

Exploration of the "Learning-Research-Application" Integrated Practice Teaching Model in the Field of Education in the Age of AI

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Abstract: The main content of this paper is to introduce the construction and optimisation of the "Learning-Research-Application" integrated practice teaching model in education under the new era of artificial intelligence. The first is to solve problems in teacher education, such as the gap between theory and practice, the fragmentation of research and teaching, and the lag in internship guidance. In accordance with the new idea of "learning-research-application", this paper will investigate how AI technology can change the learning environment and present some cases of data-driven scientific research and intelligent internship management. It has good study methods, is data-driven in its research, and has some special internships. Strengthening the integration of coursework learning, scientific research training and educational practice with artificial intelligence can effectively promote the classroom teaching ability, scientific research inquiry ability and digital literacy of student teachers. Therefore, the development of educational internships will be in a more scientific, traceable and iterative direction.

Keywords: AI Empowerment, Learning-Research-Application Integration, Education Major

Introduction

The development of artificial intelligence technology has brought about many changes in education. The model of undergraduate education for primary school teachers in China has not been fully built yet. One sign of this is that little attention has been paid to practical teaching; in fact, it has become the weakest link in the current undergraduate education system for primary school teachers^[1]. At present, the talent cultivation model for teachers in China's teacher-training universities and colleges is too traditional; it has been reduced to observation of teaching and short-term internships. A narrow view will not only weaken the system of applied teaching but also reduce its function in the professional development of teachers. However, the value of educational practice for the training of primary school teachers cannot be ignored. As some scholars have pointed out, "A true understanding of education can only be obtained through rich, real-world educational practice." Therefore, correctly understanding and striving to build a practical teaching model for the primary education major is necessary for the development of practical teaching in the undergraduate primary education program and for the design of its professional curriculum system^[3]. Build a good virtual classroom and intelligent data analysis tools for learning with artificial intelligence. In addition, by combining learning, research and practice from all sides, students can obtain knowledge through study, solve problems by conducting research, and gain experience through internships; thus, they are not limited to a single classroom environment. Therefore, student teachers can promote all-round development of knowledge transfer, research inquiry and educational application in a digital environment, achieve deep integration of theory and practice, and carry out research and teaching activities^[4].

1. Reconceptualising the Connotation of "Learning-Research-Application" Integration in the Field of Education in the AI Era

1.1 The Intelligent Rearrangement of the Learning Paradigm

Artificial intelligence technology is changing the way people learn in education; now, it is no longer about memorising knowledge by heart but about intelligent, data-driven learning. Most of the traditional courses are still teacher-centred, and lectures and textbooks are the main teaching methods;

they lack real-life experience and timely feedback, so the theoretical knowledge is often not in line with the actual teaching situation. AI can be employed to organise all sorts of course materials and tailor various learning paths for students. Learning is no longer solely the transmission by teachers. With the help of intelligent recommendation algorithms and adaptive learning platforms, many teaching cases, classroom videos, simulated scenarios, etc., can be provided to students according to their own circumstances. In this virtual classroom, they will be able to take part in all kinds of training activities, such as lesson planning, question creation and class management. In this way, they will better understand the educational theories and be able to apply what they have learned in actual teaching; thus, the problem of "learning without application" in the old system will also be solved^[5].

1.2 The Application Practice of Scientific Research Training

Educational research has long been theoretical and fragmented, and its research topics are not closely related to the actual teaching conditions in primary and secondary schools. AI can use data and context to provide direction for the scientific research training, and thus the research questions will be based on the environment of educational internships. Classroom behaviour analysis systems, speech recognition tools and learning situation monitoring platforms can automatically collect and organise data on students' behaviour, frequency of interaction, structure of teachers' language, etc., to create quantitative and traceable research materials. AI can be used to model the data of educational problems in the classroom, and students in the field of education can carry out research by collecting and analysing this data. The above way of conducting research can increase the importance and effectiveness of science education; at the same time, it can help student teachers form the habit of evidence-based teaching and thus promote the continuous development of science education through research.

1.3 The Intelligent Upgrade of the Internship Period

Educational internships are good places for learning, research and application. In the past, they were mainly the transmission of knowledge by teachers; there was little feedback in time, and they lacked objective data support. With the help of artificial intelligence, intelligent teaching analysis systems can be built to carry out various kinds of analysis on student-teacher classroom language, speed control, interaction modes, etc., and automatically generate visual evaluation reports. In addition to the teacher's observations, there is also a type of feedback that contains both figures and descriptions, and it is released relatively promptly. Collect teaching videos, student test papers and self-assessments on the AI platform to build a growth portfolio that tracks the development of teaching ability and offers a basis for internship guidance. Based on the above data, we have started to improve the internship system from the inside out, and now students can experience teaching in a real environment and develop professional abilities as future teachers.

1.4 The Compound Orientation of Competency Cultivation

AI-driven reconstruction of "learning-research-application" is a technological innovation and also a change in the goals of competency training for educators in education^[6]. The new model requires that future teachers have the following three types of abilities: they should be able to use AI for the integration of curriculum resources and classroom improvement; they need to be able to use data tools for action research and apply the research results directly in teaching; and they should be able to engage in self-correction during educational internships based on intelligent feedback to achieve continuous improvement. The two directions above meet the basic education demands for research-oriented and practice-oriented teachers, and also address the problem of improving the structure of teacher competence in light of the national education digitalisation plan.

2. AI-Powered Practical Paths for "Learning-Research-Application"

2.1 Construction and Application Research of Intelligent Learning Situations

With the development of artificial intelligence, teaching and learning in schools have moved from passive reception to active creation. The old model of textbooks and lectures for the main courses in primary school can no longer meet students' needs for learning in actual teaching situations and experiences. AI teaching simulation platforms can create typical situations in primary school

classrooms and add all sorts of difficulties, such as class questions, problems with emotional regulation and differentiated student interaction, very well. Therefore, the way of teaching will be more practical and less theoretical. Intelligent Situations can interest students in learning, and as soon as they receive some data back, they will know whether they have made a mistake and adjust accordingly to learn better.

The problem is that some courses have not yet had their PPTs and theoretical explanations prepared, and AI tools have not been used in the teaching materials. Therefore, what has been learned is not in line with the actual work. Therefore, to solve the problem mentioned above, we will gradually introduce a "course learning-simulation-practice" mode. Course learning provides the theoretical basis, AI simulation is used for imitation practice, and the real classroom will be where it is tested and optimised. This is the only way to achieve learning of knowledge, exercise of abilities and adaptation to the actual circumstances of teaching.

2.2 Data-driven Research Embedding and Exploration of the Practice Cycle

With the development of artificial intelligence, scientific research has moved away from traditional literature reviews and conceptual analyses; now, it is directly applied in teaching and has taken the form of data-driven, real-time research. With the help of classroom behaviour recognition, language analysis and learning situation tracking, AI can turn all kinds of information in the classroom, such as the types of teacher questions, how distributed student attention and interaction frequency are, etc., into quantitative data and provide direct evidence for educational research. The traditional lag research method of questionnaires and interviews is too slow; therefore, at this time, we will collect prompt and objective data to shorten the research period and complete the identification of problems, countermeasures and results verification during the educational internship.

The results of this study will depend on how well the students and teachers understand the data and research design. If there is a lack of statistical literacy and an educational perspective, the data produced by AI will be at a "demonstration" level and have little research value^[7]. Therefore, in order to improve students' skills in educational statistics, data analysis and design of action research, some training courses for research need to be organised. Therefore, the AI data can be applied in practice to improve teaching based on the principle of "evidence-based improvement", and the results of this research can directly benefit the improvement of teaching.

2.3 Application of Intelligent Management and Precise Guidance in Educational Internships

Although the goal of educational internships is to learn through research and practice, there are still many implementation defects, such as poor organisation, inadequate guidance and a lack of feedback. At the same time, the AI-driven internship management platform will also collect classroom videos, student comments and mentor evaluations; it will automatically analyse factors such as the language used by teachers, organisation of the blackboard and class speed, etc., and generate visual reports. Therefore, the mentor teacher can provide more specific guidance based on this data, and the students will be better able to improve themselves through self-study based on self-assessment.

3. Problems and Solutions in Model Construction

3.1 Lagging Concepts and the Disconnect in Technology Application

With the development of the AI-driven "learning-research-application" model, some teachers and student teachers are still bound by old ideas and ways of teaching. They will probably use AI tools as auxiliary means and do not want to learn how to apply AI in educational theory and goals. As a result of this concept lag, the application of AI in the classroom is still at a basic level, such as providing resources and grading homework. Therefore, it has not yet been applied to the planning of learning paths, research integration and internship guidance.

Countermeasures: At the same time, we will update the concept and strengthen training. On the one hand, AI education technology should be added to the curriculum system of pedagogy. Through case studies and scenario simulations, student teachers will be able to use technology in their teaching, learn the concept of "technology applications for educational purposes", and at the same time, special digital education training sessions need to be organised for supervising teachers and administrators to improve their ability to use AI tools and apply them in the classroom. It will be more convenient to introduce

artificial intelligence in all parts of the "teaching-research-application" system.

3.2 Risks to Data Ethics and Privacy

AI has collected many kinds of data on the promotion of educational internships and research, such as classroom videos, student behaviour data and learning situation data. If the collection, storage and use of such data are not standardised, there will be problems with privacy and ethics. It is especially serious in the area of primary school education. As shown in some actual cases, some student teachers have used unauthorised classroom recordings for their research; thus, there is a lack of data compliance in the management of internships.

Countermeasures: Build a good ethics management system in the company. According to the framework of university-local cooperation agreements, the scope of data collection, desensitisation measures, storage period and application range should be specified in line with the requirements of laws and ethics in education. A Data-Access Grading System will be introduced to limit the number of people who can view the research data. Strengthen the teaching of data ethics in the research and internship courses to help students form a sense of legality and compliance in the use of data, ensure that the bottom line of privacy protection is not ignored for the sake of technical convenience, and raise awareness of data ethics.

3.3 Insufficient Digital Literacy of Teachers Hinders Model Implementation

The AI-assisted "learning-research-application" model has increased the level of digital literacy of the supervising teachers. However, in actual practice, some teachers are only familiar with the basic functions of AI tools and fail to make full use of the potential of AI in teaching design, research guidance and internship management. Therefore, the application of AI will be limited, and the guidance provided during the internship will not be well-organised or particular.

Countermeasures: organise regular training for university teachers in the "digital mentor" programme. Teachers will be trained in the new AI functions for classroom analysis, data interpretation and research assistance at the school in cooperation with enterprises and other universities. Given the current situation of educational internship management, a new hybrid guidance model of "AI platform + mentorship system" will be introduced, and lead teachers will be trained in the application of AI for team guidance. Therefore, the general level of digital literacy among the teachers will be relatively high, and the model can operate normally.

3.4 Uneven Resource Distribution and Disparities in Application Environments

There are many differences in the application of the AI-enhanced "learning-research-application" model in urban and rural areas, as well as among different institutions. Some local teacher-training universities or elementary schools that serve as internship bases do not have sufficient funds, facilities, networks, etc., and are thus unable to provide a good AI-support environment. Therefore, it will be difficult to apply in actual teaching and carry out research.

Countermeasures: Increase the coordination of resources and build a platform for cooperation to solve this problem. The National Smart Education Platform and the regional educational resource centre will be employed to share school resources. Construction of a Cloud-based Platform for Virtual Teaching Practice and Data Analysis of Student Teachers should be promoted. Build a classroom analysis and virtual lesson preparation function based on a lightweight AI tool that is suitable for mobile phones and has a low hardware cost. Therefore, it can also be employed in places with limited funds.

3.5 Lack of Self-awareness and a Broken Cycle

With the help of artificial intelligence, some student teachers have begun to rely on automatically generated analysis reports and have failed to engage in deep reflection on the pedagogical logic of their teaching behaviour. The problem of "tools replacing thinking" weakens the reflection and improvement stage in the "Learning-Research-Application" cycle, and it is difficult to show the emergent and developmental characteristics of practical teaching.

Countermeasures: Enhance the Lead Role of Data-Driven Teaching Reflection. At the end of the internship and research training, the process of "AI diagnosis results - pedagogical interpretation -

improvement plan design" should be established. With the help of teachers, students will be able to analyse the educational environment they have learned about. Students should be asked how well the changes have worked in the next round of teaching. Repeat the cycle of "data - theory - action" several times so that the students can develop a sense of self-awareness and build a long-term "learning-research-application" cycle.

All the problems mentioned above, such as the lag in concept updates, ethical risks, professional skills of faculty, imbalance of resources and lack of foresight, will be addressed, and thus every link in the AI-empowered "Learning-Research-Application" model will be continuously strengthened. It will fully support the actual teaching and educational internship work of students in the field of education and help foster high-quality future primary school teachers.

4. Actual Results and Promotion Value

4.1 Promoting the Deep Integration of Teaching and Research

The public is now permitted to use the AI-driven "learning-research-application" model. Based on intelligent classroom simulation and data-driven action research, problems in the teaching situation will be identified, AI will be employed to gather and analyze data, and then, according to the evidence, modifications will be made to the teaching methods. Classroom behaviour data, such as the proportion of asked questions and how often students speak, fall under the category of teaching diagnoses. Thus, research will no longer be purely theoretical but will also have practical application and effect; this way, it will become more useful and timely for society.

4.2 The Professionalization and Precision Enhancement of Educational Internships

Artificial intelligence has changed the type of internship guidance from experience-based to data-driven. Quantification of the effect of teacher guidance can be carried out by analysing videos, and with the help of speech recognition technology, the delay in feedback will be reduced. AI diagnosis, mentor interpretation and correction of errors can all be provided to help interns improve their teaching after only a few attempts. Based on the above practice, the interns have improved their classroom management, use more explicit and precise teaching language, employ strategically layered questions, and organise the entire class more reasonably. Thus, both the accuracy and the effect of internship guidance have risen.

4.3 Promoting the Competency Development of Compound Primary School Teachers

The model above will promote the integration of teaching ability in the classroom with scientific research and exploration and digital literacy. AI simulation training will give the interns some experience in class management and improve their organisation and cooperation skills. Research embedding can help students conduct small-scale action research based on data and apply the results in their own teaching promptly. Application of digital tools helps students learn how to use technology to solve problems in school. In this way, we can develop the competency of research-oriented and innovative teachers in primary school education and provide a practical foundation for fostering compound teachers.

4.4 Building a Generalizable Educational Internship Management Model

Artificial intelligence can collect and organise the information about internships better than humans do, as well as notify companies about candidates applying for internships. Collect classroom data, internship evaluations and mentor comments from the platform to change the basis of internships from experience to data. Intelligent analysis can help us find problems in teaching diagnosis and correction promptly and fix them; thus, a good management cycle can be built. This model can be promoted and applied in collaboration among all schools and regions for teacher training.

Conclusion

The arrival of the AI era has introduced new opportunities for the training of professionals in education and also raised the bar for the integrated "learning-research-application" practical teaching

model. Artificial intelligence will not be used to assist in teaching any longer, research will no longer be limited to post hoc theorization, and internships will no longer be reduced to substitute teaching and observation. Smart Tools, Data-driven Thinking and Context-aware Integration can all promote the development of learning, research and application. This model will change both the learning path and the competency structure of student-teacher cooperative education, and improve the scientific nature and accuracy of educational internship management; it is a complete chain that includes coursework learning, research training and practical application^[8].

In the future, with the continuous development of AI technology and the gradual optimisation of the smart education ecosystem, more applications and spread of this model will be realised^[9]. At the same time, we need to enhance the integration of pedagogical theories, artificial intelligence technology and teaching practice to build a good cultivation system for courses, contexts and platforms. At the same time, we also need to strengthen the construction and sharing of regional resources, promote joint action among universities, internship-based schools and educational platforms, etc. It will help to reduce the disparity in educational resources among different areas and thus effectively serve the goals of educational equity and raising the standard of teacher cultivation^[10].

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