Research on the Construction of a Landscape Engineering Teaching Resource Library Under the "4321" Industry-Education Integration System

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Abstract: This paper studies and explores the construction of a teaching resource library for landscape engineering under the "4321" industry-education integration system, focusing on the construction objectives, construction paths, and construction contents, aiming to open-up the channel of school-enterprise cooperation, improve enterprise participation, and promote the reform of teaching mode and teaching methods. Establishing a practical resource library will connect and integrate students, teachers, and enterprises. A complete library of landscape-oriented teaching resources will be constructed according to the talent portraits of the industry to open-up the relationship between upstream and downstream courses, and further improve the precise fit between the cultivation of applied undergraduate talents and enterprises.

Keywords: Integration of production and education; Teaching resource library; Landscape engineering

1. Introduction

This study uses landscape engineering teaching content in the environmental design major as an example to explore the basic ideas of teaching resource library construction under the background of "school-enterprise cooperation and integration of industry and education." The structure of this resource library is explored and researched from the perspectives of possible resources to meet diverse needs, innovative service supply models, and students' lifelong learning. To guide students' learning motivation and professional aspirations, we will cultivate environmental design talents who can adapt to design, meet social service needs, and serve local economic development.

2. Construction goals

The construction goals of the resource library are as follows.

    (1)   The first goal is to break down the barriers between schools and enterprises and build information channels between schools and enterprises. Through the design of a specialized resource library, the

support of relevant intelligence empowerment, orderly management, and continuous updating, the school's knowledge and corporate project cases are connected in series to build a system that covers landscape construction drawings, construction preparations, construction organization, and on-site integration and coordination of industry back-end links for landscape construction technology management and process management, with the ability to transform "I learn" into "I know," and transform book knowledge into application in project practice scenarios. It dramatically reduces the professional information gap between schools and enterprises, thus allowing students to understand better and become familiar with actual work scenarios, and the production and operation model of landscape engineering through the corresponding teaching resource library.

(2) The second goal is to build a "library" with a "library" and build an expert database, project database, and case database for landscape engineering based on the teaching resource database to better implement the construction of the "4321" industry-education integration system. Through the establishment of the "three libraries" and the integration of online resources, the utilization and update of the resource library will be strengthened, and it will be built into an in-depth and shared teaching resource library with a specific demonstration effect [1-3] and become a learning center serving applied undergraduate education.

(3) The third goal is to combine innovative reforms in landscape engineering teaching methods, teaching models, and teaching content to effectively implement the close relationship between the teaching resource library and teaching. The disconnection between teaching content and teaching resource library should be avoided. The construction and exploration of the teaching resource library in the direction of environmental design and landscape engineering will be carried out through teaching to promote the library to supplement the teaching, and the teaching library to advance together, thereby improving the quality of environmental design, and related professional talent training and social service capabilities, and giving full play to the service-learning society construction role [4].

3. Construction path

3.1. Exploring a high-quality teaching resource library for landscape engineering teaching based on the "4321" industry-education integration system

To further implement the teaching concept of "serving local economic development and cultivating applied senior professionals" and deepen the talent training model of "school-enterprise cooperation, industry-education integration," we will explore the construction of the teaching resource library of the "4321" industry-education integration system. Starting from the concepts of "four modernizations," "three libraries," "two bases," and "one platform," the construction path of the teaching resource library is explored. "4321" mainly refers to the construction of "four modernizations," which are "case-based" professional teaching, "project-based" professional training, "post-based" professional internships, and "intelligent" teaching management; the construction of "three databases" includes expert databases, projects library, and case library; the construction of "two bases" includes on-campus internship bases and off-campus internship bases; "one platform" mainly refers to the intelligent teaching management and quality monitoring platform.

Based on this "4321" system, we focus on cultivating applied senior professionals, building a landscape engineering teaching resource library with leadership, guidance, practicality, integration, and adaptability, and completing the information series of students, teachers, and enterprises [5].

3.2. Deepening the construction of the three databases and achieving full coverage of landscape engineering and back-end management links

The three databases mainly refer to the expert, case, and project databases. Among them, the establishment of the expert database focuses on hiring experts from the front line of engineering management in the landscape industry to form an expert database, including the construction side during the construction process and senior industry experts from the construction side, who can better participate in professional setting, training plan revision, and teaching resource library development, construction, and other work to achieve effective connection between professional construction and industry talent needs. The focus of the case library relates to the teaching content, which is mainly derived from the landscape engineering management technology and the organization's actual production. It aims to serve the teaching objectives of the course and achieve the visualization, participation, and enterprise linkage of teaching knowledge points. The project library is driven by the "two bases" practical projects to effectively support and consolidate the professional knowledge of landscape engineering and the cultivation of professional application capabilities.

3.3. Adopting project management and establishing a practical project operation mechanism to ensure the sustainability of resource construction

It also involves developing management methods for practical training and practice projects, building a professional resource library management mechanism, strengthening resource construction process monitoring, clarifying rights and responsibilities, ensuring dynamic updates of construction content such as landscape engineering technology and management, and constantly updating resource platform technology to provide a stable and efficient resource library.

4. Matching enterprise standards and building a complete database of landscape engineering teaching resources

Landscape engineering teaching will start from the reality of social production, focusing on studying and exploring garden engineering construction technology, landscape engineering construction and organization, construction drawings, and other design back-end work. Therefore, landscape engineering teaching resource library needs to cover the entire chain of drawings, project engineering management, and project management, fully integrate with the enterprise's landscape construction management model, and accurately match the enterprise's employment needs.

4.1. Establishing "three databases" of landscape engineering based on social and industry development

Relying on the "4321" integration of industry and education, the "three databases" of teaching resources are established, focusing on connecting industry experts, teaching practice cases, and practical projects. Among them, the teaching practice case segment is constructed in a closed-loop manner according to the logical sequence before and after landscape engineering. Through the logical relationship between the before and after cases, students' understanding and mastery of the technical content of landscape engineering are strengthened, including industry-specific materials related to teaching content, such as construction texts, construction site photos, construction process videos, related technical animations, etc. At the same time, based on social and industry development, policy information is supplemented promptly, including national policies and regulations, industry introductions, industry information, new technology introductions, industry development plans, industry research reports, and other materials [6]. In addition, it also includes some guidance documents such as

occupational position analysis, talent training objectives, job ability standards, talent training plans, curriculum construction standards, teaching condition configuration, etc.

4.2. Establishing a resource library for the landscape engineering curriculum system

According to the talent training plan, the course resources of five courses are coordinated: "Design Drawing," "Landscape Engineering Technology," "Landscape Engineering and Organization," "Architecture and Environmental Design Research," and "Environmental Design Materials and Structure," summarizing the course introduction, course lectures, course standards, study guides, teaching design, teaching calendar, theoretical teaching, practical teaching, exercise bank, online tests, etc., in the resources of each course. Academic teaching takes knowledge points as units and consists of teaching resources such as teaching content, electronic lesson plans, teaching courseware, as well as case library resources such as pictures, teaching videos, three-dimensional animations, and knowledge expansion, as well as supplementary materials such as exercises and in-class tests; practical training teaching resources takes the "two bases" as the source of the project, it consists of project resources that are combined with work practice, such as practical training configuration, practical training guidance, construction process operation videos, and construction site inspections.

4.3. Micro-course resource library

Establishing the micro-course resource library focuses on expanding and supplementing traditional classroom teaching. It supplements the micro-course teaching videos based on the difficulty in restoring construction scenes in landscape engineering teaching. The focus is on supplementary explanations and scenes exhibition of on-site operations, and technical points of landscape engineering, in order to help students to better understand the knowledge points and promptly combine them with actual work scenarios to establish a work practice system for landscape engineering. At the same time, establishment of a micro-course resource library can be classified according to the types of landscape engineering business, and the classroom content can be supplemented in a more targeted manner. For example, the catalog construction of the micro-course resource library can be completed through the corresponding landscape engineering characteristics of different business types, such as parks, residences, and courtyard spaces [7].

4.4. Interactive knowledge base

The interactive knowledge base focuses on mutual construction between teachers and students. It encourages students to share their experiences and gains from classroom learning, practical training inside and outside the school, and project practice. It can include comprehensive information such as construction drawings, construction techniques, selection of construction materials, and primary material prices. At the same time, we can also share industry trends, new landscape materials, new technologies, new processes, etc., and take students as the main body to timely share and accumulate advanced consultation and information on the direction of landscape engineering from industries and enterprises, thereby forming a way of mutual assistance.

4.5. Creating an interactive platform

Through interactive platforms such as online forums and chat rooms, teachers can answer students' questions in time, understand students' learning progress and difficulties, and adjust teaching strategies accordingly. At the same time, students can exchange learning insights and experiences to promote sharing and disseminating knowledge, including internship and employment opportunities, that can be shared within this platform.

5. Construction steps

5.1. Industry research to build accurate knowledge framework and talent portraits

The research below can be carried out to build accurate knowledge framework and talent portraits.

(1) Investigating typical jobs in industry enterprises, such as construction workers, project managers, construction specialists, etc., listing typical work tasks, summarizing them to form a portrait of talents in the direction of landscape engineering, and then building knowledge in the direction of landscape engineering. The framework makes the establishment of a teaching resource library more targeted.

(2) Investigating the current status of education and teaching resources in the field of landscape engineering at the undergraduate level and completing the corresponding analysis report based on the understanding system of Industry-Education Integration 4321.

(3) Student research includes fully exploring the difficulties and needs of students when learning landscape engineering-related courses and being "student-centered"; driven by the needs, it serves as an essential basis for the establishment of a teaching resource library to form a virtuous cycle, which uses the library to promote learning, and uses knowledge to build a library [8].

5.2. Step-by-step construction, gradual improvement, and continuous updating

The step-by-step and gradual construction of the resource library is as follows.

(1) Establishing a teaching resource library system based on the knowledge framework in landscape engineering, industry development trends, talent portraits, and other information obtained from the survey.

(2) Developing guiding documents such as teaching resource library construction standards and corresponding resource template requirements. At the same time, special exchange training will be conducted for large curriculum system builders and teaching resource database maintenance personnel, and the corresponding resource construction catalog will be compiled and completed.

(3) Integrating teaching courseware, pictures, animations, videos, related software, etc. The development, collection, integration, and uploading of learning materials are integrated into learning situation teaching resources for completing course teaching resources, reviewing, and publishing them.

(4) Carrying out centralized expert, case, and project databases construction. Completing the construction of the expert database according to the teaching resource database system framework, and then inviting experts to screen the case database and project database. Carrying out blanket reading and screening from full-process project cases to engineering technical detail pictures to ensure that the cases and projects can effectively support the teaching objectives and keep up with the pace of industry development. The resource allocation of the project library mainly includes two aspects. On the one hand, it is the technical standards of high-quality engineering projects in the industry; on the other hand, it is the actual projects in the training base inside and outside the school. It also includes the project's front-end and back-end resource expansion, such as construction drawings, design plans, organization plans, and budgets.

(5) Gradually improving the micro-course resource library, combining relevant course syllabuses and teaching schedules, supplementing micro-course resources for key and complex construction technology and management issues. It also includes breaking through the limitations and constraints of the traditional classroom teaching model, and relying on the teaching catalog, as well as building a retrieval catalog of resources in the library to improve the pertinence and operability of students' independent learning. Plus, it also includes emphasizing the "Internet +" advantages of micro-courses [9] and implementing the "intelligent" among the "4321" four modernizations.

(6) Building an interactive knowledge base based on the operation of the above resource bases. This base is more student-centered and encourages students to learn, practise, and train in industry trends and new technologies related to the direction of landscape engineering; new materials and other information can be shared, and students' exchange and interaction meetings can be organized regularly based on the sharing of resources to lay a solid foundation for the online interactive communication platform.

Through the gradual construction of the above complete library of teaching resources in the direction of landscape engineering, the "4321" concept of integrating industry and education can be fully implemented, and the integration of information resources from the teaching end to the practical end in classrooms, enterprises, and industries can be truly achieved.

6. Promoting trials and collecting feedback

After the initial construction of the teaching resource library is completed, stop checkpoints are set up, and experts in the expert library, industry-related practitioners, and key teachers of the relevant curriculum systems in the school are organized to review and discuss the preliminary content of the teaching resource library, and draw optimization opinions for the next step. After the rectification, it will be released to enter the trial operation stage. Regular evaluation and feedback on the resource library is conducted to understand the usage of the resource library by students and teachers as well as existing problems and deficiencies, and make timely improvements and adjustments [10]. At the same time, during the promotion and trial process, it is necessary to collect user feedback and actively understand students' needs. Continuously improving and optimizing the functions and content of the teaching resource library can increase the user satisfaction.

7. Carrying out regular maintenance and updates

Regular maintenance and updates should be performed.
(1) Regular backup: The teaching resource library is backed up to prevent data loss or damage.
(2) Data cleaning: Expired, invalid, or low-quality data in the teaching resource library are regularly cleaned up to improve the quality and usability of the data.
(3) Content update: The case library and project library are updated timely based on industry trends, process development, and related material technology updates in landscape engineering, and the teaching resource library is updated timely in conjunction with subject development, teaching models, innovations in teaching methods, etc.
(4) Audit system: An audit system is established to ensure new content added to the teaching resource library meets the standards and eliminate possible errors or problems.
(5) Permission management: A permission management mechanism for the entire teaching resource library is established and different permissions for different users (such as students, teachers, administrators, etc.) are set to ensure the security and reliability of the teaching resource library.
(6) Removal of redundancies: Redundant files or outdated resources in the teaching resource library are regularly removed to free up the storage space and improve system performance.
(7) Software updates: Software and operating systems are regularly updated to patch possible vulnerabilities and improve system functionality.
(8) Training mechanism: A manual for using the teaching resource library is prepared and regular special training on using and maintaining it is provided to teachers, students, and administrators to improve

its efficiency and effectiveness.

(9) Feedback mechanism: A feedback mechanism is established to encourage students, teachers, and administrators to provide suggestions and opinions on the teaching resource library for improvement, and optimize its performance and services continuously.

8. Conclusion

Constructing a teaching resource library for landscape engineering can closely connect the classroom with the industry and provide a wealth of teaching resources, including design drawings, construction flow charts, field project photos, teaching videos, practical projects, and other diversified resources. These resources can help students to better understand the theoretical knowledge of landscape engineering and improve the quality of teaching. At the same time, students can learn more about the design plans and engineering technologies by watching landscape engineering cases in different projects and regions, which will help to broaden their horizons and enhance their practical capabilities. Lastly, the landscape engineering teaching resource library is also a platform for information exchange. Teachers, students, and companies can share information and experiences through this platform to better implement the "4321" concept under the industry-education integration system.

Funding

Disclosure statement

The authors declare no conflict of interest.

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