Assessment System for Learning Effectiveness of Vegetable Cultivation Smart Classroom Based on Big Data Analysis

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Keywords: Big data analysis; Vegetable cultivation; Smart classroom; Assessment system of learning effect; Implementation strategy

Abstract: This article focuses on the "assessment system of intelligent classroom learning effect of vegetable cultivation based on big data (BD) analysis". Firstly, this article expounds the development trend of smart education and the application prospect of BD analysis in the field of education, points out the limitations of traditional education mode, and puts forward the necessity of building an assessment system for learning effect in smart classroom. Subsequently, the article defines the concept and characteristics of smart classroom, and clarifies its unique advantages in the teaching of vegetable cultivation. In the construction of assessment system, this article expounds the design principles and objectives, the construction of assessment index system and the application strategy of BD technology in detail, which provides scientific basis and practical methods for the assessment of learning effect in smart classroom. Finally, the article puts forward implementation strategies, including strengthening technical support and training, policy and financial support, and establishing cooperation and exchange mechanisms to ensure the smooth implementation of smart classrooms. This article holds that the assessment system of intelligent classroom learning effect of vegetable cultivation based on BD analysis is of great significance for improving instructional quality and promoting students' individualized development.

1. Introduction

In today's information age, with the rapid development of science and technology, all walks of life are experiencing unprecedented changes [1]. Especially in the field of education, the continuous emergence of emerging technologies has brought challenges to the traditional instructional mode, and also provided great opportunities for innovation [2-3]. Based on this background, this study aims to explore how to use advanced technologies such as BD to optimize the instructional process of vegetable cultivation and improve the learning effect of students.

The significance of this study is that by constructing a set of assessment system of smart classroom learning effect based on BD analysis, it can not only provide more accurate and individualized learning feedback for teachers and students, but also promote the optimal allocation of instructional resources and improve the overall instructional quality. This is of great significance for promoting the modernization of agricultural education and cultivating agricultural talents with innovative spirit and practical ability. The purpose of this study is to build a scientific and reasonable assessment system of learning effect through in-depth analysis of the current situation of the intelligent classroom of vegetable cultivation and the characteristics of BD technology.

In order to build an assessment system of intelligent classroom learning effect of vegetable cultivation based on BD analysis, we need to rely on a series of solid theoretical foundations. Learning theory provides us with important insights on how students learn and how to learn effectively [4]. Assessment theory provides us with a framework and method to build an assessment system. In addition, we also need to learn from the application research results of BD technology in the field of education to understand how to effectively collect, process and analyze learning data, and how to use these data to optimize the instructional process and improve the learning effect. These theoretical foundations will provide solid support for our research and ensure that our research can be carried out scientifically and reasonably.

  DOI: 10.25236/eeim.2024.028

2. Analysis on the present situation of wisdom classroom in vegetable cultivation

2.1. The concept and characteristics of smart classroom

As an advanced form of educational informatization development, smart classroom is based on traditional classroom and deeply integrates modern information technology, so as to realize comprehensive innovation in teaching content, methods, modes and management [5]. In the professional field of vegetable cultivation, intelligent classroom not only retains the essence of traditional classroom teaching, but also incorporates digital and networked teaching elements [6-7]. This makes the learning process more efficient and flexible. The intelligent classroom of vegetable cultivation is to provide students with individualized learning resources by using smart devices, online platforms and other tools. Futhermore, through data analysis technology, it can track students' learning progress and effect in real time and provide accurate teaching feedback for teachers.

Smart classroom shows unique advantages in the teaching of vegetable cultivation [8]. First of all, the interaction is significantly enhanced, and students can interact with teachers and other students efficiently through online discussion and instant question and answer, which promotes the in-depth understanding and application of knowledge. Secondly, individualized learning becomes possible, and the system can recommend suitable learning paths and resources according to students' learning habits and abilities, so as to help each student find the most suitable learning style. The richness of resources is also a major feature of the smart classroom [9]. Students can not only get access to the knowledge in textbooks, but also get the most cutting-edge scientific research results and practical cases through the Internet, which greatly broadens their horizons.

2.2. Practical cases of wisdom classroom in vegetable cultivation

Taking the intelligent classroom of vegetable cultivation in an agricultural university as an example, the school has realized the comprehensive digitalization of the instructional process by introducing the intelligent instructional system. In the classroom, teachers use electronic whiteboard to show the teaching content, and at the same time, combined with virtual reality technology, let students experience the whole process of vegetable planting. After class, students can finish their homework, watch teaching videos and participate in online discussions through the online platform. The system will automatically record students' learning behaviors and provide detailed learning analysis reports for teachers.

In the process of practice, some problems and challenges are also exposed. First of all, the difficulty of data collection can not be ignored. Because vegetable cultivation involves a lot of practical operations, how to collect students' learning data accurately and comprehensively has become a big problem. Secondly, the adaptability of teachers and students to new technologies is also a problem [10]. Some teachers and students are not proficient in the use of intelligent instructional system, which affects the teaching effect. Technology cost is also an important factor restricting the promotion of smart classroom, and the high equipment purchase and maintenance costs are a big burden for many schools.

3. Construction of the assessment system of the learning effect in the intelligent classroom of vegetable cultivation

3.1. Design principles and objectives of assessment system

When constructing the assessment system of the intelligent classroom learning effect of vegetable cultivation based on BD analysis, this article first clarifies the design principles. These principles are shown in Figure 1:

The goal of the assessment system is to improve the learning efficiency of the intelligent classroom of vegetable cultivation and promote teaching innovation through BD analysis. This article hopes that through the assessment system, problems and deficiencies in students' learning can be found in time, and accurate teaching feedback can be provided for teachers, so as to adjust

teaching strategies and optimize teaching contents and methods in time. This article also hopes that the assessment system can promote the sustainable growth of the intelligent classroom of vegetable cultivation, explore new instructional modes and methods and improve the overall instructional quality.

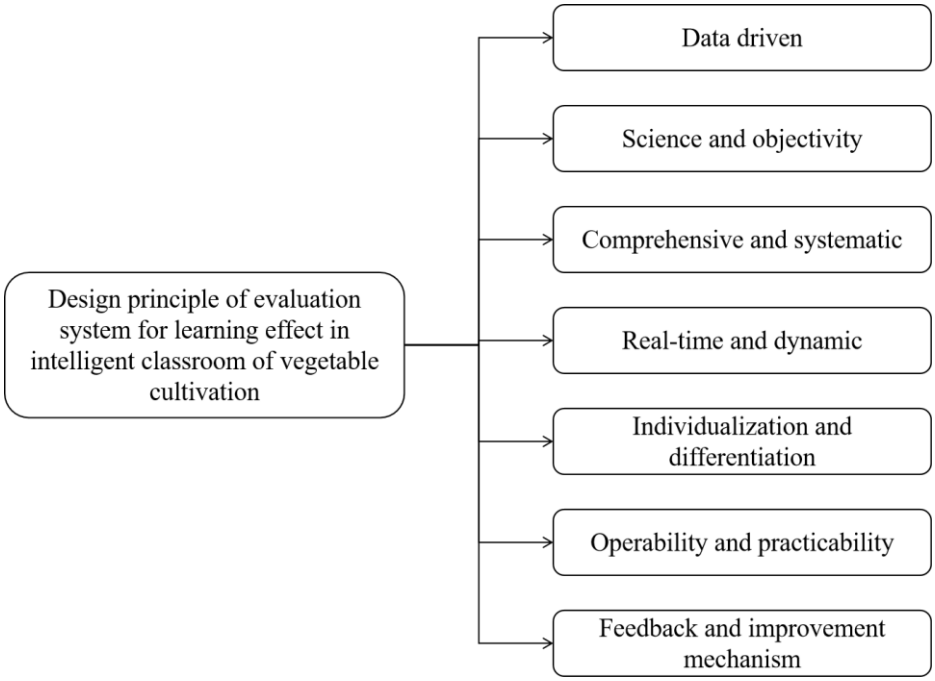

Figure 1 Design principles of assessment system of learning effect in smart classroom

3.2. Application strategy of BD technology

In the application strategy of BD technology, this article first pays attention to data collection and processing. Through the intelligent instructional system and online platform, we can efficiently collect students' learning data, including learning behavior data and learning effectiveness data. Futhermore, this article preprocesses the data, including data cleaning and data conversion, to ensure the consistency of the data.

In data analysis and mining, this article uses advanced data analysis tools and technologies to deeply analyze and mine students' learning data. Through these analyses, we can find the rules and patterns in students' learning and provide scientific basis for teaching adjustment and optimization. Finally, a feedback mechanism based on data analysis results is established. By regularly feeding back the assessment results of learning effect to teachers and students, we can guide the adjustment and optimization of teaching and ensure that teaching always follows the right direction.

3.3. Construction of assessment index system

In the construction of assessment index system, this article mainly starts from three dimensions: learning behavior data analysis, learning effectiveness assessment and individualized learning assessment. See Figure 2 for details:

In the aspect of learning behavior data analysis, this article selects key indicators such as online learning duration, interaction frequency and homework completion to reflect students' learning input and participation. In the aspect of learning effectiveness assessment, this article designs assessment indicators such as knowledge mastery, skill improvement and learning attitude change to comprehensively measure students' learning effectiveness. In the assessment of individualized learning, this article considers the satisfaction of students' individualized learning needs and evaluates the effectiveness of individualized learning paths to ensure that each student can get suitable learning resources and guidance.

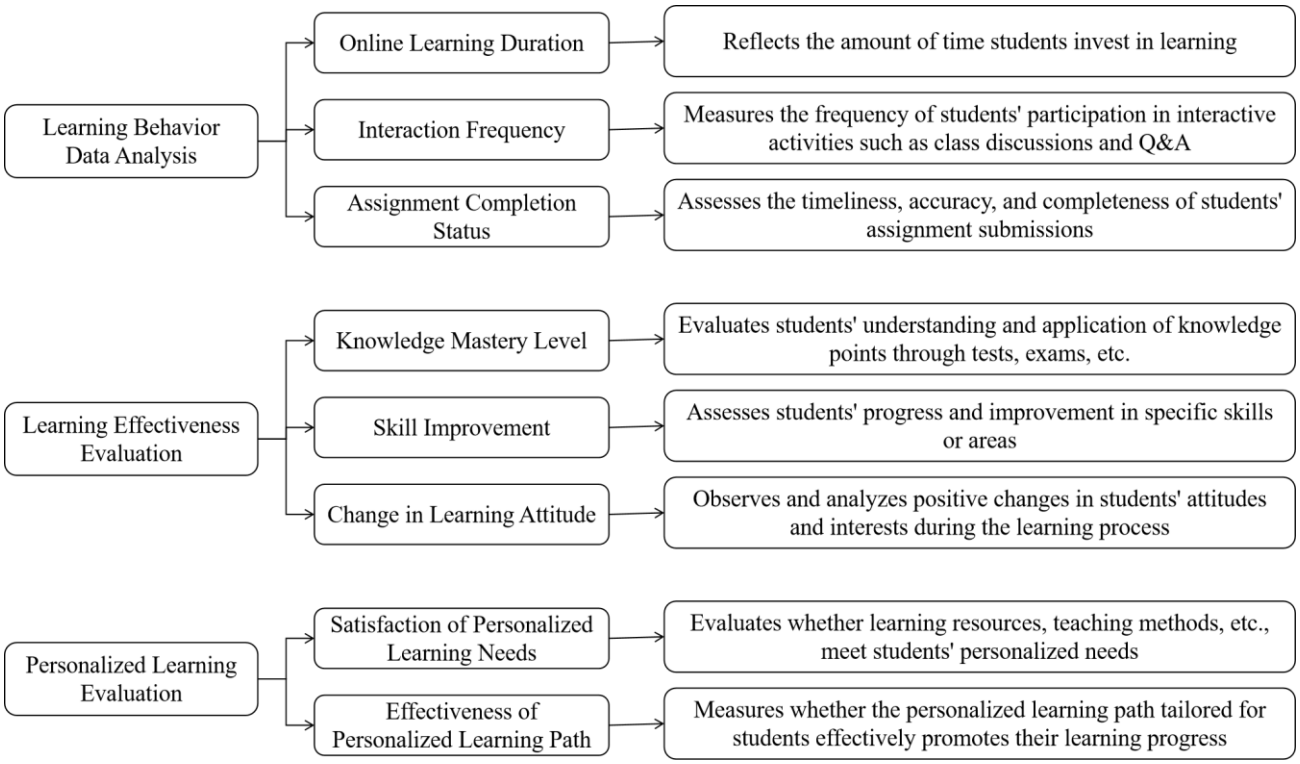

Figure 2 Assessment indicator system

4. Implement the strategy

4.1. Technical support and training

In order to ensure the smooth implementation of the assessment system of the learning effect of the intelligent classroom of vegetable cultivation based on BD analysis, it is very important to strengthen technical support and improve teachers' ability to apply BD. First of all, we need to introduce advanced BD technology and equipment to provide stable and efficient technical support for smart classrooms. This includes establishing a stable data acquisition system to ensure the integrity of learning data; And develop easy-to-use data analysis tools to help teachers master data analysis skills quickly.

In view of teachers' shortcomings in the application of BD, we should carry out systematic training activities. Teach teachers the basic knowledge, analysis methods and application skills of BD by organizing special lectures, workshops and online courses. We can also invite experts in the field of BD for on-site guidance to help teachers solve problems encountered in practical application and improve their professionalism and teaching ability.

4.2. Policy and financial support

Policy and financial support at the government and school level is an important guarantee to promote the development of smart education. The government should formulate relevant policies to encourage schools to build smart classrooms and provide legal and policy basis for smart education. The government should also set up special funds to support technology research and development, equipment purchase and teacher training in smart classrooms to ensure the sustainable growth of smart education.

Schools should also actively strive for policy and financial support to provide a strong guarantee for the construction of smart classrooms. Schools can formulate specific implementation plans and plans, clarify the construction goals, tasks and measures of smart classrooms, and ensure the effective use of funds. Schools can cooperate with enterprises and social institutions to jointly promote the development of smart education and realize resource sharing and complementary advantages.

4.3. Cooperation and exchange mechanism

In order to promote the sharing and utilization of intellectual education resources, we should advocate the establishment of interdisciplinary and inter-institutional cooperation and exchange platforms. Through the platform, teachers from different disciplines and institutions can share instructional resources, teaching experience and research results, and promote the innovation and development of wisdom education.

In order to ensure the effective operation of the cooperation and exchange mechanism, we need to formulate specific cooperation plans and exchange plans, and clarify the objectives, contents and methods of cooperation. We should also strengthen the management and maintenance of the platform, ensure the stability and security of the platform, and provide a good cooperation and communication environment for teachers and students.

5. Conclusions

After in-depth study and discussion, this article draws the following conclusions.

First of all, the assessment system of intelligent classroom learning effect of vegetable cultivation based on BD analysis has obvious advantages and potential. By introducing BD technology and methods, we can evaluate students' learning effect more comprehensively and accurately, provide accurate teaching feedback for teachers, optimize teaching strategies and improve instructional quality. This assessment system not only helps to improve students' learning efficiency and grades, but also promotes students' individualized development and meets their diverse learning needs.

Secondly, the implementation of smart classroom needs support and guarantee in many aspects. In order to ensure the smooth progress and sustainable growth of smart classroom, we need to strengthen technical support and training to improve teachers' ability to apply BD. The government and schools should also provide necessary policy and financial support to provide a strong guarantee for the construction of smart classrooms. This article should also advocate the establishment of interdisciplinary and inter-institutional cooperation and exchange mechanisms to promote the sharing and utilization of wisdom education resources and promote the in-depth development of wisdom education. Based on BD analysis, the assessment system of intelligent classroom learning effect of vegetable cultivation provides new ideas and methods for the development of intelligent education, which is worth further promotion and application.

References

[1] Zhang Aihua. Construction and implementation of O2O teaching mode in vocational colleges-taking vegetable cultivation course as an example [J]. Journal of Liaoning Vocational College, 2021(8):43-46.

[2] Liu Bangqi, Li Xin. Smart classroom data mining analysis and application empirical research [J]. Audio-visual Education Research, 2018,39(06):41-47.

[3] Wang Dongqing, Liu Huan, Qiu Meiling. Analysis method and application verification of teacher behavior data in smart classroom [J]. China Audio-visual Education, 2020,(05):120-127.

[4] Petrović L, Stojanović D, Mitrović S, et al. Designing an extended smart classroom: An approach to game-based learning for IoT[J]. Computer applications in engineering education, 2022, 30(1): 117-132.

[5] Li Furong. Smart classroom mode of college English under the background of big data [J]. Journal of Shanxi University of Finance and Economics, 2022, 44(S02):149-151.

[6] Yang Hua, Li Na. Research on the construction function of smart classroom system [J]. Computer Science, 2022, 49(8):354-357.

[7] Yang Huimin, Zhang Jianquan, Yang Xianlong, et al. Construction of comprehensive practical

teaching system of grass crop cultivation under the background of new agricultural science [J]. grassland science, 2020,37(09):1926-1930.

[8] Lin Wenqiao. Teaching practice of integrating tomato cultivation activities into relevant columns of textbooks [J]. Biology Teaching, 2022, 47(8):83-85.

[9] Wang Dongqing, Han Hou, Qiu Meiling, et al. Method and model of dynamic generative data collection in smart classroom based on situational awareness [J]. Audio-visual Education Research, 2018,39(05):26-32.

[10] Yang Xianmin, Li Xin, Xing Beibei. Construction and trend analysis of teaching big data practice framework for smart education [J]. Audio-visual Education Research, 2018,39(10):21-26.