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# Exploration on the Construction of Wisdom Classroom for Biological Science Majors

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**Abstract:** With the advancement of education information technology, smart classrooms, as a new teaching mode, have been paid more and more attention in college teaching. This paper focuses on the teaching characteristics of biological science majors and deeply discusses the building elements of a wisdom classroom in teaching this major. Through the discussion of teaching design, teaching resources, interactive teaching, and other aspects, the paper puts forward the specific strategies of the construction of a smart classroom. Combined with practical cases, it verifies the remarkable effect of the smart classroom in improving the teaching effect of the biological science major and promoting students' innovative thinking ability. The purpose of this study is to provide theoretical support and practical guidance for the construction of a smart classroom for biological science majors and other related majors.

**Keywords:** Smart classroom; Biological science major; Education informatization

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## 1. Introduction

With the deepening of education reform, the traditional classroom teaching model can no longer meet the needs of talent training in the new era. In this context, the smart classroom came into being and has become an important breakthrough in education reform [1]. In recent years, with the rapid development of biological science, biotechnology has become an important part of the national strategic emerging industries, and the demand for biological science professionals is growing. However, there are some limitations in the traditional teaching mode of bioscience in cultivating students' innovative ability and practical ability. As a teaching mode integrating modern information technology, the smart classroom provides a new idea for the teaching reform of the biological science major [2]. By optimizing the distribution of teaching resources and realizing the sharing of resources with the help of information technology, a smart classroom effectively reduces the cost of education [3]. At the same time, smart classroom plays an important role in cultivating students' innovative thinking, practical skills and comprehensive qualities, which is highly in line with the goals of the current education reform, especially in biological sciences, where the cultivation of these abilities is crucial for students' future career development [4]. Therefore, an in-depth discussion of the construction and development trend of smart classrooms

has far-reaching theoretical value and practical significance for promoting education reform.

## 2. Building elements of smart classroom for biological science majors

### 2.1. Teaching objectives of wisdom classroom construction

In the process of building a smart classroom for biological science majors, the setting of teaching objectives should be forward-looking and closely follow the latest research progress and technological innovation in the field of biological science. This aims to ensure the development of professionals who can meet the needs of society in the future. Specifically, the teaching objectives of the Wisdom Classroom for bioscience professionals cover three core areas. The first is the knowledge objective, which aims to enable students to fully master the basic theories, core knowledge and key skills of biological science, and keep pace with the frontier of the subject. Through interactive and inquiry-based learning, students will deepen their understanding of biological science concepts and improve their ability to apply knowledge. The second is the ability goal, which aims to train students to have experimental operation skills, data analysis ability, scientific inquiry method, critical thinking ability and innovative problem-solving ability. At the same time, the application of information technology and interdisciplinary collaboration ability should be strengthened to ensure that students can effectively use the knowledge and skills they have learned in future scientific research work or practice in related fields, to maximize their personal and social value. The last is the quality goal, which aims to comprehensively improve students' comprehensive quality, including scientific literacy, teamwork spirit, independent learning ability and social responsibility, as well as strengthen innovation awareness and practical ability. Through the realization of these goals, the aim is to shape biological science professionals to meet the needs of modern social development [5].

### 2.2. The teaching content of smart classroom construction

In the process of building a smart classroom for biological science majors, the selection and design of teaching content must be closely related to the characteristics and development trend of the biological science field. First of all, the teaching content should be scientific and systematic, covering the basic theory, core knowledge and experimental skills of biological science comprehensively, so as to ensure that students can build a solid professional foundation. Secondly, the teaching content should highlight its cutting-edge and contemporary nature, be updated in time, and integrate the latest scientific research results and technological developments into the curriculum, so that students can timely understand and master the latest developments in the field of biological sciences. Thirdly, the teaching content should emphasize practicality and application, and cultivate students' ability to transform theoretical knowledge into practical application through case teaching, project-driven, experimental operation, and other teaching methods, to enhance students' practical operation skills and problem-solving ability. In addition, the teaching content should be extensible and flexible, by providing rich online resources, interactive platforms and personalized learning paths, to meet the learning needs and interests of different students, and promote the personalized development of students and the cultivation of lifelong learning ability. Finally, the design of teaching content should focus on interdisciplinary integration, encouraging students to combine their knowledge of biological sciences with other subject areas such as mathematics, physics, chemistry and information science, so as to cultivate compound talents with innovative thinking and interdisciplinary problem-solving abilities [6].

## 2.3. The teaching method of smart classroom construction

In the process of building a smart classroom for biological science majors, teaching methods, as the key means to achieve educational goals, must be closely combined with modern information technology to establish a student-centered teaching concept. First of all, interactive teaching constitutes one of the core features of a smart classroom. With the help of an intelligent teaching platform, teachers should effectively promote teacher-student interaction and collaboration among students through online discussion, real-time question-and-answer, group cooperation and other forms, so as to stimulate students' enthusiasm for learning and awareness of participation [7]. Secondly, as a typical model of smart classroom, blended teaching skillfully integrates online resources with traditional offline teaching, and makes use of digital textbooks, online courses, virtual laboratories, and other rich resources to achieve seamless connection inside and outside the classroom. In addition, the case teaching method plays a crucial role in the smart classroom. By analyzing real biological science cases, students can combine theoretical knowledge with practical problems, thereby improving their ability to analyze and solve problems. Finally, experimental practice teaching, as an indispensable part of biological science professional education, intelligent classrooms should use virtual simulation technology to simulate the experiment process, so that students can carry out experiments in a safe virtual environment to enhance their practical skills.

## 2.4. Teaching evaluation of smart classroom construction

In the process of building a smart classroom for biological science majors, a perfect teaching evaluation system should be comprehensive, scientific, real-time, and developmental, to meet the specific characteristics and needs of smart teaching. First of all, the wisdom classroom teaching evaluation emphasizes the use of diversified evaluation methods. In addition to the traditional written test and experimental operation exam, it also includes online tests, oral reports, group projects, learning logs and other forms, so as to comprehensively evaluate students' comprehensive qualities such as knowledge mastery, practical ability, innovative thinking, and teamwork. Secondly, the teaching evaluation of the wisdom classroom focuses on the process evaluation. Through the intelligent teaching platform, teachers can track students' learning behavior, participation, and learning progress in real time, make formative evaluation of students' learning process, find problems in time and provide guidance. The teaching evaluation of smart classrooms aims to provide customized learning suggestions and growth paths for each student, and help students find their interests and strengths in the field of biological science [8]. To sum up, the teaching evaluation of the biological science professional wisdom classroom is a comprehensive, dynamic and developmental process.

# 3. The strategy of building smart classroom for biological science majors

## 3.1. Curriculum design strategies for the construction of smart classroom

In the smart classroom for biological science majors, the core of the course design strategy lies in the deep integration of modern educational technology and biological science teaching content, aiming to create an efficient and interactive learning environment. Course design should follow the principle of reverse design, start from the expected learning outcomes, clarify the course objectives and ability requirements, and ensure that the teaching content is consistent with the development trend of the industry and the needs of students' career development [9]. By constructing a hybrid learning model, online resources are organically integrated with offline activities, and means such as multimedia and network platforms are utilized to expand the spatiotemporal scope of teaching. In the course design, special emphasis should be placed on practicality and inquiry. Through

teaching means such as virtual laboratory and case analysis, students can deeply master biological science knowledge in simulated practice. The curriculum evaluation system should adopt diversified strategies, combine process evaluation and summative evaluation, and comprehensively evaluate students' learning effectiveness. By implementing these strategies, smart classrooms for biological sciences majors can significantly improve the quality of teaching and produce talents in the biological sciences who can adapt to the challenges of the future.

## 3.2. Teaching resource strategies for smart classroom construction

Teaching resource strategy occupies a core position in the strategy of building a smart classroom for biological science majors, which aims to significantly improve the teaching effect by optimizing the allocation of resources. The diversification of teaching resources is the key to achieving this goal, which should cover various forms such as teaching materials, online resources, experimental materials, video lectures, etc., to adapt to students with different learning styles and needs. The integration and sharing of resources is an important way to realize the optimal utilization of resources. A perfect resource library should be established, and the quality resources should be carefully classified and sorted out, so that teachers and students can quickly retrieve and effectively use these resources. At the same time, the dynamic update of teaching resources cannot be ignored, and the latest research progress and technological dynamics in the field of biological science must be closely followed to ensure the timeliness and advanced nature of resources [10]. In addition, the interactive and experiential nature of resources should be strengthened, and cutting-edge technologies such as virtual reality and augmented reality should be utilized to provide students with an immersive learning experience. Personalized and customized teaching resources are also a part that cannot be ignored. Through data analysis, we can deeply understand students' learning preferences and push customized learning content. Through the implementation of these strategies, the biological science professional wisdom classroom will be able to provide students with rich, efficient and personalized learning resources, so as to effectively improve the teaching quality and learning effectiveness [11].

## 3.3. Interactive teaching strategies for smart classroom construction

An interactive teaching strategy plays a crucial role in the construction strategy of a smart classroom for biological science majors. To achieve this goal, the strategy advocates the use of a range of flexible and diversified interactive teaching methods, including but not limited to discussion teaching, group cooperative learning and role playing, which are designed to stimulate students' critical thinking and effective communication skills. At the same time, with the help of modern information technologies, such as online question-and-answer platforms, instant feedback systems and interactive multimedia tools, the strategy effectively breaks through the limitations of time and space in traditional teaching and promotes smooth communication and exchange between teachers and students [12]. The interactive teaching strategy also emphasizes the transformation of the teacher's role from the traditional knowledge transmitter to the guide and facilitator of the learning process. In addition, the strategy encourages the active participation of students and enables them to learn and explore in real operation through practical teaching activities such as project-based learning and experimental design [13]. Through the implementation of these interactive teaching strategies, the wisdom classroom for biological science majors can create a dynamic and efficient learning environment, which can promote the overall improvement of students' comprehensive quality.

## 4. Practice cases of smart classroom for biological science majors

In a biological science major at a university, a team of teachers is committed to innovative teaching of Molecular Biology. Based on the advanced concept of "Internet Plus", they have carefully built a bilingual wisdom classroom [14]. The implementation of this teaching model aims to promote the innovation of molecular biology teaching concepts, the diversification of teaching forms, and the systematic cultivation of biological science thinking. Through this series of educational reforms, it can not only comprehensively improve the quality and level of teaching but also effectively optimize the current teaching situation and further stimulate the potential of students to carry out deep learning.

In the bilingual wisdom classroom, teachers make use of multimedia and network resources to combine traditional classroom teaching with online interaction, providing students with a more vivid and intuitive learning environment [15]. Students can preview the course content through the online platform, while in class, group discussions and case studies are used to delve into cutting-edge issues in molecular biology. In addition, teachers encourage students to participate in scientific research projects, combining theoretical knowledge with practice to cultivate their ability to innovate and solve practical problems. The implementation of this teaching model not only improves students' interest in learning but also strengthens their understanding and application ability in the field of biological science.

## 5. Conclusion

In the process of higher education teaching reform, the construction and exploration of a wisdom classroom for biological science majors is a fruitful attempt. Practice has proved that a smart classroom has significant advantages in improving teaching effect and cultivating students' comprehensive quality. However, the construction of a smart classroom still needs to be explored and improved in practice. We expect more educators to devote themselves to the research and practice of a smart classroom, and jointly promote the development of bioscience education.

## Disclosure statement

The author declares no conflict of interest.

## References


[1] Zhang Y, Zhang X, 2024, The Application of Smart Classroom in Teaching. China Modern Educational Equipment, 20: 70–72.

[2] Xu D, Wang Z, Guo D, et al., 2023, Thinking and Practice on the Reform of Biology Teaching Method in College. Zhejiang Medical Education, 22: 199–204.

[3] Yu H, 2022, Construction and Application of Smart Classroom Model in Biology Teaching. Biology Teaching in Middle School, 35: 19–22.

[4] Peng L, 2024, Research on Data-Driven Smart Classroom Precision Teaching Model. Modern Vocational Education, 30: 33–36.

[5] Chen Z, Liu G, Wu X, et al., 2016, Reflections on the Curriculum System Setting of Biological Science (Normal) Major in Local Colleges and Universities – A Case Study of Huizhou University. Journal of Hubei Correspondence

University, 29: 103–104.

[6] Gao J, 2023, Strategies for Constructing Intelligent Classroom Teaching Model in Colleges and Universities from the Perspective of Deep Learning. Education and Teaching Forum, 38: 145–148.

[7] Ni G, 2024, Research on Activity Structure Design and Practice of Deep Learning in Smart Classroom. Forestry Teaching, 12: 120–124.

[8] Yu H, Yin H, Liu M, 2021, Intelligent Classroom Teaching Evaluation System. Office Automation, 26: 6–8.

[9] Ren Y, 2023, Research on the Evaluation System of Smart Classroom Teaching Effect Under the Background of Big Data. Journal of Higher Education, 9: 91–94.

[10] Tao W, 2024, Intelligent Classrooms Inject Vitality into Collective Teaching. Primary School Science, 22: 142–144.

[11] Jin X, Xing B, Yang X, et al., 2019, Data Flow Mechanism and Ecosystem Construction of Smart Classroom. China Distance Education, 4: 74–81.

[12] Shao A, 2022, Teachers in the New Era Create "New Intelligent Classrooms." Forum on Basic Education, 27: 112.

[13] Yun Q, Xu S, 2012, Some Thoughts on Classroom Interactive Teaching Strategies. Journal of Shanxi Radio and Television University, 17: 3–5.

[14] Qi R, Guo X, Wu X, et al., 2021, Construction of Bilingual Molecular Biology Wisdom Classroom Based on "Internet +". Biology Teaching Research in Universities (Electronic Edition), 11: 21–25.

[15] Zhang C, Du C, 2018, Exploration and Practice of Bilingual Teaching in Molecular Biology Course for Graduate Students. Education and Teaching Forum, 17: 164–165.