Journal of Landscape Research 2025, 17(5): 65-70, 74

Construction and Empirical Study of a Digital Evaluation Model for Classroom Teaching Quality in Private Colleges and Universities: A Case Study of Landscape Architecture Major at Chongqing University of Humanities, Science and Technology

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Abstract Focusing on the digital evaluation of classroom teaching quality in private colleges and universities, an indicator model of "teaching subject–teaching object–teaching effect" for the landscape architecture major of Chongqing College of Humanities, Science & Technology was constructed. By using methods such as Delphi, AHP, Likert and questionnaire survey, the teaching quality of 8 courses of landscape architecture major was evaluated. The results show that the average score of the indicators is 2.877 6, indicating that the overall improvement space for the teaching quality of the sample professional courses is relatively large, and the key shortcomings are students' learning interest and initiative, the application and transformation of professional knowledge, as well as the cultivation of innovation and practical ability. The research verified the scientific nature and discrimination of the model, and put forward suggestions for the precise improvement of classroom atmosphere, assignment design and ability cultivation driven by data, thereby providing a replicable model for the digital evaluation and teaching quality improvement of engineering majors in private colleges and universities.

Keywords Digital evaluation, Teaching quality, Landscape architecture

DOI 10.16785/j.issn 1943-989x.2025.5.014

With the rapid development of globalization and informatization, the teaching evaluation system of higher education is gradually transforming towards digitalization. International education evaluation standards have put forward higher requirements for the assessment of higher education quality, emphasizing the scientificity, objectivity and systematicness of teaching evaluation. To improve the quality of education and promote educational equity, a series of reforms have been carried out in the field of education in China in recent years. Especially in the field of private colleges and universities, the government encourages innovation and independent development, and requires private colleges and universities to strengthen internal management and improve teaching quality. Private higher education, as an important component of China's education system, has achieved remarkable development in both scale and quality in recent years. However, private colleges and universities are significantly different from public ones in China in terms of resource allocation, management model, curriculum setting and student cultivation. Moreover, private higher education still has many deficiencies in the construction of its teaching quality evaluation system.

Currently, several main problems exist in the teaching quality evaluation system of private higher education. (i) There is insufficient research on the construction of a digital evaluation system. At present, most teaching quality evaluation systems of private higher education in China follow traditional evaluation methods, and lack in-depth understanding and application of characteristics of digital education. This current situation restricts the accuracy, objectivity and real-time nature of the evaluation systems, so it is difficult to meet the demands of modern educational development. (ii) There is a lack of empirical studies. Although theoretical research on teaching quality evaluation is relatively abundant, empirical studies on private higher education in China are relatively few. Especially in the application and effect evaluation of digital evaluation models, there is a lack of in-depth case analysis and data support, which limits the optimization and promotion of evaluation models. (iii) Evaluation indicator systems need to be improved. The existing evaluation indicator systems often fail to fully reflect the characteristics of private higher education in China, such as flexibility, innovation and market orientation. The setting of evaluation indicators focuses on the "teaching" part of teachers, but rarely touches upon the "learning" state of students during the teaching process. Emphasis is placed on students' mastery of knowledge and skills, while other aspects necessary for their growth are neglected, including emotions, morality, values, etc. Furthermore, the evaluation indicators have also failed to effectively integrate the key elements of digital education, such as the quality and utilization efficiency of online teaching resources and the application of information technology in teaching.

In conclusion, under the current background of digital transformation, it is urgent to construct a scientific and reasonable digital evaluation model to adapt to the characteristics and demands of private higher education in China.

1 Research progress

1.1 Domestic research progress

1.1.1 Relevant policies on teaching evaluation systems. In 1994, the *Higher Education Law* put forward that the state implement an educational supervision system and an educational evaluation system for schools and other educational

Received: August 12, 2025 Accepted: September 18, 2025
Sponsored by the Research Project of Higher Education (Undergraduate) Teaching Reform of Chongqing Municipal Education Commission in 2025 (253272); Key Project of Educational Reform of Chongqing College of Humanities, Science & Technology (23CRKXJJG08).
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institutions, which emphasizes the legal status of educational evaluation. In 2003, the Higher Education Teaching Evaluation Center of the Ministry of Education was established, which promotes the institutionalization and professionalization of undergraduate teaching evaluation work. In 2011, the Ministry of Education proposed the "Five-in-One" teaching evaluation system. This system has promoted the comprehensiveness and internationalization of teaching quality and enhanced the global competitiveness of education[1].

1.1.2 Diversification of teaching evaluation. In 2011, Chen Jian put forward that the evaluation standards for teaching quality should reflect a certain degree of flexibility and development, and suggested that common indicators be combined with individual indicators. This evaluation method can adapt to the individualized development needs of different universities and teachers, but the quantification and evaluation of individual indicators require more research and practical exploration. In 2013, Feng Xiaoyun advocated the establishment of a curriculum quality system centered on students' learning and development, and emphasized the student-centered principle. This view is helpful for better meeting students' learning needs, but it may affect teachers' teaching autonomy. In 2018, Xing Hongjun emphasized that classroom teaching evaluation is an important measure to improve teaching quality and deepen teaching reform. Classroom teaching evaluation is conducive to promoting the innovation of teaching methods and enhancing teaching effectiveness, but the implementation of evaluation may increase the workload of teachers[1-2].

1.1.3 Informatization and intelligence of teaching evaluation. At the beginning of the 21st century, with the development of information technology, big data analysis began to be introduced into teaching evaluation. Big data technology can be utilized to more accurately assess students' learning outcomes and optimize teaching content and methods. In recent years, intelligent teaching systems have gradually been applied. For instance, intelligent teaching systems can be used to collect teaching feedback, adjust teaching strategies in real time, and promote the rapid development and transformation of disciplines and specialties. Zhang Jun, Yang Zongkai and others proposed that under the background of "digitalization and intelligence", applying technologies such as artificial intelligence and machine learning to the teaching quality evaluation of professional courses can significantly improve the accuracy and efficiency of the evaluation and provide a scientific basis for teaching decisions.

1.2 Foreign research progress

At the beginning of the 20th century, American educator John Dewey[3] proposed the student-centered educational concept, emphasizing students' active participation and autonomous learning in the educational process. The focus of teaching evaluation should be focused on students' learning outcomes instead of teachers' teaching methods. However, it is needed to further study how to reflect the student-centered concept in the evaluation indicators[4].

In the 1970s and 1980s, educational researchers began to explore multi-dimensional and comprehensive evaluation methods for teaching quality assessment, and focused on the evaluation of students' learning outcomes, learning processes, and learning environments[5]. For example, Donald Kirkpatrick[6] proposed four levels of teaching evaluation: response level, learning level, behavior level, and outcome level. This theory provides a relatively comprehensive framework for the evaluation of teaching quality, but it lacks strong empirical research.

At the beginning of the 21st century, with the development of information technology, digital evaluation started to be applied in the evaluation of teaching quality. Robert Marzano[7] proposed a teaching evaluation model, which includes nine key areas such as clear teaching objectives, classroom management, and a positive learning atmosphere. His model provides a systematic framework for evaluating teaching quality, but it is overly theoretical and complex, making it difficult to implement and apply in actual teaching.

2 Research methods

2.1 Study area

Chongqing College of Humanities, Science & Technology (29°33'44" N, and 105°33'43" E) is located in Hechuan District, Chongqing City, China. This college is a private comprehensive higher education institution mainly focusing on undergraduate education, an independent college with coordinated development of engineering, management, literature, law, economics and education as its main disciplines, as well as one of the typical representatives of private colleges and universities in China. Chongqing College of Humanities, Science & Technology has distinct characteristics and advantages in engineering education and practical ability cultivation, and is committed to cultivating applied talents that meet the needs of social development. As of May 2024, there were approximately 23,000 undergraduate students on campus, including 519 students majoring in landscape architecture and 21 teachers in this major. The landscape architecture major of Chongqing College of Humanities, Science & Technology is one of the key majors of the School of Architecture and Design. This major focuses on cultivating students' abilities in landscape architecture design, planning and engineering management, aiming to cultivate professional and applied landscape architecture talents. The curriculums of this major cover the relevant knowledge and skills of landscape architecture design, including professional basic courses, professional core courses, professional practical courses and professional expansion courses, etc.

2.2 Research methods

2.2.1 Determination of evaluation factors and indicators. The Delphi method was adopted to determine the evaluation factors and indicators. In this study, 16 experts (with associate senior professional titles or above) from the fields of landscape architecture and education were invited to jointly determine the indicator system for evaluating the teaching quality of landscape architecture, including 7 landscape architecture experts, 5 architecture experts, 3 education experts, and 1 educational management expert[8]. Based on the characteristics of landscape architecture major and the research methods of predecessors, a four-level evaluation indicator system was designed. As shown in Table 1, the target layer is the digital evaluation of the teaching quality of landscape architecture major A. The criterion layer contains teaching subject B1, teaching object B2, and teaching effect B3. There are 10 factors in the factor layer, including teachers' ethics and conduct C01, teaching team C02, teaching methods and means C03, teaching content C04, teaching process C05, teaching practice C06, teaching assessment C07, teaching archives C08, classroom effect C09, and post-class feedback C10. The indicator layer has 39 indicators, such as professional ethics and quality D01, emotional control D02, and correct handling of the

relationship with students D03[9-10].

2.2.2 Determination of the weight of evaluation indicators. Both AHP and Delphi method were adopted to determine the weight of each indicator. Firstly, AHP method, guided by the nature of the problem and the ultimate goal to be achieved, was used to classify the problem to analyze its constituent factors, and then based on the mutual influence and subordinate relationship among the constituent factors, hierarchically aggregated the factors to form structures at different levels, thereby constructing a multi-level analytical structure model. Secondly, Delphi method was used to determine the influencing factors and rank the relative importance or relative superiority and inferiority order of the overall goal. Thus, the qualitative indicators were fuzzy quantified to calculate the hierarchical single ranking and the overall ranking[9]. Finally, the YAAHP software 10.1 was used to finally determine the weight of each indicator.

2.2.3 Acquisition of basic data used for the evaluation. Through multi-channel questionnaire surveys and on-site investigations, the students, teachers, supervisors at all levels, and representatives of expert groups in landscape architecture major at Chongqing College of Humanities, Science & Technology were surveyed. The questionnaire content was designed based on the digital evaluation indicator system of teaching

Table 1 Digital evaluation indicator system for the teaching quality of landscape architecture major

Target layer	Criterion layer	Weight	Factor layer	Weight	Indicator layer	Weight
Digital evaluation of the teaching quality of landscape architecture major A	Teaching subject B1	0.297 3	Teachers' ethics and conduct C01	0.198 2	Degree of dedication to work (working hours, energy input, sense of responsibility, etc.) D01	0.106 8
					Emotional control ability D02	0.032 5
					Properly handling the relationship with students D03	0.058 9
			Teaching team C02	0.099 1	Rationality of teaching staff structure (such as educational background, professional title, age, etc.) D04	0.016 8
					Professional quality of the team (including teaching ability, research ability, practical ability, innovation ability, etc.) D05	0.043 9
					Level of online teaching and digital education capability (such as information collection, use of information tools, data calculation and analysis, etc.) D06	0.03 84
	Teaching object B2	0.163 8	Teaching methods and means C03	0.018 9	Application of interactive teaching models such as flipped classrooms, project-based learning, and situational learning D07	0.003 8
					Attractiveness of teaching methods D08	0.007 6
					Methods and skills of online teaching D09	0.007 6
			Teaching content C04	0.068 3	Rationality of teaching objectives and teaching design D10	0.021 2
					Lecture on the latest industry trends and technological development D11	0.013 1
					Explanation of interdisciplinary and innovative content D12	0.010 9
					Preparation of digital textbooks and their reference materials D13	0.005 7
					Rationality of the arrangement of online teaching content D14	0.011 4
					Construction and update of teaching database D15	0.006 0
			Teaching process C05	0.033 4	Knowledge explanation and expression ability D16	0.007 6
					Mobilization of classroom atmosphere and teaching interaction D17	0.004 7
					Proficiency and accuracy in the course content D18	0.005 0
					Rationality of course assignment design D19	0.002 1
					Rationality of arrangement of classroom teaching activities D20	0.003 0
					Rationality of online classroom teaching organization D21	0.011 0
			Teaching practice C06	0.017 9	Rationality of the arrangement of practical teaching content D22	0.007 9
					Breadth and depth of project practice D23	0.003 0
					Development and utilization of online laboratories D24	0.006 9
			Teaching assessment C07	0.018 4	Rationality of assessment system design D25	0.004 9
					Scientificity and diversity of assessment methods D26	0.003 2
					Diversity of evaluation content and evaluation subjects D27	0.007 7
					Timeliness and effectiveness of evaluation feedback D28	0.002 6
			Teaching archives C08	0.006 9	Standardization and completeness of teaching materials D29	0.003 4
					Collection and organization of online data D30	0.003 4
	Teaching effect B3	0.539 0	Classroom effect C09	0.179 7	Students' learning interest and initiative D31	0.088 1
					Students' feedback D32	0.035 5
					Students' mastery of professional knowledge and related digital tools D33	0.056 0
			Post-class feedback C10	0.359 3	Students' ability to apply professional knowledge of a course and related digital skills D34	0.025 8
					Degree of matching between professional course knowledge and market demand D35	0.080 2
					Cultivation of students' innovative ability through professional courses D36	0.092 9
					Evaluation of students' satisfaction and learning experience D37	0.035 8
					Importance of professional courses for students' career development D38	0.072 4
					Enterprises' overall feedback on professional courses D39	0.052 2

quality of landscape architecture major and the five-level scoring standard of the Likert scale. The number (no less than 50% of the total number of students and related teachers and experts in landscape architecture major, and the number of teachers and students selected should be consistent with the original student-to-teacher ratio of the major) and the coverage (no less than 2 courses of different categories of professional courses) of questionnaires should be representative and targeted. From October to December in 2023, a total of 200 questionnaires were distributed, and 185 valid questionnaires were collected by using the above-mentioned method. The evaluation results were sorted out and summarized, and the data were appropriately corrected. Firstly, highly repetitive and logically inconsistent data were eliminated. Secondly, the SPSSPRO software is used to identify abnormal data. Finally, the abnormal data were replaced with mean or mode values according to the characteristics of this type of data[10].

2.2.4 Quantification and weighted evaluation of evaluation indicators. By using the five-level Likert scale, the comment set was divided into five grades, namely V={very good, relatively good, average, poor, very poor}, and different grades V_1, V_2, V_3, V_4 and V_5 were assigned values of 5, 4, 3, 2, and 1, respectively. QL represents the weighted average of the comprehensive score of a single indicator, and can be calculated as follows:

$$QL=\sum_{i=1}^{5}V_iQ_i \quad (1)$$

In the formula, QL is the weighted average of the comprehensive score of a single indicator; V_i represents the assigned value (5, 4, 3, 2, or 1); Q_i means the probability of the corresponding number of scoring people among the total number of scoring people[10-11].

3 Research results

The courses of landscape architecture major in the School of Architecture and Design of Chongqing College of Humanities, Science & Technology were studied, including professional basic courses (landscape architecture engineering drawing, and principles of landscape architecture design), professional core courses (landscape architecture planning and design, and landscape ecology), professional practical courses (landscape architecture architectural surveying and mapping training, and landscape planning and design training of residential areas), and professional extension courses (design application writing, and professional English). The teaching quality of these courses was digitally evaluated based on the methodology and model constructed above. The research results are shown in Table 2.

According to the evaluation results (Table 2), the comprehensive scores of the 8 professional courses are mainly concentrated in 3 intervals. The comprehensive scores of landscape architecture planning and design as well as landscape planning and design training of residential areas are above 3.0. The comprehensive scores of four courses range from 2.5 to 2.7, including landscape architecture engineering drawing, principles of landscape architecture design, landscape ecology, and landscape architecture architectural surveying and mapping training. The comprehensive score of design application writing and professional English are below 2.3. In a word, there are obvious differences in the scores in the three intervals.

The "average scores" in Table 2 represent the overall evaluation of each indicator of the teaching quality of the sample courses in landscape architecture major. Among them, the scores of some indicators of landscape architecture planning and design, and landscape planning and design training of residential areas exceed 4.0, but the average scores of all indicators are below 4.0. Among these indicators, the average scores of normative indicators (such as professional ethics and quality, emotional control, correct handling of the relationship with students, rationality of teaching staff structure, professional quality of the team, rationality and inspiration of course introduction and design case introduction, whether the selection of teaching materials and reference materials is appropriate, beauty and vividness of courseware production, proficiency and accuracy in the course content, training program, teaching syllabus, teaching plan, and teaching calendar) reach 3.5−4.0. The average scores of some indicators (such as rationality of course assignment design, rationality of arrangement of classroom teaching activities, breadth and depth of participation in landscape architecture design project practice, summary, exchange and evaluation of landscape architecture design practice, completeness, feasibility and implementation of teachers' teaching archives, completeness and richness of students' learning archives, students' learning interest and initiative, application and transformation of professional knowledge in landscape architecture, and cultivation of students' innovation and practical ability in landscape architecture major) are all below 3.0. The overall score of the indicators is higher than the comprehensive score, and the score of indicator coordination degree is relatively low, with an average score of 0.33.

4 Discussion

4.1 Scores of evaluation indicators

According to the evaluation results (Table 2), the average score of the indicators is 2.877 6, indicating that the overall teaching quality of the sample courses in the landscape architecture major of Chongqing College of Humanities, Science & Technology has a relatively large room for improvement. Particularly, indicators such as students' learning interest and initiative, the application and transformation of professional knowledge, as well as the cultivation of innovation and practical abilities need to be strengthened. Because such indicators account for a relatively high proportion in the evaluation system, their scores directly affect the overall score of the indicators[12-13].

4.2 Suggestions on the teaching of professional courses

Based on the digital evaluation system of professional courses in landscape architecture major and evaluation results, corresponding suggestions are provided for the indicators with higher weights and lower scores, such as mobilization of classroom atmosphere, design of course assignment, learning interest and initiative, application and transformation of knowledge, as well as cultivation of innovation and practical ability (Table 3).

5 Conclusion

In order to address problems such as the subjectivity of traditional educational evaluation and the incompleteness of the early digital evaluation system, this study is dedicated to constructing a scientific, comprehensive and highly practical digital evaluation model for the teaching quality of professional courses, thereby actively promoting the digital transformation of education. In this study, the teaching quality of 8 professional courses of landscape architecture major of Chongqing College of Humanities,

Science & Technology were evaluated digitally. The research results show that compared with traditional subjective evaluation and qualitative analysis, this study proposes a scientific, objective and highly targeted digital evaluation model, which can comprehensively assess their teaching quality from multiple dimensions and perspectives, summarize the hidden patterns behind educational data, and formulate relevant policies and take corresponding measures to promote the digital transformation of private colleges and universities and the overall improvement of their teaching quality.

The innovation points of this research are mainly reflected in the following aspects. First, in the process of constructing the evaluation indicator system, both Delphi and AHP method were adopted. In the quantification and calculation of evaluation indicators, the five-level Likert scale and FCE were used. Secondly, the method used in this study has strong applicability and implementability. After the evaluation indicators are adjusted appropriately according to the characteristics of schools and majors, it can be widely applied to the digital evaluation of the teaching quality of similar majors in other private colleges and universities, especially for

Table 2 Digital evaluation of the teaching quality of professional courses in landscape architecture major

Indicator layer	Score								
	Landscape architecture engineering drawing	Principles of landscape architecture design	Landscape architecture planning and design	Landscape ecology	Landscape architecture architectural surveying and mapping training	Landscape planning and design training of residential areas	Design application writing	Professional English	Average score
D01	3.812 3	3.712 5	4.093 6	3.956 8	3.734 5	4.136 5	3.497 8	3.480 8	3.803 1
D02	3.656 8	3.532 5	3.956 8	3.577 5	3.657 2	3.876 8	3.344 5	3.231 5	3.604 2
D03	3.923 1	3.877 9	4.123 5	3.868 3	3.768 1	4.023 3	3.968 3	3.716 3	3.908 6
D04	3.453 8	3.558 6	3.678 3	3.545 7	3.345 1	3.578 3	3.6457	3.636 1	3.555 2
D05	3.779 8	3.621 2	3.783 3	3.647 3	3.547 2	3.763 2	3.547 1	3.582 1	3.658 9
D06	3.232 1	3.110 9	3.356 7	3.063 5	3.163 1	3.456 2	2.863 5	2.995 6	3.155 2
D07	3.256 6	3.013 3	3.348 9	2.876 8	2.976 8	3.351 2	2.856 8	2.830 0	3.063 8
D08	3.335 8	3.222 1	3.435 2	3.221 3	3.421 1	3.389 0	3.121 3	2.911 8	3.257 2
D09	3.521 3	3.328 9	3.636 5	3.233 1	3.333 6	3.621 5	3.133 2	3.027 1	3.354 4
D10	3.453 2	3.437 7	3.589 7	3.413 4	3.213 2	3.601 2	3.213 3	3.120 7	3.380 3
D11	3.656 2	3.428 8	3.732 1	3.331 8	3.131 2	3.723 1	3.431 9	3.424 1	3.482 4
D12	3.789 7	3.678 8	3.835 6	3.345 5	3.245 1	3.795 4	3.545 5	3.433 2	3.583 6
D13	3.877 8	3.776 3	3.982 3	3.453 8	3.251 0	3.782 4	3.653 2	3.652 8	3.678 7
D14	3.756 7	3.603 3	3.887 6	3.358 9	3.158 7	3.787 2	3.458 9	3.419 1	3.553 8
D15	3.456 7	3.332 5	3.567 7	2.789 2	2.689 7	3.467 1	2.889 3	3.051 0	3.155 4
D16	3.332 3	2.898 8	3.466 5	2.886 9	2.986 2	3.566 2	2.686 9	2.626 6	3.0563
D17	3.235 6	2.884 4	3.056 8	2.532 5	2.832 2	3.256 1	2.5125	2.543 5	2.856 7
D18	3.788 9	3.657 7	3.953 8	3.332 8	3.132 3	3.983 1	3.292 8	3.278 6	3.552 5
D19	3.123 2	2.886 3	3.432 3	2.421 9	2.621 2	3.532 1	2.361 9	2.440 3	2.852 4
D20	3.235 7	2.803 4	3.557 8	2.557 8	2.757 1	3.557 8	2.457 8	2.462 2	2.923 7
D21	3.532 1	3.013 5	3.667 8	3.222 3	3.322 1	3.567 8	2.922 3	2.784 9	3.254 1
D22	3.133 5	3.023 3	3.043 8	2.873 3	3.073 3	3.543 8	2.773 3	2.720 5	3.023 1
D23	3.132 4	2.878 8	2.957 8	2.788 5	2.988 5	3.257 8	2.688 3	2.533 5	2.903 2
D24	3.001 8	2.881 7	2.935 6	2.656 8	2.756 3	3.235 6	2.653 2	2.450 2	2.821 4
D25	3.432 8	3.402 9	3.567 7	3.332 9	3.132 3	3.367 7	3.336 7	3.279 0	3.356 5
D26	3.339 9	3.120 3	3.454 5	2.887 9	2.987 2	3.474 5	2.881 3	2.832 8	3.122 3
D27	3.412 2	3.226 8	3.558 9	3.006 7	3.206 2	3.608 9	3.008 9	3.020 2	3.256 1
D28	3.566 7	3.678 8	4.032 6	3.332 9	3.132 8	4.031 2	3.331 6	3.323 8	3.553 8
D29	3.082 9	2.988 7	3.589 8	2.423 6	2.623 6	3.489 1	2.133 6	2.095 1	2.803 3
D30	2.988 9	2.787 6	3.453 3	2.553 2	2.573 2	3.353 3	2.433 2	2.448 5	2.823 9
D31	2.712 3	2.560 9	3.657 8	2.531 2	2.931 2	3.717 8	1.981 2	1.698 0	2.723 8
D32	3.878 9	3.757 8	4.1567	3.332 7	3.732 7	4.256 1	2.632 7	2.483 6	3.528 9
D33	3.031 3	3.123 2	3.455 6	3.178 8	3.578 2	3.355 1	2.578 8	2.488 6	3.098 7
D34	3.058 9	3.033 8	3.603 8	3.099 9	2.791 9	3.703 8	2.699 9	2.476 0	3.058 5
D35	3.153 5	2.983 2	3.512 3	2.878 9	2.978 9	3.512 3	2.078 9	1.583 6	2.835 2
D36	2.783 5	2.567 7	3.188 6	2.623 3	3.028 8	3.288 6	2.023 3	1.485 8	2.623 7
H1	3.738 8	3.657 7	3.887 6	3.538 9	3.638 9	3.887 2	3.238 9	2.923 2	3.563 9
H2	3.189 5	2.929 9	3.433 5	2.632 3	2.832 3	3.333 5	2.332 3	2.142 3	2.853 2
H3	3.448 9	3.332 2	3.758 8	3.283 7	3.383 7	3.858 1	2.483 7	2.555 7	3.263 1
Score of an indicator	2.956 5	2.840 8	3.301 7	2.846 1	2.906 9	3.336 1	2.495 4	2.289 2	2.871 6
Score of indicator coordination degree	0.350 4	0.337 8	0.375 4	0.327 2	0.338 6	0.379 3	0.270 0	0.261 3	0.330 0
Comprehensive score	2.695 9	2.590 5	3.009 1	2.594 2	2.650 1	3.040 4	2.272 8	2.086 4	2.617 4

Note: For the consistency test of the judgment matrix, CR=0.008 9<0.1.

Table 3 Suggestions for improving the teaching quality of professional courses in landscape architecture major

Class	Mobilization of classroom atmosphere	Design of course assignment	Learning interest and initiative	Application and transformation of knowledge	Cultivation of innovation and practical ability
Professional basic courses	Adopting various teaching methods such as lectures, group discussion, and case analysis to enhance classroom interaction and students' participation[14-15]	Providing practical cases and problems to stimulate students' thinking and problem-solving ability, as well as fully considering students' basic knowledge, moderately challenging their ability, and making homework have a certain degree of practicality[16]	Providing a wealth of cases and practical application scenarios to stimulate students' interest and thirst for knowledge, emphasizing the cultivation of students' basic knowledge, thinking ability and problem-solving ability[17]	Requiring students to apply the knowledge they have learned to practical problems, encouraging them to think of innovative solutions, and providing tutoring and guidance[18]	Guiding students to participate in course-related projects or experiments, cultivating their ability to analyze and solve problems, encouraging them to conduct research, and providing opportunities for presentation and discussion
Professional core courses	Creating a positive learning atmosphere and encouraging students to ask questions, communicate with each other and share experiences	Designing open-ended and flexible assignments, and encouraging students to independently choose and deeply study topics of interest[19]	Guiding students to actively participate in classroom discussion and group cooperation, stimulating their interest and initiative in learning, and set-ting up individual or group pro-jects for teachers to provide opportunities for self-directed learning[20]	Organizing practical case analysis and project research to enable students to apply their knowledge to real-life situations, cultivating their ability to solve practical problems, and encouraging students to explore innovative solutions	Providing opportunities for students to participate in project practices in related industries, helping them familiarize themselves with the professional practice process, and cultivating their innovative consciousness and practical ability[21]
Professional practical courses	Encouraging students to participate in discussion, ask questions and share experience, promoting interaction and cooperation among students, and creating a positive learning atmosphere[18]	Designing homework based on practical cases and problems to enable students to apply theoretical knowledge to practical problems	Designing interesting and challenging practice courses to make students feel a sense of achievement, and making students independently choose or participate in professional practice projects to cultivate their interests and professional qualities[22]	Combining practical courses with relevant theories and practical problems to guide students to apply their knowledge to solve problems in practice, and encouraging students to apply innovative methods and tools to propose solutions	Organizing students to participate in entrepreneurship competitions, innovation projects, etc., encouraging them to think independently and practice innovatively, and cultivating their innovative spirit and practical ability[23]
Professional extension courses	Utilizing modern technological means such as multimedia and online platforms to enrich teaching content and interactive methods[24]	Providing detailed assignment requirements and evaluation criteria to make students clearly understand the requirements and goals of the assignment	Offering a wide range of extension courses covering different fields and research directions, and encouraging students to choose courses based on their personal interests and career plans to enhance their learning interest and initiative	Focusing on the practicality and application of extension courses, providing opportunities for students to apply their knowledge to solve practical problems, and encouraging students to delve deeply into and explore new knowledge in related fields	Organizing students to participate in practical projects or research groups, allowing them to practice learning in the extension courses and providing opportunities for presentation and communication, and cultivating their innovative and practical ability[25]

the engineering majors in private colleges and universities that are still in the initial stage of digital education. The results of this study not only provide a basis for the improvement of professional teaching quality and discipline construction, but also offer an empirical study for the digital evaluation of teaching quality. The research is conducive to promoting the improvement of digital education theories in private colleges and universities, the renewal of digital education reform methodologies, and the accumulation of practical experience in educational digital transformation. In addition, this study also provides a reference for the construction of a digital evaluation model for the teaching quality of similar disciplines and related majors in private colleges and universities. The next step of research will expand the sample data, improve the evaluation indicators centered on students' learning outcomes, further optimize the evaluation model, and construct a more scientific and comprehensive digital evaluation model for the teaching quality of professional courses in private colleges and universities.

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(To be continued in P74)

Table 1 Quality assessment index system for ideological and political education in landscape architecture courses

System	First-level indicators	Second-level indicators
Quality assessment index system	Goal design	1. Whether the ideological and political goals are consistent with the professional goals;
		2. Whether the ideological and political goals are specific and feasible;
		3. Whether the ideological and political goals are designed in layers.
	Content integration	1. The relevance between ideological and political elements and professional content;
		2. The depth of exploration of ideological and political elements;
		3. The regional characteristics of ideological and political content.
	Method innovation	1. Whether the ideological and political teaching methods are diverse;
		2. Whether information-based teaching methods are used;
		3. Whether practical projects are integrated.
	Effect output	1. The degree of improvement in students' cognitive level of ideological and political education;
		2. The number of cases of students' practice of ideological and political concepts;
		3. The output of excellent cases of ideological and political education in courses.

is a systematic project that requires the joint efforts of many departments to complete. By clarifying the goals, constructing a "hierarchical and classified" content system, strengthening the construction of the teaching team, and improving the evaluation system, ideological and political education can be effectively integrated into the professional teaching of landscape architecture. This helps cultivate high-quality landscape architecture professionals and provide strong support for the sustainable development of the landscape architecture industry in the new era.

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