Region - Educational Research and Reviews, 2026, Volume 8, Issue 1
DOI: 10.32629/rerr.v8i1.4900
ISSN Online: 2661-4634
ISSN Print: 2661-4626

Reconstructing educational research methods courses for pre-service teachers: a digital technology empowerment approach

Yini YAO*, Jiangmei BAI

Yunnan Technology and Business University, Kunming 651701, China
*Corresponding Author
Email address: 850406684@qq.com

Abstract: In the context of the national educational digitalization strategy, traditional educational research methods courses for pre-service teachers face the dilemma of being disconnected from digital technology, research practice, and professional development. This study proposes a reconstruction framework guided by digital literacy, research capability enhancement, and deep technology integration. A new curriculum was developed by integrating digital research modules and innovative teaching methods. Preliminary practice indicates that this reconstruction can effectively equip pre-service teachers with the ability to apply digital research tools, solve complex educational problems, and showcase academic innovation in real-world teaching scenarios.

Keywords: digital technology; pre-service teachers; educational research methods; course reconstruction; digital literacy

1 Introduction

With the promulgation of the educational industry standard *Teacher Digital Literacy* (2022) and the comprehensive implementation of the *National Educational Digitalization Strategic Action*, the teaching profession has entered a new stage of development in which digital literacy has become a core competency. As the reserve force for future education, the research capacity of pre-service teachers is not only critical to their academic development but also the cornerstone of evidence-based teaching and professional autonomous growth [1]. However, a significant gap has emerged between traditional educational research methods courses—in terms of content, methods, and evaluation—and the rapidly developing digital technology as well as authentic , complex research scenarios. This hinders the cultivation of pre-service teachers who can utilize intelligent technology and conduct innovative educational research.

2 The dilemma of traditional educational research methods courses: a situation-based analysis

Through the analysis of course syllabi from multiple normal universities, in-depth interviews with course instructors, and questionnaire surveys of pre-service teachers, this study found that traditional courses mainly suffer from the "Three Major Disconnections" dilemma:

2.1 Disconnection from digital technology development: obsolete tools and inadequate literacy

Course content is largely confined to basic operations of traditional tools like SPSS and Wenjuanxing, with minimal

coverage of cutting-edge digital research skills such as tools for intelligent literature review, big data collection, and advanced analysis. Surveys indicate that over 70% of pre-service teachers find the course's technological tools insufficient for real projects.

2.2 Disconnection from practical research needs: separation of theory from practice and artificial scenarios

Course teaching often follows a linear model of "theoretical lecture - example demonstration - simple exercises". Research problems are mostly virtual or simplified cases, lacking training in conducting complete research processes within authentic, complex, and uncertain educational contexts. Students often struggle to apply memorized steps to real classroom data or problems. Their research design capability, data ethics judgment, and contextual adaptability are noticeably inadequate.

2.3 Disconnection from teacher professional development: narrowed objectives and limited perspectives

Course objectives have long been skewed towards the "academic compliance" function of completing degree theses, neglecting the attribute of research capability as a core professional competency for teaching reflection, practice improvement, and school-based research. This results in pre-service teachers failing to establish an integrated professional development perspective of "teaching-research-innovation". Their research perspective remains limited to traditional academic topics, lacking sensitivity and methodological preparation for investigating cutting-edge practical issues such as digital classroom behaviors and learning pathways.

3 Framework design for course reconstruction empowered by digital technology

Addressing the aforementioned dilemmas, this study constructs a five-in-one course reconstruction framework encompassing "philosophy-objectives-content-methodology-assessment ".

3.1 Reconstruction philosophy and principles

Guided by the goal of "Development of Digital Literacy", this approach prioritizes the cultivation of digital literacy, focusing on research ethics and knowledge creation over mere skill training [2][3]. Centered on the enhancement of research capability, it focuses on cultivating authentic research capability through solving real educational problems. Following a path of deep technological integration, this framework seeks the organic integration of digital technology into research and teaching, positioning it as a natural extension of practice [4].

3.2 Reconstruction of the objective system

The overall objective is to cultivate future teachers with the capacity to proficiently use digital technology, adhere to academic norms, independently conduct innovative educational research, and translate research outcomes into enhanced teaching capabilities.

The specific objectives can be summarized from three dimensions. The technology application objective is to master the full-chain application of digital research tools covering the entire research process. The methodological innovation objective is to understand and preliminarily apply emerging research paradigms, including learning analytics, design-based research, and digital ethnography. The research practice objective is to complete a comprehensive micro-research project and produce digitized academic outputs.

3.3 Reconstruction of the content system: modularization and technological integration

The course content is reorganized into four core modules, each deeply integrating digital technology. The intelligent literature research and problem identification module introduces bibliometric tools to equip students with the ability to identify research frontiers, knowledge maps, and genuine research questions from massive digital literature. The digital data collection and processing module covers the digital implementation of traditional methods like questionnaires and interviews, while expanding to emerging data sources such as classroom video analysis, online learning log collection, and

social media data acquisition. The intelligent analysis and interpretation module builds upon traditional quantitative statistical analysis by incorporating basic intelligent techniques like text sentiment analysis, sequential pattern mining, and multimodal data analysis. The digitized presentation and dissemination of research findings module trains students to use interactive charts, research dashboards, academic blogs, or micro-videos for the visualization and communication of results.

3.4 Innovating teaching methodology: from lecture-based to generative approaches

Project-based learning (PBL) employs authentic, course-long projects to drive students to actively integrate knowledge and technology. Blended virtual-real practical training utilizes educational big data simulation platforms and virtual teaching-research laboratories for simulated training of high-risk or high-cost research processes, combined with field investigations. Generative learning design encourages students to use AI-assisted tools for tasks like literature review outlining and data interpretation, with the teacher's role shifting to design, guidance, and critical dialogue.

3.5 Reform of the assessment system: diversification and process-orientation

A multi-evaluator system involving "teacher-peers-self" is established, and an electronic research portfolio is adopted to record the entire process. The assessment focus shifts from the final report to the value of the research question, appropriate tool selection, data ethics, and the iterative process.

4 Conclusion

Digital technology has not only introduced new tools to educational research methods courses but also catalyzed profound changes in course philosophy, objectives, and form. The reconstruction framework proposed in this study aims to transform the course from an isolated "methodology" course into a pivotal course connecting digital literacy, research capability, and teacher professional development. Future research needs to further track long-term effects and explore course implementation models that are more closely linked with basic education settings, so as to continually foster the development of pre-service teachers' research and innovation capabilities in the digital age.

Acknowledgments

This research was supported by the 2024 China Private Education Association Planning Project (School Development Category) Grant (CANFZG24523); 2025 Yunnan Technology and Business University University-Level Project (XGJJT-YYSQ-YX-2025120983934).

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

References

[1] Zhao P, Zhao Y. How to integrate digital literacy cultivation into the curriculum system for pre-service teachers [N]. China Education Daily, 2023-10-21(3).

[2] Xu GX, Kong XY, Guan J. Cultivation of university students' digital literacy in the context of digital integration: model and pathways[J]. China Educational Technology, 2024, 2:53-60.

[3] Yang XH, Meng BX, Wang DH. Digital literacy framework and cultivation pathways for pre-service teachers oriented towards the "teacher digital literacy" standard[J]. e-Education Research, 2024, 5:83-89.

[4] Zhu ZT, Hu J. Analysis of the essence and research prospects of educational digital transformation[J]. China Educational Technology, 2022, 4.

About the author

Yini Yao, Master's degree, Yunnan Technology and Business University, Research interests: Principles of Education;

Jiangmei Bai, Master's degree,Yunnan Technology and Business University, Research interests: Teacher Professional Development.