

A Case Study on Using Artificial Intelligence Generated Content to Improve Problem-Solving Competence in Primary and Secondary Schools

Qingkun Liu*

Ningbo Childhood Education College, Ningbo, Zhejiang, China

*Corresponding Author

Abstract: In the context of Chinese primary and secondary education, head teachers represent a highly significant group, as they simultaneously fulfill the dual roles of subject teacher and class advisor. Consequently, research on enhancing the problem-solving abilities of head teachers has considerable potential for wider application. This study originated from the need to identify an “educational discourse intermediary” that could facilitate the improvement of head teachers’ capabilities. Utilizing action research and case study methods, it explored the mechanism by which Artificial Intelligence Generated Content (AIGC), as an educational discourse intermediary, promotes the enhancement of head teachers’ abilities. Through generic analysis and situational analysis of the data, it was found that AIGC empowers head teachers to improve their problem-solving capabilities by deepening their thematic learning and thinking, enhancing their verbal representation skills, and providing intelligent augmentation of problem-solving paradigms.

Keywords: Problem-Solving; Head Teachers; Educational Discourse Intermediary; Artificial Intelligence Generated Content (AIGC)

1. Introduction

In the context of Chinese primary and secondary education, head teachers face numerous complex educational scenarios, such as intervening in students’ psychological crises and resolving conflicts between students, teachers, and parents. These scenarios demand high levels of immediate decision-making and systematic guidance from head teachers. The development of these abilities goes beyond mere behavioral imitation and knowledge application, requiring

individual head teachers to progress through a process of “embodied cognition-situational adaptation-meta-cognitive regulation” to gradually evolve and reconstruct their self-cognition. However, current head teacher training is largely confined to two modes: one focuses on static knowledge structures, lacking a microscopic examination of “situation-action-reflection”; the other discusses the enhancement of head teachers’ abilities from the perspective of “clinical practice skills,” facing the risk of “meaningful transformation-cultural adaptation[1]” in experience transfer. Regardless of the perspective, head teacher training activities face the pain point of a gap between theory and practice, failing to effectively assist in the real capability enhancement of head teachers. Fundamentally, on one hand, the improvement of head teachers’ abilities requires external information and support, as the phrase “the insider is confused” aptly describes this situation. On the other hand, external forces that can assist in enhancing head teachers’ abilities, whether they are university scholars or outstanding head teachers, have differences in discourse systems and practical cultures with individual head teachers, leading to either “inadequate expression” or “poor results.” In response to this gap in knowledge transformation, there is an urgent need to construct a mechanism for breaking through different discourse systems, leveraging an “educational discourse intermediary” to promote innovation in educational practice behaviors.

Various scholars have made numerous efforts in exploring the concept of an “intermediary,” such as “Educational Narrative Action Research[2]” and “Cross-boundary Learning Based on Boundary Objects[3].” The rapid development of Artificial Intelligence Generated Content(AIGC), technology offers another possibility for the

“intermediary.” Observing AIGC’s role in promoting ecological evolution across various industries, we anticipate that AIGC can serve as a wise scholar present at the right time and a front-line expert always ready to solve problems. It can reduce the cognitive load for head teachers when accessing external information, enhance their ability to solve practical problems, and empower them to conceptualize and rationalize their self-experienced practices. As some scholars have found by integrating the digital divide theory and the knowledge gap theory, there exist “access gaps, usage gaps, and knowledge gaps” among different individuals. The willingness and needs of individuals to access digital technology, as well as the impact of its use on knowledge acquisition and production, have significant effects [4, 5]. However, the existence of AIGC hallucinations also warns us to maintain technical rationality when using AIGC as an “intermediary.”

Based on this, this study, through action research and case study methods, takes the problem-solving and ability enhancement of head teachers in education as the research anchor. By exploring questions such as “How does AIGC affect the problem-solving of head teachers in education?” and “How does AIGC enhance the problem-solving ability of head teachers?” this study discovers the mechanism by which AIGC affects the problem-solving of head teachers in education and their corresponding ability enhancement, leading the readers of this article to understand the mechanism by which AIGC affects the educational practice activities and self-ability enhancement of primary and secondary school teachers.

2. Research Design

Since 2012, Zhejiang Province has been conducting a continuous competition for the basic skills of primary and secondary school head teachers. From the perspective of the participants, the competition in Zhejiang Province can be divided into two stages. From 2012 to 2021, the competition was quota-based in various cities of Zhejiang, with each city having 6 quotas, totaling 15 first prizes and 67 participants (including 1 from provincial schools). Since 2022, the competition has been allocated based on the proportion of teachers in each city, with a total of 101 participants (including 2 from provincial schools), and 3

special prizes and 19 first prizes. From the perspective of competition projects, the competition can be divided into three stages. The first stage, from 2012 to 2019, included written and interview sections, focusing on moral education knowledge and activity plans in the written section, and educational scenario simulation in the interview section. The second stage, in 2020, included thematic class meetings and interviews (as above), evaluating the ability of head teachers to design and implement class theme education activities through submitted teaching designs and classroom recordings. The third stage, from 2021 to the present, includes nurturing stories, class management strategies, thematic class meetings (as above), and scenario simulations (as above). Nurturing stories evaluate the ability of head teachers to conduct personalized education through storytelling, and class management strategies evaluate the philosophy, ideas, and practices of head teachers through speeches on their educational philosophies. From 2012 to 2020, the competition was a regional event, with competition methods mainly negotiated by provinces in the Yangtze River Delta region. Starting in 2021, the Ministry of Education’s Department of Basic Education organized a national exchange activity for the basic skills of primary and secondary school head teachers, which included modules such as nurturing stories, class management strategies, and thematic class meetings. Since then, the basic skills competition for head teachers in the Yangtze River Delta region, including Zhejiang, has integrated the national requirements with the original local competition requirements. Through the review of the entire competition, it is evident that since 2021, the competition in Zhejiang Province has begun to focus on the examination of practical knowledge of head teachers. “Nurturing stories, class management strategies, and thematic class meetings[6]” focus on the explicit practical knowledge of individual head teachers, while scenario simulations focus on their implicit practical knowledge.

As a prefecture-level city under the jurisdiction of Zhejiang Province, N City’s primary and secondary school head teacher basic skills competition is fully carried out according to the requirements of the provincial competition. Based on the proportion of Ningbo contestants winning provincial first-class or above awards, we divide Ningbo’s head teacher competition

into two stages: from 2012 to 2022, the proportion of award-winning contestants is $\leq 1/15$ (1 or 0 winners), and from 2023 to 2024, the proportion of award-winning contestants is $\geq 2/11$ (7 winners in 2023 and 4 winners in 2024). During this process, the method of recommending provincial competition contestants in Ningbo has been determined by the results of the municipal head teacher basic skills competition for a long time. After the provincial competition contestants are determined, the municipal training unit invites provincial moral education experts to provide short-term intensive training on competition content knowledge and scenario models for the contestants. Starting from 2023, N City has made significant changes to the method of determining provincial competition contestants and the training model. First, the municipal head teacher basic skills competition is scheduled one year earlier than the provincial competition. Second, the provincial competition training team is selected according to the ranking of municipal competition contestants. Finally, the final provincial competition contestants are determined based on the performance of the selected individuals during a one-year concentrated research and training program. The concentrated training has been changed from a single static knowledge transfer model to a one-year phased “thematic learning + scenario simulation drills.” From the above factual review, it is evident that long-term specialized learning around class education activities has a significant effect on the production of practical knowledge and the improvement of abilities for the primary and secondary school head teacher group.

Since 2013, the researcher has been involved in the basic skills competition activities of primary and secondary school head teachers in the city, initially just participating in the competition selection activities, and later deeply involved in the design of the city-level head teacher basic skills research and training system and the implementation of research and training activities. Based on this, the researcher can participate in the action research on the improvement of the city-level head teacher basic skills research and training activities from the perspective of an insider. Additionally, the researcher often participates in the city-level head teacher basic skills competition selection and the provincial head teacher basic skills

selection as a judge, and can study the explicit practical knowledge production of the head teacher group from an external perspective through the analysis of physical objects such as “nurturing story texts, class management concepts, and thematic class meeting videos.” Through the on-site observation of the scenario simulation section and the judges’ questions, the implicit practical knowledge expression of the head teacher group is also studied. Given this, the current study selected the N City 2025 Provincial Class Teacher Training Team as a case study. The training team began a concentrated training program on the basic skills of class teachers in November 2024, focusing on the primary issues of student development and class management in primary and secondary schools. The training was conducted through a closed-loop learning approach of “thematic learning-simulation diagnosis-practical reflection-situational simulation.” In this training session, we introduced the AIGC model to reshape each segment of the concentrated training. The research collected text and video recordings of “educational stories, class management strategies, and thematic class meetings” produced by the training team members at each training stage, as well as the on-site video recordings and judges’ questions from each selection competition’s situational simulation session. Additionally, data was collected from one-on-one discussions and seminars with training team members at each stage of the training. After data collection, research conclusions were drawn through categorical analysis and situational analysis.

3. Research Findings

3.1 AIGC Can Enhance the Depth of Thought in Class Teacher Training

The learning of class teachers is not about acquiring abstract educational theories, but about learning the logic and methods of action, and the best way to learn is through “learning by doing.” In problem-solving, they learn how to communicate between practical experience and theory. Static knowledge-sharing lectures are typically conducted by university scholars, whose knowledge is often based on logical reasoning or empirical research. This type of knowledge has a significant difference from the practical ecology of class teachers’ educational practice. Therefore, scholars are constantly

adjusting their self-awareness to integrate into front-line practice strategies, from forming learning communities with front-line teachers to cross-boundary learning perspectives. Chen's research[7-10] suggests that stimulating trust can awaken teachers' learning subjectivity and provide appropriate theoretical nourishment, helping teachers in action dilemmas achieve sudden enlightenment. Wang Mingshuai has preliminarily explored the feasible mechanism for cross-boundary learning between universities and primary and secondary schools through a teacher research literacy enhancement project. These research explorations are still localized explorations by a few university scholars. However, a learning mechanism that benefits a large number of teachers has not yet been formed. The "clinical practice" training conducted by outstanding front-line teachers often encounters resistance from the cultural context of the learners' practice field. Even if the experience is recognized by the learners, it may undergo a process of "decontextualization-recontextualization" and produce a shift in meaning.

However, the integration of the AIGC model between the information provided by university scholars, outstanding teachers, and the self-practice of front-line class teachers has had a significant impact on the thematic learning of class teachers. As mentioned by Teacher Zhang, "For example, during a thematic learning session on 'home-school communication,' I was able to gain a deeper understanding of the national laws and policies regarding home-school cooperation through the in-depth interpretation of AIGC, as well as the classroom explanations from the training instructors (university scholars). By feeding past award-winning works into AIGC, I was able to understand concepts such as educational philosophy, educational strategies, and the logic of actions, which were difficult to grasp on my own. This has greatly inspired my storytelling. By imitating the structure, I can now write my own good stories." "AIGC has helped me find ideas that match my practices. If I relied solely on myself, it would take a lot of effort and may not be as well-summarized as it is now. I wrote an educational story titled 'Growth Passwords in LEGO,' and AIGC helped me identify the 'growth mindset, emotional education, cooperative learning, positive behavior reinforcement, and Su Dongpo's educational wisdom' as the key points in my

story. Through further dialogue with AIGC, it recognized that my educational approach follows a 'developmental education paradigm,' focusing on student development and integrating emotional education and social education. Now, I constantly summarize and organize my class management experience based on this practice paradigm and have made significant progress." It can be seen that AIGC has become an intermediary between external information and the self-practice of class teachers. Through the learning mechanism of "thematic learning - cognitive expansion - practice reconstruction," class teachers integrate external information with their self-practice. AIGC plays a crucial role in connecting the top-down and bottom-up processes. It acts as an accompanying guide, helping new ideas and good experiences to be implemented in the self-work field of learner-class teachers. It also serves as an academic mentor and assistant, helping class teachers conceptualize and rationalize their educational practices. It can be said that a compound cognitive system of "training experts - AIGC - practice community" has been formed to promote in-depth thematic learning among class teachers.

3.2 AIGC Can Enhance the Verbal Representation Ability of Class Teachers

Class teachers are practitioners who engage in immediate action and cyclical practice. Immediate action refers to the need for class teachers to immediately translate their educational philosophy and experience into action strategies when encountering unexpected events. Cyclical practice refers to the need for class teachers to carry out educational activities in a systematic manner within the time frame of a school year. This requires class teachers to have the ability to translate their educational philosophy and experience into systematic educational behaviors and activities. The practical knowledge required by class teachers is centered on their own educational philosophy, and is obtained through reflective practice in complex classroom contexts through educational behaviors such as thematic class meetings, interactions with students, and class activities. This knowledge is gradually formed through the two-way interaction between abstract concepts, educational philosophy, and embodied educational behaviors and decisions. In the original practice ecology, the diagnosis and

guidance of individual class teachers' educational behaviors by university scholars and well-known class teachers were important ways to promote the improvement and verbal representation of class teachers' self-practical knowledge. In the AIGC era, the symbiotic relationship between "class teacher's practical experience + AI intelligence" has been reconstructed, promoting the digital transformation of class teachers' verbal representation ability. As mentioned in the case, after analyzing more interview content, we found that AIGC can play an auxiliary role for practical workers such as class teachers in the aspects of structuring the framework of practical reflection, recognizing non-verbal behavior patterns, conceptualizing educational experience, and adapting to external experience culture. For example, the thematic class meeting activity implementation framework "cognitive reconstruction, behavioral drills, cultural infiltration" provided by AIGC has helped the aforementioned teacher effectively improve the quality of collective education in class meetings.

3.3 AIGC Can Intelligently Enhance the Problem-Solving Paradigm of Class Advisors

As mentioned above, the work of class advisors has both immediate and periodic characteristics. They must provide immediate intervention measures while planning long-term co-educational behaviors between families, schools, and communities. When facing unexpected events with individual students, class advisors need to implement complex educational behaviors such as "interrupting the event, comforting emotions, correcting behavior, and guiding education" within a short time. When dealing with group events, class advisors must handle complex educational scenarios like "anxiety in high-achieving students, avoidance in struggling students, and inclusive education for special students." Class advisors must achieve a dynamic balance between immediate response and long-term design, and complete educational guidance for the class during emergency responses. By constructing an activity system of "daily penetration, weekly activities, and monthly themes," educational behaviors can be curricularized. Zhejiang's experience shows that simulating educational scenarios can significantly improve class advisors' problem-solving abilities. As one teacher stated, "Through repeated scenario

simulations in the training team, I am now more adept at handling both student and family-school issues." With the empowerment of AIGC, we have found that the work of class advisors has transformed from relying on experience to intelligent enhancement. For example, in a recent selection competition for the training team, there was a scenario simulation question: "The school organized a viewing of the movie 'Ne Zha 2,' allocating five spots to each class. The class advisor of Class 301, adhering to the principle of fairness, selected five students to watch the movie through a lottery. One of the selected students, Lili, was disqualified from watching the movie by Math Teacher Cai because she had not corrected her math homework. That evening, Lili's father sent a text message to Teacher Wang: 'Teacher Wang, there's no relation between academic performance and watching movies, right? Why did the math teacher prevent my child from watching the movie?' If you were Teacher Wang, what would you do?" In the absence of AIGC, the strategies provided by the teacher were: "1. Home-school communication, empathizing with the parents' anxiety, guiding parents to establish consistent educational goals with the teacher, and cooperate to improve Lili's learning efficiency; 2. Coordination with co-teachers, using a 'consultative communication' approach to maintain teacher authority while conveying parents' demands, negotiating homework assignment strategies, and exploring win-win solutions; 3. Student assistance, using fragmented time for one-on-one tutoring to reduce accumulated homework." In the selection activity, nearly 20 teachers' on-site simulation expressions of problem-solving strategies basically followed the above experiential problem-solving methods. These strategies showed the general procedures for handling normal problems, ignoring the "subtext" in Lili's father's words. After the simulation, we provided the corresponding teachers with feedback on the on-site response video and assigned them the task of re-providing solutions to the problem after deeply interacting with AIGC. After analyzing the subsequent text, it was found that with AIGC's empowerment, class advisors could identify Lili's father's "internal developmental anxiety: worrying that Lili would fall into the development trap of 'academic backwardness → loss of opportunities → decrease in motivation,' and the optimization

appeal for the transparency and fairness of the school's activity participation system." AIGC's "golden 30-minute response" and "dual-track information collection" strategies greatly inspired me. In terms of procedure, I should have replied to Lili's father with a voice message on the day I received the text message, promising to provide a solution as soon as possible, and then verified the situation with Lili and the math teacher separately. I looked for the real reasons why Lili had not completed the corrections (insufficient ability/time management/family factors) and the extent of her expectation to watch the movie (whether the activity was a core growth need). I also confirmed Lili's homework correction situation with the math teacher (determining whether it was a persistent problem or excessive homework). In this way, the problem-solving process was both warm and objectively fair." "In my dialogue with AIGC, it suggested a 'dual-track' activity participation standard: basic qualifications (lottery/rotation to ensure procedural fairness) and dynamic adjustments (growth point system to ensure educational fairness). This inspired me to think about how to eliminate educational inequality in class activity management from the perspective of system construction." "In the dialogue, I saw a concept called 'teacher collaboration system,' which reminded me of an article I read about a school in Nanjing that had the concept of a class teacher community. There are similarities between the two. By establishing an 'educational discussion forum' consisting of 'class advisor + subject teachers + parent representatives,' they hold monthly meetings to ensure the unity of punishment scales in class educational activities. This gave me a direction for improving class management." It can be seen that in problem-solving, AIGC can help class advisors in "emotional comfort techniques, behavioral intervention strategies, and home-school coordination plans." In addition, in the training of class advisors at the municipal level, we also found that AIGC can assist training institutions in establishing an "educational ability exercise scenario library (multimodal problem library, typical experience library), intelligent interactive exercise field, and response strategy analysis engine." AI's problem pattern recognition capabilities can effectively empower class advisors in educational decision-making, forming a complete enhanced loop from

individual case handling to group education, from immediate response to systematic training, and enhancing the problem-solving effectiveness of class advisors.

4. Conclusion

This study originated from the communication barriers encountered in the process of enhancing the capabilities of primary and secondary school class advisors between external information and self-practice discourse. Practice requires finding an appropriate educational discourse intermediary. Constructing intermediaries such as "educational narrative action research" and "cross-boundary learning based on boundary objects" is an attempt by university scholars to delve into theoretical knowledge within the existing communication mechanisms. This study uses AIGC technology as a bidirectional interactive intermediary that connects theoretical knowledge and others' experiences with self-practice, leveraging the inherent advantages of researchers who navigate between the dual roles of class advisor training and selection. Through action research and case studies in the basic training of class advisors in N City, it was found that as an intermediary, AIGC can help class advisors integrate theoretical knowledge with practical behavior in thematic learning, thereby achieving deep thinking. AIGC enhances the verbal representation ability of class advisors by reconstructing the symbiotic relationship between "practical experience + AI intelligence." By empowering the transition from individual case handling to group education, and from immediate response to systematic training, AIGC enhances the problem-solving abilities of class advisors. In the context of Chinese primary and secondary education, teachers' roles can be categorized into principals, teachers, and class advisors based on their job responsibilities. However, in practice, these roles are sometimes blended in individual teachers. Our class advisors often hold dual roles as subject teachers and class advisors. Most principals have grown from being subject teachers or class advisors. The purpose of the above statement is to express that the enhancement of class advisors' problem-solving abilities is homologous to that of subject teachers and principals. In summary, the enhancement of this ability requires a bidirectional integration of "what is learned and what is known through action." By analogy,

AIGC can serve as an intermediary for different discourses and play a significant role.

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