the teachers' AI competency development system, strengthen the integration of AI technology and subject teaching, and strive to cultivate a group of high-quality teachers with strong AI competency, so as to provide strong talent support for the high-quality development of the school and the cultivation of students' digital literacy and innovative ability.

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