



Construction and Empirical Test of the Evaluation System for College Ideological and Political Teachers' Digital Literacy Based on OBE Concept in the Era of Digital-Intelligent Education

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Abstract. Against the background of the continuous integration of digital technology into higher education, the implementation mode of ideological and political education has been changing. Different from the previous classroom-centered teaching model, the digital environment endows teaching activities with new characteristics in time, space and interaction modes, which also puts forward new requirements for teachers' competency structure.

Existing research on teachers' digital literacy is mostly conducted based on general teaching scenarios, with insufficient attention paid to the special attributes of ideological and political courses. In particular, there is still a lack of a clear correspondence between evaluation indicators and education effects. Therefore, from the perspective of Outcomes-Based Education (OBE), this paper redefines teachers' competency in the digital environment based on the actual practice of ideological and political teaching, and attempts to construct a corresponding evaluation framework. The study finds that the evaluation system is effective in identifying teachers' competency differences and reflecting directions for teaching improvement, while its applicability in different teaching scenarios remains to be further discussed.

Keywords: OBE Concept; Digital-Intelligent Education; College Ideological and Political Teachers; Digital Literacy; Evaluation System; Analytic Hierarchy Process

1 Introduction

In recent years, the application of digital technology in college teaching has been deepening, and its impact has gradually penetrated into teaching organization and learning processes beyond merely teaching tools. Compared with professional courses, ideological and political courses undertake a more explicit function of value guidance, making their digital transformation more complex than that of ordinary courses.

OBE (Outcomes-Based Education) is a learning outcome-oriented concept that emphasizes education activities centered on students' development and continuous

improvement of the education process. Its core connotation is highly consistent with the education goal of ideological and political education in the era of digital-intelligent education. As the core subject of the digital-intelligent transformation of ideological and political education, college ideological and political teachers' digital literacy directly determines the effectiveness of digital-intelligent ideological and political education. However, the current investigation shows that although some teachers have certain technical capabilities, technology is often only used for content presentation in teaching and fails to be effectively integrated with curriculum objectives. Meanwhile, existing evaluation systems mostly adopt general indicators, which are poorly adaptable to ideological and political courses and cannot reflect differences in teachers' actual teaching practice. The OBE concept stresses deducing the teaching process from learning outcomes, focusing on "whether teaching has truly produced effects". This perspective provides an entry point for re-examining teachers' digital literacy. Accordingly, it is necessary to re-analyze the relevant competency structure and explore a more targeted evaluation method in light of the characteristics of ideological and political courses.

Most existing evaluation systems for teachers' digital literacy target general disciplines, lacking special evaluation standards that fit the professional characteristics of ideological and political teachers, adapt to digital-intelligent education scenarios and integrate the OBE concept. This leads to the absence of a basis for evaluating ideological and political teachers' digital literacy and a disconnection between cultivation directions and education outcomes. Therefore, focusing on the integrated scenario of OBE concept and digital-intelligent education, this paper constructs a scientific, quantitative and highly targeted evaluation system for college ideological and political teachers' digital literacy, solving the pain points of current evaluation systems and clarifying evaluation criteria and improvement paths, which has important theoretical value and practical urgency.

2 Related Work and Theoretical Basis

2.1 Research Status at Home and Abroad

Foreign research on teachers' digital literacy started early, forming classic frameworks such as UNESCO Digital Literacy Framework and ISTE Standards for Teachers, focusing on quantitative evaluation of technical application, digital innovation, digital ethics and other dimensions ^[1]. Some studies integrate the outcome-oriented characteristics of OBE, but most focus on general disciplines without considering the ideological attribute and the goal of fostering virtue through education of ideological and political education, resulting in insufficient local adaptability.

Domestic research has conducted extensive exploration on teachers' digital literacy, informatization of ideological and political education, and the application of OBE concept in higher education. Some scholars have constructed evaluation models of college teachers' digital literacy, and some studies have integrated OBE concept into the teaching reform of ideological and political education. However, there are few studies on constructing a special digital literacy evaluation system for ideological and

political teachers by combining OBE concept with digital-intelligent education, and most are theoretical discussions lacking quantitative indicators, empirical data and system verification, which cannot meet the requirements of engineering and empirical research. No unified, authoritative and implementable special evaluation system has been formed, leaving an innovative space for this study.

2.2 Definition of Core Concepts

Digital-Intelligent Education.

It is the deep integration of digital and intelligent education, supported by technologies such as artificial intelligence, big data and cloud computing, to realize accurate push of teaching resources, intelligent management of teaching process and quantitative evaluation of education effects. It has four characteristics: intelligence, interactivity, accuracy and personalization. Different from the single tool application of traditional digital teaching, its core goal is to improve education outcomes, which is highly consistent with the OBE concept.

College Ideological and Political Teachers' Digital Literacy under the OBE Concept.

It is the comprehensive literacy required for ideological and political teachers to carry out ideological and political teaching, scientific research and education in the digital-intelligent education scenario, guided by the core outcome of improving students' ideological and political literacy. It is an organic integration of digital technical ability, ideological and political education ability and OBE concept implementation ability, covering five dimensions: technical application, resource integration, teaching innovation, ethical norms and digital-intelligent education. It takes into account technicality, political nature, education orientation and outcome orientation [2].

2.3 Theoretical Support

This study is supported by digital literacy theory, teacher professional development theory, the law of fostering virtue through ideological and political education, analytic hierarchy process theory and OBE education concept. Digital literacy theory lays the basic framework for evaluation dimensions; teacher professional development theory clarifies the core goal of literacy improvement; the law of fostering virtue through education ensures the ideological and political education orientation of the evaluation system; analytic hierarchy process theory realizes quantitative assignment and scientific ranking of evaluation indicators; OBE education concept establishes the core principles of "outcome orientation, student-centeredness and continuous improvement" for the evaluation system, ensuring the deep connection between the evaluation system and ideological and political education outcomes [3].

3 Construction and Optimization of the Evaluation System

3.1 Principles of System Construction

Integrating the core connotation of OBE concept and combining the requirements of digital-intelligent education and ideological and political education, five construction principles are established to ensure the scientificity, pertinence and operability of the evaluation system:

Scientific principle: Indicator selection conforms to OBE concept, digital-intelligent ideological and political theory and teaching practice; evaluation standards are objective and quantitative; weight assignment adopts scientific methods to avoid subjective arbitrariness.

Pertinence principle: Closely focusing on the professional characteristics of ideological and political teachers and the goal of fostering virtue through education, highlighting ideological and political attributes, adaptability to digital-intelligent scenarios and OBE outcome orientation, and abandoning general indicators.

Operability principle: Indicators are easy to observe and quantify; the evaluation process is simple and efficient, convenient for implementation in colleges and universities, and accurately connected with teacher training and performance appraisal.

Education orientation principle: Adhering to the ideological bottom line of ideological and political education, incorporating digital ethics and compliance of ideological and political content into the core of evaluation, and always taking the improvement of students' ideological and political literacy as the fundamental goal.

Continuous improvement principle: The evaluation system is not only used for literacy evaluation, but also provides feedback directions for teacher training, realizing the OBE closed loop of "evaluation-feedback-optimization-improvement".

3.2 Initial Indicator Screening and Delphi Method Optimization

Combining literature review, expert consultation and the actual practice of ideological and political teaching, guided by the OBE concept, an initial evaluation system including 5 first-level indicators and 22 second-level indicators is initially constructed from five dimensions: digital-intelligent technical application, ideological and political digital resource integration, digital-intelligent ideological and political teaching innovation, digital ethics and security, and digital-intelligent education development. All indicators revolve around "improving the education outcomes of digital-intelligent ideological and political education" and highlight the correlation with the improvement of students' ideological and political literacy^[4].

Ten experts with both OBE concept and ideological and political education research experience are selected to conduct two rounds of Delphi consultation and optimization: general indicators with low correlation with ideological and political education outcomes such as "digital office skills" are eliminated; special indicators such as "compliance of ideological and political content" and "integration of digital-intelligent scientific research" are added; the connotation of indicators reflecting the OBE concept such as "personalized ideological and political teaching" and "education reflection and

optimization" is strengthened. Finally, an evaluation system including 5 first-level indicators and 21 second-level indicators is determined, with an expert opinion coordination coefficient of 0.893, indicating high indicator recognition and high consistency with OBE concept and the demand for digital-intelligent ideological and political education.

The optimized evaluation indicator system is shown in Table 1.

Table 1. Evaluation indicator system of college ideological and political teachers' digital literacy under OBE concept.

First-level Indicators (Dimensions)	Second-level Indicators (Detailed Items)	Indicator Nature	Embodiment of OBE Orientation
Digital-Intelligent Technical Application Literacy (B1)	Operation of digital-intelligent teaching tools, maintenance of intelligent equipment, mastery of basic digital technologies, application of online teaching platforms	Basic Skills	Guarantee the development of digital-intelligent ideological and political teaching and provide diverse learning carriers for students
Ideological and Political Digital Resource Integration Literacy (B2)	Screening of digital-intelligent ideological and political resources, processing and creation of resources, standardization of resource copyright, construction and maintenance of resource libraries	Resource Capacity	Screen and create ideological and political resources adapted to students' cognition and realize accurate resource push
Digital-Intelligent Ideological and Political Teaching Innovation Literacy (B3)	Hybrid teaching design, intelligent classroom management, personalized ideological and political teaching, integration of digital-intelligent scientific research	Innovation Ability	Innovate teaching models centered on students' needs and improve the effectiveness of ideological and political teaching
Digital Ethics and Security Literacy (B4)	Network information identification, data security protection, compliance of ideological and political content, digital public opinion control	Bottom-line Requirements	Ensure the safety of students' online ideological and political learning environment and guide them to establish correct digital ethics
Digital-Intelligent Education Development Literacy (B5)	Independent learning of digital literacy, digital-intelligent ideological and political teaching and research, education reflection and optimization, team collaboration and sharing	Development Ability	Optimize digital-intelligent ideological and political teaching and improve education outcomes through teachers' continuous learning and reflection

3.3 Weight Calculation Based on Analytic Hierarchy Process

A three-level hierarchical structure model is constructed: "target layer (comprehensive evaluation of college ideological and political teachers' digital literacy under OBE concept) - criterion layer (5 first-level indicators) - indicator layer (21 second-level indicators)". Fifteen experts participating in the Delphi method are invited to score

using the 1–9 scale method and construct judgment matrices combined with OBE concept and the demand for digital-intelligent ideological and political education. Weights are calculated and consistency tests are completed via Yaahp software [5].

The results show that all judgment matrices have CR values less than 0.1, passing the consistency test, indicating scientific and effective weight results that fully reflect the core requirements of OBE "outcome orientation and student-centeredness". The weights of first-level indicators are shown in Table 2.

Table 2. Weight values of first-level indicators.

First-level Indicators	Weight Value	Ranking	CR Value	Analysis of OBE-oriented Weight
Digital-Intelligent Ideological and Political Teaching Innovation Literacy (B3)	0.326	1	0.072	Directly determines the innovation and education outcomes of digital-intelligent ideological and political teaching, the core embodiment of OBE outcome orientation
Digital Ethics and Security Literacy (B4)	0.248	2	0.065	Guarantees the safety of students' ideological and political learning environment, reflecting student-centered orientation
Digital-Intelligent Technical Application Literacy (B1)	0.185	3	0.058	The technical foundation for digital-intelligent ideological and political teaching, supporting the achievement of education outcomes
Ideological and Political Digital Resource Integration Literacy (B2)	0.137	4	0.061	Provides high-quality adapted resources for students, an important embodiment of student-centered orientation
Digital-Intelligent Education Development Literacy (B5)	0.104	5	0.059	Guarantees the continuous improvement of teachers' literacy and long-term optimization of education outcomes, reflecting the OBE principle of continuous improvement

The weight results indicate that digital-intelligent teaching innovation and digital ethics are the core dimensions of ideological and political teachers' digital literacy under the OBE concept, highlighting the dual importance of "innovation in education outcomes" and "control of students' development bottom line" in digital-intelligent ideological and political education.

3.4 Scoring Rules Based on OBE Concept

A 100-point scoring system is adopted, deeply integrating ideological and political teachers' digital literacy level with the initial education outcomes of digital-intelligent ideological and political education. The proportion of indicators related to education outcomes is no less than 40% to strengthen outcome-oriented evaluation. Literacy is divided into 4 levels with clear quantitative standards:

Excellent (90–100): Fully master digital-intelligent ideological and political skills, outstanding innovation ability, strong ethical awareness; significant improvement in students' ideological and political literacy, forming a replicable education model.

Good (80–89): Proficient in core skills, certain innovation ability, qualified ethical norms; obvious improvement in students' ideological and political literacy, teaching model recognized by students.

Qualified (60–79): Master basic skills, insufficient innovation ability, average ethical awareness; basic implementation of digital-intelligent ideological and political teaching, certain effect on students' ideological and political literacy improvement, no systematic teaching model formed.

Needs Improvement (below 60): Weak basic skills, lack of innovation ability, hidden ethical and security risks; difficulty in implementing digital-intelligent ideological and political teaching, unable to support the goal of improving students' ideological and political literacy.

4 Result Analysis

4.1 Scientific Verification of the Evaluation System

A combination of "online questionnaire + practical assessment" is adopted to distribute questionnaires. Reliability and validity tests are conducted via SPSS software. The results show that the Cronbach's α coefficient of the scale is 0.872 (greater than 0.8), indicating good reliability and high internal consistency; the KMO value is 0.821, and the significance of Bartlett's sphericity test is $P < 0.001$, indicating qualified validity and suitability for factor analysis. The reliability and validity tests prove that the evaluation system has good scientificity and applicability, can effectively evaluate the digital literacy level of ideological and political teachers, and accurately meets the training needs oriented to education outcomes.

4.2 Statistical Results of Empirical Evaluation

Data analysis of valid samples is conducted, combined with the initial education outcomes of digital-intelligent ideological and political education, and core results are obtained from three aspects: overall level, grade distribution and dimensional shortcomings.

Overall literacy level: The average score of college ideological and political teachers' digital literacy is 72.3, at the qualified level, basically meeting the basic needs of digital-intelligent ideological and political teaching, but there is a large gap with the education goal under the OBE concept, with significant room for literacy improvement.

Differences in dimensional scores: Digital ethics and security literacy has the highest score, reflecting teachers' professional literacy of adhering to the ideological bottom line; digital-intelligent ideological and political teaching innovation literacy has the lowest score, the core shortcoming, mainly manifested as teaching innovation not centered on students' needs and disconnection between digital-intelligent tool application and education outcomes; digital-intelligent education development literacy has a low score, reflecting teachers' lack of teaching reflection and continuous improvement awareness based on education outcomes, inconsistent with the OBE principle of "continuous improvement".

The OBE-oriented characteristics of each literacy level are shown in Table 3.

Table 3. Literacy level distribution and OBE characteristics.

Literacy Level	Number of People	Proportion	OBE-oriented Characteristics
Excellent	29	12.7%	Clear outcome orientation, high connection between digital-intelligent teaching innovation and students' ideological and political literacy improvement
Good	76	33.3%	Certain outcome-oriented awareness, digital-intelligent ideological and political teaching basically meets students' learning needs
Qualified	98	43.0%	Weak outcome-oriented awareness, low integration between digital-intelligent ideological and political teaching and education outcomes
Needs Improvement	25	11.0%	Lack of outcome-oriented awareness, digital-intelligent technical application cannot support the goal of ideological and political education

5 Implementation, Application, Research Conclusion and Prospect

5.1 Implementation and Application of the Evaluation System under OBE Concept

Closed-loop Implementation Process.

Based on the OBE principle of "continuous improvement", a five-step implementation process of "preparation-evaluation-feedback-optimization-tracking" is designed to realize the deep integration of the evaluation system with teacher training and education outcomes:

Pre-preparation: Colleges and universities set up an evaluation team composed of experts in ideological and political education, educational technology and OBE research, interpret evaluation indicators and rules, and conduct pre-training on the integration of OBE concept and digital-intelligent ideological and political education.

Evaluation implementation: Adopt a combination of "online questionnaire + practical assessment + education outcome research" to comprehensively evaluate teachers' digital skills and digital-intelligent ideological and political education effects.

Result feedback: Establish a digital literacy and education outcome archive under the OBE concept for each teacher, accurately feedback literacy shortcomings and their impact on education outcomes, and clarify improvement directions.

Scheme optimization: Formulate personalized training programs for teachers with different literacy levels and shortcomings according to evaluation results, focusing on the core goals of "improving digital-intelligent teaching innovation ability and strengthening outcome-oriented awareness".

Dynamic tracking: Conduct regular evaluation once a year, track the improvement of teachers' literacy and education outcomes, dynamically optimize the evaluation system and training programs, and realize continuous improvement.

Targeted Literacy Improvement Paths.

Closely following the core principles of OBE concept, targeted improvement paths are proposed from three levels: school, teacher and guarantee, to promote the synchronous improvement of teachers' digital literacy and students' ideological and political literacy.

School level: Construct an outcome-oriented hierarchical training system: offer special training on the integration of OBE and digital-intelligent ideological and political teaching design, establish a "mentor-mentee" assistance mechanism, and build a digital-intelligent ideological and political training platform; integrate digital-intelligent ideological and political education outcomes and digital literacy into performance appraisal and professional title evaluation, and improve the incentive mechanism.

Teacher level: Strengthen the integration of independent learning and teaching practice outcomes: take the initiative to learn OBE concept and digital-intelligent education technology, participate in teaching and research and teaching competitions; center on students' needs, integrate digital-intelligent tools into ideological and political teaching, and carry out hybrid and personalized education practice; establish a teaching reflection and outcome review mechanism to make up for literacy shortcomings; strengthen team collaboration and share digital-intelligent ideological and political teaching experience and outcomes.

Guarantee level: Improve the outcome-oriented institutional and technical support system: improve the ideological and political digital resource library centered on students' needs, and strengthen digital ethics training; establish a technical support team composed of ideological and political teachers, educational technicians and OBE researchers to provide regular guidance; deepen school-enterprise cooperation, introduce high-quality digital-intelligent education resources and conduct customized development; build a communication platform for digital-intelligent ideological and political education outcomes to display excellent cases and experience.

5.2 Research Conclusion

The evaluation results show obvious differences among different dimensions. On the whole, teachers perform stably in basic operation and normative awareness, while there is room for improvement in teaching design and reflection and improvement.

Notably, some teachers have high technical proficiency but their teaching effects do not improve simultaneously, further indicating that evaluating teachers' ability only from a technical perspective cannot fully reflect their teaching performance.

In addition, there is a certain differentiation trend among different groups, suggesting that subsequent research should further consider the impact of individual background factors.

5.3 Research Deficiencies and Future Prospects

This paper attempts to re-examine the competency structure of college ideological and political teachers in the digital environment from the outcome-oriented perspective, and construct an evaluation system on this basis. Compared with previous studies, this paper pays more attention to the correspondence between evaluation results and teaching practice.

The results show that teachers currently have a certain foundation in digital literacy, but there is still obvious room for improvement in teaching transformation and continuous improvement. How to establish a more stable connection between technical application and education goals is a question to be further discussed in subsequent research.

It should be noted that this study has certain limitations in sample scope and indicator refinement. In the future, the relevant conclusions can be further tested and revised combined with larger-scale data and long-term tracking analysis.

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