Research and Practice on Teaching Reform of the "Landscape Botany" Course in the Context of New Agricultural Sciences

Yang Gao

College of Urban, Liaoning Communication University, Shenyang, 110136, Liaoning, China

Keywords: Landscape Botany, Course Teaching, Reform Research

Abstract: "Landscape Botany" is a compulsory course for the landscape architecture major, characterized by its strong theoretical and practical components. Traditional teaching methods can no longer satisfy students' needs for learning landscape botany. In response to the emerging teaching challenges, this paper conducts research on curriculum teaching reform, aiming to pave a new path for this course and thereby achieve the goal of education.

1. Introduction

As a crucial component of landscape architecture, garden plants not only enhance the beauty of the environment and improve the ecology but also provide people with delightful visual enjoyment and comfortable living experiences. Through the study of landscape botany, we can gain a better understanding of plant characteristics, enable us to select and arrange plants judiciously to create diverse, ecological balance, and artistically compelling garden landscapes.

"Landscape Botany" is a core and compulsory course for the landscape architecture major, characterized by its strong theoretical and practical components. It is also a part of the project package and plays a significant role in the talent development program. The course primarily covers four areas: landscape botany, dendrology, floriculture, and planting design. Through this course, the students are expected to master the morphological characteristics, systematic classification, ecological habits, geographical distribution, and landscape uses of garden plants. Given the extensive and fragmented knowledge system of the course, the voluminous teaching content, and the fact that all classes are scheduled within a single semester, students may find the course monotonous and tedious inevitably, which may hinder the expected outcomes of talent development. Therefore, conducting reformative research on the current issues in course teaching holds practical value for the development of applied undergraduate education and the teaching system at large.

The construction of the New Agricultural Science aims to establish a talent cultivation system targeted at fostering a new type of agricultural and forestry professionals who are knowledgeable about and devoted to agriculture. It emphasizes the systematic, holistic, and coordinated advancement of talent development. Under this objective, through the research and practice of teaching reform in the "Landscape Botany" course, proposed improvement measures and construction strategies will facilitate the effective implementation of the course. This approach is conducive that enhancing students' interest in learning about landscape plants, integrating theory with practice effectively, and providing valuable insights for course construction and the deepening of teaching reform and development.

2. Research status at home and abroad

With the in-depth advancement of globalization and the rapid development of the knowledge economy, higher education is facing new challenges and opportunities. The development trend of curriculum and teaching reform in colleges and universities is crucial for cultivating high-quality talents with an international perspective and innovative ability. Foreign universities pay more attention to the diversification of course settings, adding many interdisciplinary courses, online courses and practical courses on the basis of traditional courses. In addition, they also emphasize the personalized setting of courses, providing a large number of elective courses and personalized

  DOI: 10.25236/icssem.2025.050

professional directions, allowing students to freely choose according to their interests and career plans, fully reflecting the educational concept of teaching students in accordance with their aptitudes. This not only reflects the new concepts of contemporary education, but also provides ideas for reform and development for us. We must earnestly promote the integration of science and education, add science education in the "double reduction" of education, sow the seeds of science, stimulate the curiosity, imagination and inquisitiveness of teenagers, and cultivate a group of teenagers with the potential of scientists and willing to devote themselves to the cause of scientific research. In response to this important speech, many institutions have started blind online teaching without in-depth interpretation. With the development of online teaching resources such as MOOCs and Rain Classroom, as well as the development of various plant identification APPs, the convenience of students' learning of garden plants has been greatly improved to a large extent. However, at the same time, the problem of students' "high eyes and low hands" in learning has become increasingly serious. Therefore, the teaching of "Botany of Garden Plants" is facing huge challenges and opportunities. For the talent cultivation and future employment of application-oriented universities, its teaching methods need to be further reformed and improved to adapt to the new changes and requirements of the industry.

3. Problem

3.1 Traditional education still predominates

Traditional education emphasizes teacher-centered knowledge impartation, where students assume a passive role in the learning process. The conventional assessment methods predominantly rely on summative evaluations, primarily in the form of examinations that test students' memory and exam-taking skills. There is little to no emphasis on formative assessment of teaching effectiveness, or it is minimally addressed through attendance, routine assignments, or classroom performance evaluations [1]. Moreover, the traditional teaching model is characterized by a one-way transmission of knowledge from teacher to student, with the teacher at the helm. Educators often resort to a continuous "output" of prepared knowledge through PowerPoint presentations in class. However, this approach overlooks the students' knowledge base and their capacity to absorb information, neglecting the stimulation of students' initiative and the cultivation of their professional competencies. As a result, students lack the drive for active exploration of specialized knowledge. Compounded by the fact that the assessment method for the "Landscape Botany" course is almost exclusively examination-based, the vast amount of knowledge to be mastered dampens students' enthusiasm for learning. The mere passive reception of knowledge leads to suboptimal learning outcomes.

3.2 The teaching model is monotonous

In conventional theoretical teaching, the typical approach is "the teacher lectures, and the students listen," while in practical teaching, it often follows the pattern of "the teacher leads, and the students follow; the teacher explains, and the students take notes." This passive mode of learning—where students merely listen, memorize, and regurgitate—makes it difficult for them to truly understand and master the relevant knowledge. For complex or challenging concepts, teachers should strive to leave a lasting impression on students. Creating a memorable learning experience starts with the appeal of the course materials. Many teachers treat their presentation slides as mere cue cards, putting little effort into lesson preparation and simply reading aloud from text-heavy slides, often devoid of images. How can such uninspiring materials leave a deep impression on students? To engage students effectively, teachers must design visually appealing and interactive presentations that stimulate curiosity and facilitate comprehension, ensuring that key concepts resonate long after the lesson ends.

3.3 The cultural aspects of plants have not been deeply excavated

Throughout the long history of plant cultivation and utilization by humans, plants have been

closely intertwined with human life. Influenced by and integrated with other cultural elements, they have given rise to a wealth of related plant cultures. These include dietary cultures associated with the edible and beverage values of plants, as well as ideological cultures that reflect traditional human values, aesthetic tastes, philosophical consciousness, and spiritual pursuits [3]. In the curriculum of landscape botany, the cultural connotations of plants indeed represent a field ripe for deeper exploration. The culture of plants encompasses not only history, literature, art, and religion but is also closely linked to regional cultures and folk traditions. As culture embodies the realm of artistic conception, each plant carries its own unique cultural significance. Infusing plant culture into teaching and integrating it into the ideological and political aspects of the curriculum holds profound educational significance for students [2].

In the course of garden botany, plant culture is an important component. Howevzer, many current courses do not delve deeply enough into plant culture. For instance, there is insufficient coverage of the roles plants have played in history and their cultural symbolic meanings, such as the symbolic significance of plum, orchid, bamboo and chrysanthemum in Chinese culture. Also, there is a lack of in-depth exploration of the evolution of plant culture over time. Moreover, there is insufficient connection to regional culture, with few courses touching upon the unique status of plants in different regional cultures, such as the symbolic meaning of the olive tree in Mediterranean culture. Additionally, there is a scarcity of discussion on the representation of plants in art forms such as literature, painting and music, and insufficient introduction to plants with local cultural characteristics and their cultural connotations. Furthermore, there is a lack of exploration from the perspective of ecological culture on the relationship between plants and humans, as well as insufficient introduction to the application of plants in traditional ecological wisdom and practices. In fact, the discussion on the dissemination and integration of plant culture in the context of globalization is still insufficient. In the future, teaching should be strengthened in aspects such as historical culture, regional culture, literature and art, folk customs and religions, ecological culture, and cross-cultural comparisons, in order to comprehensively enhance students' cultural literacy and comprehensive abilities.

3.4 Unreasonable assessment methods

There are numerous knowledge points in the subject of Ornamental Plant Science. Teachers merely impart knowledge and draw diagrams during classes, devoting all their energy to drawing. Students are not interested in the dull text in the books, and many specialized terms are not fully understood by them. They rely on rote learning to pass the exams but fail to apply the knowledge flexibly. Students who memorize well tend to achieve higher grades, while those who do not put in the effort to memorize tend to score lower. However, this does not necessarily mean that the latter did not learn well during the semester. Therefore, this simple examination method to assess students is not scientific. Moreover, rote learning cannot foster students' self-study and innovative abilities. It is unfair to evaluate students' achievements for the entire semester in this way. It is like depicting a vibrant plant as a dead tree, which is not the purpose of the talent cultivation plan. This will have the opposite effect.

3.5 Unscientific course arrangement

Currently, this course is offered as a single course with a total of 64 class hours, including 48 hours of theoretical teaching and 16 hours of practical teaching. However, due to the vast amount of knowledge and numerous plant species involved, such as their morphological characteristics and landscape uses, it is difficult for students to digest all the information within one semester. If all the knowledge and plant varieties are covered before practical teaching, the plants in the northern region will be in a state of winter dormancy, missing the best viewing season. Conversely, if practical teaching is conducted before the National Day, many plant knowledge and varieties have not been covered yet, making it difficult to focus on the key points and losing the significance of practical teaching. Plants are living organisms and different from other subjects. To understand their morphological characteristics, at least one year of observation is required, which reflects the seasonal nature of ornamental plants.

4. Method

4.1 Establish a new teaching philosophy and transform "passive" learning into "active" learning

To reform the course teaching model, the first step is to consider the recipients of the education—the students. Conducting an analysis of the student cohort reveals that the students enrolled in this semester's course are 2022-level undergraduate landscape architecture majors. They exhibit a serious attitude towards learning and possess active minds, but they lack any foundational knowledge of plants. In light of this analysis, it is imperative to alter the traditional teaching model by incorporating methods such as the flipped classroom and group discussions. These approaches aim to transform students from passive recipients of knowledge into active contributors, thereby enhancing their enthusiasm and initiative in learning.

Before each class, one student is assigned to present a specific plant. In preparation, the student must research relevant materials and images, gather pertinent information, and then organize and integrate this knowledge. After completing these tasks, the student presents their findings to the class. Since each student has their unique presentation style, this method introduces a fresh perspective to each session. Following the presentation, the student must field questions from their peers, addressing any unclear points or insufficiently detailed explanations. This process not only fosters greater interaction among students but also broadens the scope of the course content, breaking away from traditional teaching paradigms.

4.2 The teaching model should be diversified

The teaching model should be diversified. Introducing a blended online and offline teaching model to construct the "Landscape Botany" course system not only broadens the professional perspective of the course but also continuously enriches the forms, methods, and means of teaching. Moreover, offline interactions strengthen the exchange of information and interaction between teachers and students [3].

Utilizing the Chaoxing platform to create online courses or establish cross-institutional course enrollment allows for the exchange and study of courses from other universities. This enables students to engage in online learning during their spare time. By receiving instruction from teachers at two different institutions for the same course, students gain a deeper understanding. Additionally, online instructors may also conduct in-person classes for the enrolled students. Through the utilization and study of network resources from different institutions, teaching resources are expanded, and friendships between universities are fostered.

Utilize AI for intelligent teaching, such as intelligent lesson preparation systems, online Q&A systems, etc. These tools can help teachers improve their efficiency in preparing lessons, answer students' questions in a timely manner, and enhance teaching quality; Collect students' learning data through AI technology, including learning duration, click rate, accuracy rate, etc. Conduct in-depth analysis of these data to understand students' learning habits and needs, providing a basis for curriculum optimization. Based on students' feedback and data analysis results, the course content is constantly updated and optimized. Introduce the latest research results and technological progress to maintain the timeliness and cutting-edge nature of the curriculum. For example, when students are asked to draw the shape of a plant, they will use AI to understand the morphological characteristics and ecological habits of the plant, and then draw a picture of the plant based on their own understanding.

It is possible to engage in school-enterprise cooperation by signing agreements with multiple landscaping and horticulture enterprises, and regularly organizing students to participate in practical learning at these companies. Given the close relationship between enterprises and the market, students can gain a better understanding of market demands through the production trends of the companies, and adjust their own knowledge structure to meet the needs of industry development. Through practical experience in enterprises, students can better comprehend and apply the knowledge they have learned, cultivate innovative thinking, and even rationally develop and utilize surrounding resources to generate economic value. Practical teaching is an experiential activity

centered around the objectives of educational and teaching activities. By adopting a cooperative approach with enterprises, we can tailor the cultivation of talents to the specific needs of the companies, emphasizing the practicality and effectiveness of the talents, which can compensate for the shortcomings of classroom education.

4.3 Course ideological and political education achieves' moistening things silently '

"Every class not only imparts knowledge but also spreads virtue." "If the younger generation has ideals and takes on responsibilities, the country will have a bright future and the nation will have hope."

Chinese civilization contains a profound and extensive plant culture. The significance of plant culture lies in its expression of thoughts and emotions, as well as its carrying of spiritual sustenance through flowers, grass, trees and plants. It embodies the virtues of being positive and virtuous, and comparing the qualities of a gentleman to those of plants. It not only records the historical experiences, emotional preferences and interests of our ancestors, but also guides and changes people's spiritual world at the ideological level, and shining with the spiritual light of human society.

Flowers, grasses and trees carry people's boundless emotions. Traditional Chinese culture often expresses sentiments and conveys meanings by drawing inspiration from the plants around us. For instance, when explaining the flower carnation, students all know that it is used on Mother's Day in foreign countries, but they are unaware that the flower used on Mother's Day in China is the daylily. The daylily has been regarded as the flower of mothers since ancient times, symbolizing love and remembrance for mothers. It is also known as the "forget-your-troubles" grass, representing "forgetting all unpleasant things", letting go of worries and hidden feelings. Therefore, one of its flower meanings is "forgotten love". By playing the song "Daylily" on the screen, students are encouraged to think about the love their mothers have shown them and whether they expressed their love to their mothers on this year's Mother's Day. This leads students to associate with the love their mothers have given them, making them aware of gratitude and the importance of respecting their mothers. All of this is carried out on the basis of knowledge explanation, but it transitions very naturally. In this way, ideological and political education is subtly integrated into the course, achieving the goal of nurturing students.

4.4 Implementing project-based teaching assessment

The project-based teaching method was first introduced in the book "Project-Based Teaching Method" co-authored by American educator Katz and Canadian educator Chard [4]. It is a student-centered teaching approach that transforms various knowledge points in the traditional curriculum system into multiple course projects. Teaching is conducted around these projects, allowing students to participate throughout the process. According to the project package requirements, project-based teaching is carried out, and students are assigned different tasks. They start with practical tasks, conducting preliminary research, on-site investigations, data collection, data organization, data comparison, and drawing conclusions. This method enhances students' ability to apply theory to practice rather than relying solely on imagination. By completing a project, students can personally experience the importance of the knowledge they have learned and apply it purposefully. Using the project teaching package of application-oriented universities as a carrier, students conduct landscape design for courtyards, squares, residential areas, and parks. They conduct on-site investigations of actual projects, transform the knowledge and skills learned in class, and apply them to practice, achieving a combination of theory and practice.

4.5 Reasonable arrangement of course structure

Some domestic universities, represented by Beijing Forestry University, have divided the teaching content of landscape ornamental plant science into "Ornamental Trees" or "Ornamental Botany" and "Floriculture"; while some universities, represented by Huazhong Agricultural University, have divided it into the compulsory course "Ornamental Trees" and the elective courses "Floriculture" and "Ornamental Tree Cultivation" [5]. These examples demonstrate that ornamental

plant science is not an independent discipline but is composed of many sub-disciplines. Each discipline should be arranged for study in different semesters to enable students to have a better understanding and research of ornamental plants. Therefore, it is necessary to divide the course "Ornamental Plant Science" into different sub-disciplines and arrange them for teaching in different semesters.

5. Conclusion

Through the research and practice of reforming the "Horticultural Botany" course in terms of teaching content, teaching methods and assessment methods, the teaching quality of the course can be effectively improved, students' learning interest and initiative can be stimulated, and students' practical ability, innovative thinking and comprehensive quality can be cultivated. At the same time, by strengthening the construction of the teaching staff, the construction of practical teaching bases and the construction of teaching materials and other guarantee measures, strong support can be provided for the smooth implementation of the course reform. The reform of the horticultural botany course is a continuous process, which requires continuous summary of experience in teaching practice and further optimization of reform measures to adapt to the rapid development of the horticultural industry and the demand for high-quality talents.

References

[1] Yu Ting, Yang Yi. "Discussion on the Reform of the Assessment Method of 'Botany of Ornamental Plants' Centered on Students". Modern Horticulture, vol. 8,pp. 198 , 2024.

[2] Zhang Mingcan, Lin Ping, Pan Gengyun, et al. Plant Culture and Modern Garden Plant Configuration. Anhui Agricultural Sciences, vol.38, no. 5, pp. 2701-2703, 2010.

[3] Ji Zhiqing. Research on the Application of Online and Offline Blended Teaching Mode in the Teaching of "Botany of Landscape Gardening" in Environmental Design Major. Modern Business Trade Industry, vol. 9, pp. 16, 2021.

[4] Guo Ajun, Wei Jinhua, Zhao Yan. Curriculum Design and Application of "Plant Configuration and Landscaping" Based on Project-Based Teaching Method. Heilongjiang Science and Technology Information, no. 3, pp. 65, 2015.

[5] Liu Shiyao. New Ideas for Curriculum Education Reform and Construction under the New Discipline Positioning: Taking Landscape Botany of Landscape Architecture as an Example . Housing and Real Estate, pp. 225, November 2017.