Application scenarios of Chinese language teaching and research supported by digital technology

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ABSTRACT Based on the "Teacher Professional Development" dimension of the "Teacher Digital Literacy" educational industry standard released by the Ministry of Education in 222, and relying on the "AI-empowered" digital technology system, this paper explores three digital application scenarios for primary school Chinese teaching and research: the personal reflection — self-observation promoting teaching improvement; the team teaching and research scenario—data interpretation guiding targeted discussion; and the archive construction scenario—classroom slicing mapping out the growth trajectory.

Keywords digital technology; Chinese language teaching and research: teacher professional development; application scenarios

Teacher professional development is the key to education and teaching reform. The "Compulsory Education Chinese Language Curriculum Standard (2022 Edition)"hereinafter referred to as the "New Curriculum Standard") has added a section on "Teaching Research and Teacher Training". It points out that teachers "should actively apply new concepts, methods, and to Chinese language teaching, and improve their professional level through various channels such as personal reflection, peer mutual assistance, and expert guidance", [1] which is an urgent requirement for professional development. In November 2022, the Ministry of Education released the "Teacher Digital Literacy" education industry standard, which proposes requirements for teacher digital literacy from five dimensions digital awareness, digital technology knowledge and skills, digital application, digital social responsibility, and professional development. Among them, the "Teacher Professional Development" dimension includes "continuously learning using technology resources", "using digital technology resources to support reflection and improvement", "participating in or hosting online training", "carrying out digital teaching research", and "innovating teaching and learning methods". To promote teacher professional development from these five aspects, the key lies in "breaking path dependence and innovating application scenarios". [2]

The digital transformation of education is a process that, based on the digitalization, networking, and intelligence of the educational environment, maximizes the of an overall balanced and harmonious relationship between people, technology, and educational practice, promotes innovation in educational models and formats, enhances innovation and productivity through the transformation of educational organization, supports higher-level growth of teachers and students, and realizes a new educational ecosystem oriented towards the cultivation of innovative talents, with digital information as the infrastructure and supporting tool. [3] Our school has created the "Thinking Classroom", also known as "AI Empowerment", which is a digital technology information system integrating recorded and live intelligent analysis, lesson preparation, lesson observation, lesson evaluation. It can analyze teaching audio, teaching scenes, mathematical processes, and teaching trajectories, and generate analysis reports to provide data support for teachers' self-assessment and expert diagnosis In classroom practice, a "Thinking Classroom Observation and Analysis Laboratory" research base has been established, and a team of backbone teachers has been formed. Through methods such as "one research month" and "one lesson per person", teachers are encouraged to conduct practical research, experience the impact of digital technology on the perspective and method of classroom observation, and gradually form habit and ability to use digital technology for classroom observation. In classroom observation supported by digital technology, teachers can not only see the learning process of every student, but also observe the connection the teacher's "teaching" and the students' "learning". Under educational collaboration, we attempt to rely on the "AI Empowerment" system to construct three major application scenarios, order to promote the professional development of primary school Chinese teachers.

Personal Reflection Scenario: Self-Observation Promotes Teaching Improvement

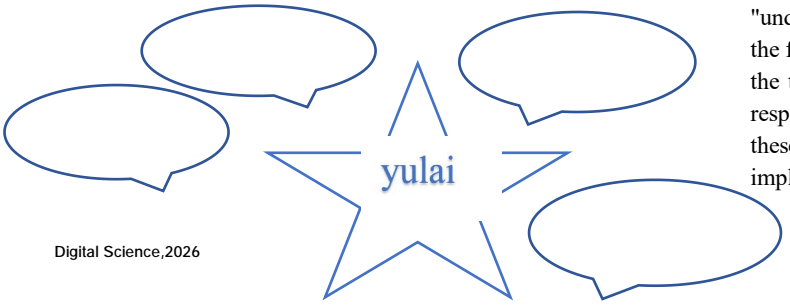
The digital transformation of classroom teaching is not about replacing education with technology, but using technology as a lever

to reconstruct the core logic the teaching and learning ecosystem, which needs to be understood from the two dimensions of "adhering to the fundamentals" and "embracing change" [4]. In actual teaching teachers' vague understanding of their current classroom teaching situation affects their professional development. To solve this problem, teachers need to consciously observe their own classrooms and re-evaluate themselves. Data is core element for promoting educational change and an important driving force for advancing the digital transformation of education. Therefore, the primary task in advancing the digital transformation of basic education is to build "digital foundation" [5]. Taking the teaching of the lesson "Little Hero Yulai" in the second semester of the fourth grade as an example, the teacher thought the teaching went quite smoothly, but the students' learning enthusiasm was not very high. This was the teacher's preliminary perception without basing it on a classroom analysis report. If teachers do not their own classrooms with their own eyes, it will be difficult to achieve profound and valuable reflection, and thus improve classroom teaching. The research group sorted out the teacher's teaching behavior and the students' learning behavior time for this lesson, and found that the teacher's classroom teaching time was dominated by teacher activities, with lecture time accounting for more than half. evaluation given by the analysis report is: "From the time distribution in the table above, it can be seen that the main method of the teacher's teaching behavior in this is lecturing. It is necessary to avoid purely 'lecture-type' teaching and 'all-inclusive' teaching. On the basis of small group work as the main student learning method emphasis should be placed on interactive communication and independent learning." Before seeing the data, the teacher never thought their classroom was "lecture-type", but the data truly recorded the teacher' lecture time in the classroom, forcing the teacher to re-examine themselves and re-evaluate their classroom teaching style.

Combining the analysis report, the teacher re-watched the videos of their own classroom teaching multiple times and identified three problems: first, the teacher held complete over the teaching process, breaking down the teaching objective of "grasping the main content of the article" into fragmented pieces with 10 questions; second, the questions lacked high level thinking, such as "Find out who the characters are" and "How will Uncle Li, the traffic officer, praise Yulai," which are all low-level thinking questions third, the teacher had a verbal tic, unconsciously asking students, "Do you think that's right?"

Based on an objective understanding of their own classroom, the teacher reflected and improved the plan. If not so many questions were asked, could the goal of "according subheadings based on the main content of the article" still be achieved? After the improvement, the following instructional design was formed:

The teacher shows a mind map and asks a question: Can you understand what information this map wants you to fill in?



Assign learning tasks: Students read the text, think, and fill in this character relationship chart.

Students check the chart, and the teacher the second learning task: Can you use this character relationship chart, along with the title "Little Hero Yulai" , to talk about the main content of this story? And draft sub.

The improved teaching, using mind maps as a learning scaffold, transforms questions into learning tasks, reduces the number of teacher's questions, leaves classroom learning time students, and shifts the teaching method from lecture-based" to "autonomous inquiry-based," achieving a transformation in the teaching approach.

The "AI-empowered" system is like a mirror that truly reflects the state of the classroom, allowing teachers to compare their ideal self with their real, deeply examine the gap between their own classroom and the concepts of the new curriculum standards, and recognize their problems and room for growth by comparing the improved classroom with the original one, stimulating the passion and motivation to continuously improve themselves and their classrooms.

Team Teaching and Research Scenario: Data Interpretation Guiding Targeted Discussion

Teaching and research activities are an important way for school training and teacher development. However, many teachers are not very enthusiastic about participating in these activities. Although have already grasped relevant data on teachers' research needs through preliminary surveys, the themes of the teaching and research activities determined based on the survey results do not match the actual teaching problems by teachers. The main reason is that teachers do not know what their teaching confusion is. Determining appropriate research themes that target the pain points and difficulties of teachers' teaching is the key improving their participation in teaching and research activities. The data provided by the "AI-empowered" system can provide such a focus, making teaching and research activities targeted and effective

Taking the classroom as a starting point, this analyzes the background and significance of educational digital transformation, elaborates on the core position of the in digital transformation, and explores specific measures for classroom digital transformation from the perspectives of teaching resources, teaching methods, and teaching evaluation. [6] As the core content of Chinese language, reading serves as the focal point to promote the effective integration of digital technology, thereby maximizing the application value of digital technology. [7] For example, young teachers' teaching competitions generally conducted in the form of "same lesson, different structures," allowing us to identify existing but unnoticed problems from the classroom performances of different teachers. Taking a third-grade teaching session the lesson"Undersea World" as an example, three young teachers taught this same lesson. The Chinese language element of the unit containing this lesson is "understanding from which aspects the text clearly introduces," and the first post-lesson exercise of this text is "state from which aspects the text introduces the undersea world." The post-lesson exercises respond to the unit's language elements, and through the study of these elements, the Chinese language elements are effectively implemented. System analysis data "empowered by AI" shows that

the three young teachers spent an of 3 minutes and 24 seconds on the implementation phase of this key question. The resolution of the key question took up less than 1/10 of the classroom. This is an issue worthy of attention. Let's take a look at the classroom recording of one of the teachers:

Teacher: From which aspects does the text introduce the underwater world? Please read the text and underline the key sentence of each paragraph. (Students read the text and underline key sentences)

Student:The seabed is still very quiet.

Animals on the seabed often whisper to each other.

Seabed animals each have their own ways of activity.

The plants on the seabed also vary greatly The seabed contains rich reserves of coal, oil, petroleum, and natural gas, as well as rare minerals that are scarce on land.

Teacher: Coal, iron, oil, natural gas, and non-ferrous metals have a common name. It is called "energy resources", so the last can be briefly summarized as - Student: The seabed contains abundant energy resources.

The process of the teacher guiding the students to solve the key problem can be said to be quite smooth. But are there really no obstacles and difficulties in reading?, please look at the third paragraph of the text:

When the surface of the sea is turbulent, the seabed remains very tranquil. The biggest waves and winds can only affect the water to a depth of a few meters. Sunlight rarely penetrates the deep sea; the deeper the water, the darker the light, and it becomes completely dark below five hundred meters. In this pitch-black deep sea however, there are many points of light like twinkling stars, which are deep-sea fish with bioluminescent organs swimming around.

Which aspect of the underwater world does this passage introduce? Some students think the passage describes the tranquility of the underwater world, some think describes the darkness, and others think it is about deep-sea fish with bioluminescent organs. Interviewing three teachers, they all said they found that students looked for different sentences when the question. Since there are different answers, why did the classroom teaching go so smoothly? Because the teachers did not want to present the students' wrong answers; if different answers appeared they thought they wouldn't know how to guide the students. To make the classroom teaching go more smoothly, the teachers unanimously chose to ignore the wrong answers and directly chose the with the correct answers to answer. The data analysis of the "AI-empowered" system truly presents the problems existing in the classrooms of young teachers, and behind this problem is dilemma of the teachers' teaching ability. Not daring to face the students' wrong answers, they are unable to unfold the learning process. Students thus miss the learning process from not knowing knowing, and authentic learning cannot happen in the classroom. Based on this, the theme of the regional teaching and research activities can be determined as "Finding Authentic Difficulties, Constructing Scaffolds - Research on Effective Learning Activity Design". Based on the interpretation of the data from the analysis reports after multiple teachers' same-lesson different-structure, replaying classroom scene fragments, conducting face-to-face interviews with teachers, extracting the key problems that teachers' teaching urgently needs to solve, making the content of the teaching and research activities the teachers' authentic learning needs, breaking through the teachers' teaching dilemmas, and improving their teaching ability.

III. Archive Construction Scenario: Classroom "Slicing" to Map Growth Trajectories

The application of digital technology in teaching not only improves teaching efficiency and quality, but also promotes the innovation and transformation of teaching models, making classrooms dynamic and efficient. [8] "Portfolio assessment" is not a new topic; it is an objective and comprehensive evaluation of the subject based on a portfolio. In addition to playing positive role in the growth process of students, "portfolio assessment" also plays an important role in recording and promoting the growth process of teachers. However, the construction of portfolios faces problems as the inability to keep up with information collection in a timely manner and limited resource storage space. With the support of the "AI-empowered" system, classroom recordings and analysis reports be generated instantly, and the convenient, seamless information collection and cloud storage methods bring great convenience to teachers in preserving resources. Based on these raw collected data, it is possible to better the growth trajectory of teachers. We can call it a "digital portfolio".

Teaching reflection is an important component of a teacher's growth portfolio. Teachers face two main problems when writing teaching reflections: first, they try cover everything but fail to focus on a single point for in-depth exploration; second, reflections are presented solely in text, making it impossible to clearly recall the teaching scene years later Creating classroom "slices" is a good solution to these two problems. By editing a noteworthy teaching activity scene from a class into a video clip and pairing it with corresponding reflective text, combination of video and text allows for the possibility of returning to the teaching scene at any time. Classroom "slices" provide a perceptual description of teaching ability, while reflective text offers a expression of teaching research; the two complement each other. Teacher growth is a long process. If teachers can use the "A1 Empowerment" system to record one class, create classroom slice, and write a teaching reflection every month, the author believes that teachers will achieve rapid growth through such daily accumulation.

The methods for constructing "digital archives" are diverse. Teachers can not only record a single lesson and divide it into several classroom teaching "slices", but combine their lesson-polishing experiences to focus on a specific research point, turning each improvement in classroom teaching into a "slice" for comparative research. Furthermore, they can create corresponding "slices" from the classroom teaching of master teachers, which serve as important learning resources for their own professional growth. Teaching "slices" can be named from multiple perspectives to facilitate cl

Canadian author Gladwell first proposed the "10,000-hour rule" in his book *Outliers*, stating that to become an expert in field, long-term deliberate practice is required. If teachers persist in continuously conducting teaching reflection and research by creating classroom "slices," they may not necessarily reach the level

of an expert However, they will certainly achieve an improvement in their classroom teaching abilities, which is an absolute path for teachers' professional development.assification and.

The new generation of information technology, represented by artificial intelligence, is greatly promoting the development of intelligent education and becoming an endogenous variable driving the systemic transformation of. [9] With the advent of the digital era, the widespread application of digital and internet technologies has brought earth-shaking changes to the world. Teachers, who bear the responsibility of nurturing future talents, need to continuously improve their personal digital literacy, leverage digital technology to enhance their thinking vitality and broaden their horizons, and utilize technological means to optimize,, and transform teaching methods, enabling both teachers and students to grow together.

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