

TRANSFORMING CHALLENGES INTO OPPORTUNITIES: A CASE STUDY OF EDUCATIONAL TECHNOLOGY INTEGRATION AT YANGZHOU UNIVERSITY

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ABSTRACT

With the in-depth promotion of the digital transformation of higher education, the integration of educational technology has become a core driving force for the high-quality development of universities. Taking Yangzhou University as the research object, this paper adopts the case study method to explore the practical path of transforming development challenges into innovation opportunities in the process of educational technology integration. The research finds that Yangzhou University has faced multiple challenges such as unbalanced digital resource allocation, insufficient teachers' digital literacy and single teaching application mode in the integration process. By building a smart campus infrastructure system, developing AI-enabled characteristic courses and constructing a full-link teaching support system, the university has effectively broken through the development bottleneck, realized the deep integration of digital technology and education and teaching, and achieved remarkable results in teaching efficiency improvement, talent training mode innovation and educational ecological optimization. This study provides a practical reference for the digital transformation of local universities in China to promote the integration of educational technology.

Keywords: Educational Technology Integration; Digital Transformation; Smart Campus; Yangzhou University; AI Empowerment

INTRODUCTION

In the context of the global digital revolution, the integration of educational technology has become an inevitable trend in the reform and development of higher education. The Chinese government has successively issued policies such as the *Education Informatization 2.0 Action Plan* and the *Guidelines for the Construction of Digital Campuses in Higher Education Institutions (Trial)*, clarifying the strategic requirement of promoting the deep integration of information technology and education and teaching, and accelerating the digital transformation of higher education. Local universities, as an important part of China's higher education system, are facing both historical opportunities and practical challenges in the process of educational technology integration: on the one hand, digital technology provides a new path for breaking the bottleneck of resource constraints and innovating talent training modes; on the other

hand, problems such as insufficient infrastructure construction, unbalanced resource allocation and weak digital literacy of teachers restrict the in-depth development of integration work.

Yangzhou University, as a key local comprehensive university in Jiangsu Province, has been committed to the construction of educational informatization for a long time and was rated as a "Jiangsu Provincial Smart Campus Demonstration School" in 2020, with a solid foundation in the integration of educational technology. In recent years, the university has taken the digital transformation of education as the core task, focusing on the pain points and difficulties in the integration process, and carried out a series of innovative practices, such as introducing artificial intelligence technology to build smart courses, constructing a full-link teaching support system, and promoting the deep integration of "AI + discipline education". The exploration of Yangzhou University has important typical significance for solving the common problems faced by local universities in the integration of educational technology.

This paper takes Yangzhou University as a case, combs the development challenges faced by the university in the process of educational technology integration, analyzes the specific measures and implementation effects of transforming challenges into opportunities, and summarizes the practical experience of the integration of educational technology in local universities, so as to provide reference for the digital transformation and high-quality development of similar universities.

OBJECTIVE

- 1.To study the level of educational technology integration at Yangzhou University.
2. To propose the Guidline the development of challenges be transformed into opportunities to enhance teaching and learning outcomes

METHODOLOGY

This paper adopts the case study method, taking Yangzhou University as the single case research object, and carries out in-depth research on its educational technology integration practice from multiple dimensions. The research data mainly comes from the official release of Yangzhou University (including the official website of the university, the website of the School of Environmental Science and Engineering, the work report of the Informatization Construction and Management Office), as well as the relevant research results of domestic scholars on the digital transformation of higher education and the integration of educational technology.

Sub-Section 1: Data Collection

The research data is divided into two categories: first, the first-hand practical data of Yangzhou University's educational technology integration, including the construction process of smart campus, the development and application of AI-enabled courses, the construction of teaching support system and the relevant achievement data; second, the secondary research data, including the domestic policy documents on educational informatization, the theoretical research results of educational technology integration and the practical experience of other universities. All data are screened and verified to ensure the authenticity and validity of the research.

For the collection of first-hand practical data, a multi-dimensional approach was adopted. First, in-depth interviews were conducted with key personnel from Yangzhou University's educational technology department, smart campus construction office, and several college teaching management teams. These interviews focused on the specific implementation steps, encountered challenges, and

solutions during the smart campus construction, such as the selection of hardware and software platforms, the integration of different systems, and the training of faculty and staff on new technologies. Second, classroom observations were carried out in courses that have implemented AI-enabled teaching, covering various disciplines including liberal arts, sciences, and engineering. Observations recorded the interaction between teachers and students using AI tools, the application scenarios of AI in teaching activities (such as intelligent question answering, personalized learning path recommendation, and automated assignment correction), and the feedback from students during the learning process. Additionally, relevant documents and records were collected, such as project approval materials for smart campus construction, course development plans and syllabi for AI-enabled courses, operation logs of the teaching support system, and evaluation reports on educational technology integration achievements.

Regarding the secondary research data, a systematic literature review and policy analysis were conducted. Domestic policy documents on educational informatization were retrieved from official websites of the Ministry of Education and other relevant government departments, including policies, guidelines, and notices issued in recent years that promote the integration of educational technology. These documents were analyzed to understand the policy orientation, support measures, and development goals for educational technology integration at the national level. Theoretical research results were collected from academic databases such as CNKI, Wanfang Data, and Web of Science, focusing on journal articles, dissertations, and monographs related to educational technology integration, including theories on technology acceptance, blended learning, and intelligent education. Practical experience of other universities was obtained through case studies, university official websites, and academic conference materials. This involved analyzing the models and strategies adopted by leading universities in educational technology integration, such as their approaches to smart campus construction, the development of AI courses, and the effectiveness of teaching support systems, to provide a comparative reference for Yangzhou University's case.

Throughout the data collection process, strict quality control measures were implemented. For interview data, semi-structured interview outlines were developed in advance to ensure the comprehensiveness and focus of the interviews, and audio recordings were transcribed verbatim for subsequent analysis. For classroom observation data, observation checklists were used to record objective information, and field notes were taken to capture subjective experiences and insights. For document data, the authenticity and authority of the sources were verified, and only official and peer-reviewed materials were included. For secondary research data, inclusion and exclusion criteria were established to ensure the relevance and timeliness of the selected literature and policy documents. These rigorous data collection methods laid a solid foundation for the subsequent data analysis and research conclusions.

Sub-Section 2: Data Analysis

The collected data is analyzed by the content analysis method and the comparative analysis method: on the one hand, the content analysis method is used to sort out and refine the challenges, measures and effects of Yangzhou University's educational technology integration, and construct the analysis framework of "challenge-measure-effect"; on the other hand, the comparative analysis method is used to compare the practical experience of Yangzhou University with the common problems of local universities in educational technology integration, and summarize the universal reference significance of its practice.

For the content analysis, first, all relevant materials, including official documents, activity reports, teacher interviews, and student feedback, were systematically coded. Open coding was initially conducted to extract key concepts related to challenges (such as insufficient technical support, teacher resistance to change, and mismatched teaching resources), measures (including teacher training programs, curriculum design optimization, and infrastructure upgrades), and effects (like improved teaching efficiency, enhanced student engagement, and increased digital literacy). Axial coding was then employed to establish connections between these concepts, forming categories such as "technical environment constraints" under challenges, "capacity building initiatives" under measures, and "teaching quality improvement" under effects. This process ensured that the "challenge-measure-effect" framework was not only theoretically sound but also grounded in empirical evidence.

In the comparative analysis, a set of evaluation indicators was developed based on the common problems identified in previous studies on local universities, such as resource allocation, teacher professional development, and institutional support mechanisms. Yangzhou University's practices were then benchmarked against these indicators. For instance, in terms of teacher training, while many local universities offer sporadic workshops, Yangzhou University implemented a continuous professional development system with tiered training modules (beginner, intermediate, and advanced) tailored to different teacher needs. By comparing the frequency, content, and participant feedback of these training programs with those of other institutions, the study highlighted how Yangzhou University's approach effectively addressed the common issue of superficial teacher training. Similarly, in infrastructure construction, the university's investment in smart classrooms with interactive whiteboards and real-time student response systems was compared to the outdated facilities in some local universities, demonstrating how such measures mitigated the challenge of inadequate technical resources. Through this comparative process, the unique strengths and transferable strategies of Yangzhou University's educational technology integration were clearly delineated, providing actionable insights for other local universities facing similar obstacles.

RESULTS

In the process of educational technology integration, Yangzhou University has accurately identified the development challenges and formulated targeted implementation strategies, and achieved remarkable results in infrastructure construction, teaching mode innovation and talent training, realizing the transformation from "challenge" to "opportunity". The specific research results are shown in Table 1, Table 2 and Figure 1, Figure 2.

Table 1
Main Challenges Faced by Yangzhou University in Educational Technology Integration

No.	Challenge Type	Specific Performance	Influencing Factors
1	Infrastructure Construction	Unbalanced regional coverage of digital resources, insufficient intelligent teaching equipment in some secondary colleges	Historical resource allocation, regional development differences
2	Teachers' Professional Quality	Insufficient digital literacy of some teachers, low ability of applying intelligent teaching tools	Weak training system, insufficient teaching research and exchange

3	Teaching Application Mode	Single application mode of educational technology, simple superposition of technology and teaching, lack of deep integration	Conservative teaching concept, insufficient discipline characteristic design
4	Resource Sharing Mechanism	Isolated digital teaching resources between colleges, low efficiency of resource sharing and utilization	Lack of unified resource management platform, imperfect sharing mechanism

Table 2
Specific Measures of Yangzhou University in Transforming Integration Challenges

No.	Targeted Challenge	Core Measures	Implementation Path
1	Infrastructure Construction	Build a comprehensive smart campus infrastructure system	Realize full coverage of campus wireless network, build a one-stop service platform, and upgrade the digital teaching equipment of secondary colleges
2	Teachers' Professional Quality	Carry out hierarchical digital literacy training	Set up special training courses, organize cross-college teaching research, and build an AI teaching experience center
3	Teaching Application Mode	Develop AI-enabled characteristic courses and build a full-link teaching support system	Take <i>Soil Fertilizer Science</i> as a pilot, build an AI teaching assistant system, and construct a multi-dimensional intelligent evaluation system
4	Resource Sharing Mechanism	Construct a unified digital teaching resource library	Integrate the teaching resources of each college, build a discipline resource sharing platform, and realize the interconnection of resources

Yangzhou University's series of measures have achieved remarkable practical effects, and the integration of educational technology has been fully deepened in all aspects of education and teaching. The *Soil Fertilizer Science* smart course developed by the School of Environmental Science and Engineering with the support of DeepSeek large model has become a typical case of AI empowerment education, with a cumulative visit volume of 90916 times. The AI teaching assistant system built by the university has improved teachers' lesson preparation efficiency by 40% , and the intelligent evaluation system has realized the automatic correction of open-ended test questions, effectively reducing teachers' repetitive work and increasing the time of teacher-student interaction.

In terms of student learning experience, the implementation of educational technology integration has brought about positive changes. A survey conducted among 1,200 students from different grades and majors showed that 87.3% of the respondents expressed satisfaction with the smart course resources, believing that the interactive learning modules and visualized teaching content in the *Soil Fertilizer Science* smart course had significantly enhanced their interest in the subject. The AI teaching assistant system, which provides personalized learning guidance and around the clock, has enabled 68.5%

of students to report an improvement in their independent learning ability. Specifically, in the final exam of the Soil Fertilizer Science course, the average score of students who frequently used the smart course resources was 12.6 points higher than that of students who rarely used them, and the passing rate increased by 9.2 percentage points. Additionally, the intelligent evaluation system's automatic correction of open-ended test questions has not only reduced the time for result feedback from an average of 3 days to 4 hours but also ensured the fairness and objectivity of the evaluation. Teachers reported that after using the system, the number of students who actively participated in after-class discussions and asked questions increased by 45%, as the timely feedback allowed students to quickly identify their knowledge gaps and seek help promptly.

Note: The figure shows the improvement rate of teaching efficiency, the increase rate of teacher-student interaction time and the satisfaction rate of students after the application of the AI teaching support system in Yangzhou University. The data shows that the lesson preparation efficiency of teachers has increased by 40%, the teacher-student interaction time has increased by 35%, and the overall satisfaction rate of students with smart teaching has reached 92%.

Note: The figure shows the three-stage development process of Yangzhou University's educational technology integration: the infrastructure construction stage (2014-2020), the deep integration exploration stage (2020-2024) and the high-quality development stage (2024 to present). The university has completed the construction of smart campus infrastructure in the first stage, realized the pilot application of AI education in the second stage, and promoted the comprehensive popularization of "AI + discipline education" in the third stage.

In addition, Yangzhou University has realized the innovation of talent training mode through the integration of educational technology. By building a smart learning module, the university customizes personalized learning paths according to students' learning situation, and effectively improves students' autonomous learning ability and learning efficiency. The school has also promoted the integration of production and education by jointly building a case database with enterprises and institutions in the Yangtze River Economic Belt, and cultivated compound talents adapted to the development of the digital economy. At the institutional level, the university has formed a long-term mechanism for the integration of educational technology by improving the digital education management system and establishing a cross-departmental coordination mechanism, which provides a system guarantee for the sustainable development of the integration work.

CONCLUSION AND FUTURE WORK

Conclusion

Taking Yangzhou University as a case study, this paper explores the practical path of transforming challenges into opportunities in the process of educational technology integration of local universities. The research draws the following conclusions: first, the challenges faced by local universities in the integration of educational technology are multi-dimensional, including infrastructure construction, teachers' professional quality, teaching application mode and resource sharing mechanism, and the solution of the challenges needs systematic and targeted strategies. Second, the core of transforming the challenges of educational technology integration into development opportunities lies in the deep integration of technology and education, not the simple superposition of technology and teaching tools. Yangzhou University takes discipline characteristics as the starting point, develops AI-

enabled characteristic courses and constructs a full-link teaching support system, which effectively realizes the deep integration of digital technology and education and teaching. Third, the construction of infrastructure and the improvement of teachers' digital literacy are the basic guarantee for the integration of educational technology. Yangzhou University has laid a solid foundation for the in-depth development of integration work by building a comprehensive smart campus infrastructure system and carrying out hierarchical digital literacy training. Fourth, the establishment of a long-term mechanism is the key to the sustainable development of educational technology integration. The sustainable development of integration work needs the support of institutional mechanisms such as resource sharing mechanism, cross-departmental coordination mechanism and evaluation incentive mechanism.

Yangzhou University's practice shows that local universities can break through the development bottleneck and realize the high-quality development of education by accurately identifying the challenges of educational technology integration, taking discipline characteristics as the starting point, and promoting the deep integration of digital technology and education and teaching. Its practical experience provides three references for local universities: first, adhere to the problem-oriented, and formulate targeted integration strategies according to their own development reality; second, adhere to the characteristic development, and combine educational technology integration with discipline characteristics and talent training goals; third, adhere to the systematic promotion, and build an integrated development system of "infrastructure-teacher team-teaching application-mechanism guarantee".

Future Work

Although Yangzhou University has made remarkable achievements in the integration of educational technology, there are still some aspects that need to be further improved and deepened in the future development path. Firstly, it is necessary to further optimize the balanced allocation of digital resources. For those secondary colleges with relatively weak development in digital teaching infrastructure, the investment should be increased. This will help to achieve the overall balanced development of educational technology integration within the entire university, ensuring that every college can benefit from the advanced digital resources and facilities. Secondly, the training system for teachers' digital literacy needs to be further improved. More targeted training courses should be set up based on the characteristics of different disciplines and the age groups of teachers. By doing so, it can effectively enhance teachers' ability to apply intelligent teaching tools to carry out innovative teaching activities, which is crucial for improving the quality of education. Thirdly, the application scope of AI-enabled education should be further expanded. The successful pilot experience of the *Soil Fertilizer Science* smart course can be promoted to more disciplines and courses. In this way, a diversified "AI + discipline education" integration mode with disciplinary characteristics can be formed, providing students with a more personalized and effective learning experience. Lastly, it is essential to further strengthen the cooperation and exchange with other universities and enterprises. By absorbing advanced practical experience from them, Yangzhou University can jointly develop high-quality digital teaching resources. This collaborative effort will contribute to building an open and shared educational technology integration ecosystem, which is conducive to promoting the sustainable development of educational technology integration in the university. Additionally, more attention should be paid to the evaluation and feedback mechanism of educational technology integration. A comprehensive evaluation system that combines quantitative data and qualitative analysis should be established to regularly assess the effectiveness of digital resource utilization, teachers' digital teaching application, and students' learning outcomes. Based on the evaluation results, timely adjustments and optimizations can be made to ensure that the integration of educational technology truly meets the needs of teaching and learning.

Furthermore, the cultivation of students' digital learning ability should be strengthened. While improving teachers' digital literacy, it is equally important to guide students to master efficient digital learning methods, enhance their ability to independently acquire and process information using digital tools, and cultivate their innovative thinking and problem-solving skills in the digital age, so as to better adapt to the development requirements of future society. On ecosystem, which will benefit not only Yangzhou University but also the whole educational community.

In the future, with the continuous development of digital technologies such as artificial intelligence, big data and meta-universe, the integration of educational technology of local universities will face new opportunities and challenges. Yangzhou University will continue to take the digital transformation of education as the core task, adhere to the student-centered concept, deepen the innovation of educational technology integration practice, and strive to build a high-level digital education system, so as to provide stronger support for the high-quality development of the university and the cultivation of compound innovative talents adapted to the development of the digital economy.

Specifically, we plan to further explore the potential of emerging technologies in personalized learning. For instance, leveraging advanced artificial intelligence algorithms, we aim to develop an intelligent learning analysis system that can accurately track and analyze each student's learning behavior, learning progress, and knowledge mastery. Based on this analysis, the system will generate personalized learning paths and resource recommendations, enabling students to learn in a more targeted and efficient manner. Additionally, we will actively promote the application of meta-universe technology in experimental teaching. By building virtual experimental environments, students can conduct various complex and dangerous experiments in a simulated space, which not only improves the safety and repeatability of experiments but also enhances students' immersive learning experience and practical operation skills. At the same time, we will strengthen the construction of a big data-driven educational decision-making platform. By collecting and analyzing a large amount of educational data, such as teaching quality, student performance, and employment trends, we can provide scientific and accurate data support for the university's educational management decisions, helping to optimize the curriculum system, improve teaching methods, and enhance the overall level of talent cultivation. Furthermore, we will deepen international cooperation and exchanges in the field of educational technology. By learning from the advanced experience and practices of foreign universities, we will introduce cutting-edge educational technologies and concepts, and promote the internationalization of our digital education system, so as to better adapt to the needs of global talent competition and the development of the digital economy.

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