International Education Forum, 2025, Volume 3, Issue 11
http://ojs.bbwpublisher.com/index.php/IEF
Online ISSN: 2981-8605
Print ISSN 3083-4902

Research on the Construction of an Intelligent Teaching Interactive Platform for Universities Based on the Internet of Things, Cloud Technology, and Big Data

Guangzhi Dong*, Rui Wang, Jing Dai

Dalian Naval Academy, Liaoning 116001, Dalian, China

**Author to whom correspondence should be addressed.*

Abstract: Through research and analysis of the current situation of teaching models in universities, this article summarizes the problems of limited teaching methods, rigid teaching activities, and scattered teaching resources. It proposes the idea and application strategy of using information technology to deeply integrate education and teaching, and build an intelligent teaching interactive platform in universities, promoting the reform of intelligent teaching models and helping college students develop independent learning and personalized abilities.

Keywords: Higher education institutions; Teaching interactive platform

Online publication: December 3, 2025

1. Introduction

The 21st century is the century of "classroom revolution", where artificial intelligence has disrupted this balance and accelerated the process of classroom innovation. In July 2017, the State Council issued the "Development Plan for the New Generation of Artificial Intelligence", emphasizing the use of intelligent technology to accelerate the reform of talent training models and teaching methods, and to build a new education system that includes intelligent learning and interactive learning. In the era of informatization, the new talents needed by the country should have the awareness of actively constructing knowledge, deepen their self-learning ability through the interaction of existing knowledge and new knowledge, continuously enrich their own knowledge, and form a thinking mode suitable for the era of informatization. This article focuses on the research of information technology and intelligent teaching mode in universities, explores the deep integration of information technology and education teaching, explores the construction and innovation of intelligent teaching interaction platforms in universities, and helps college students to learn independently

and develop personalized abilities.

2. Analysis of the current status of teaching models in higher education institutions

2.1. The teaching methods are limited to standardization and fail to stimulate students' learning interest

The teacher's systematic explanation of knowledge architecture, core concepts, and theoretical systems to help students establish basic cognition remains the most common teaching form in universities. During the teaching process, teachers mostly organize interactions through classroom discussions, questioning and answering questions, presentations, and reports. Due to limitations in classroom time, space, and teacher resources, there are few opportunities for participation and communication, difficulties in sustainable development of interactions, an inability to record communication processes, and insufficient preparation for interactive thinking, which limits the effectiveness of traditional interactive teaching methods [1, 5].

2.2. Teaching activities are hindered by stereotypes and cannot meet the needs of work practice

In the process of teaching activities, teachers mainly impart knowledge to students and fail to provide personalized teaching plans by analyzing students' learning behaviors and habits. Classroom exploration activities are difficult to arrange, and the integration of "teaching" and "practice" in professional courses is insufficient. Students only focus on learning knowledge, and there is insufficient cultivation of higher-order thinking, such as innovation ability, problem-solving ability, decision-making ability, and critical thinking. There is also less emphasis on practical application, independent thinking, and proactive thinking, resulting in poor effectiveness of existing teaching activities in cultivating applied and forward-looking talents.

2.3. Teaching resources tend to be fragmented and cannot meet the needs of shared applications

In the teaching process, information resources are relatively abundant, but overall, they are quite complex. Due to different sources, diverse types, and independent system segmentation, it is difficult to share and use them. Teaching resources mainly rely on personal collections by teachers, which are limited by factors such as teaching experience and collection methods, resulting in uneven quality of resources and a lack of targeted collection and organization of teaching resources [2]. At the same time, most of the information resources used by teachers have not been collected uniformly and have not been standardized. Unstructured data, such as videos, images, and documents, lacks means and platforms for sharing and use, resulting in low utilization of information resources and poor teaching effectiveness.

3. Research on the advantages of intelligent teaching modes in universities

3.1. Intelligent teaching mode

With the continuous deepening of teaching reform, the integration of information technologies such as the Internet of Things, cloud technology, and big data with courses has become a key and hot topic in teaching research [3]. The integration of information technology and curriculum refers to a new teaching and research method that organically integrates information technology, information resources, information methods,

human resources, and curriculum content in the process of curriculum teaching, and jointly completes classroom teaching tasks. The intelligent teaching model inherits the concepts of "Rate of Response" and "Cumulative Response Recording" from behaviorism theory, by recording students' behaviors and guiding them in learning based on the obtained data. The essence of an intelligent teaching mode is to use information technology with computers and networks as the core, guided by advanced educational ideas and theories, as cognitive tools, emotional incentive tools, and creation tools to promote students' autonomous learning, and to enrich the teaching environment. These tools are fully applied to the teaching process, so that teaching resources, teaching elements, and teaching links can be combined, reconstructed, and integrated on the basis of overall optimization to produce a clustering effect, thereby achieving the goal of promoting the transformation of traditional teaching methods, cultivating students' innovative spirit, and practical ability. The specific mode is shown in **Figure 1**.

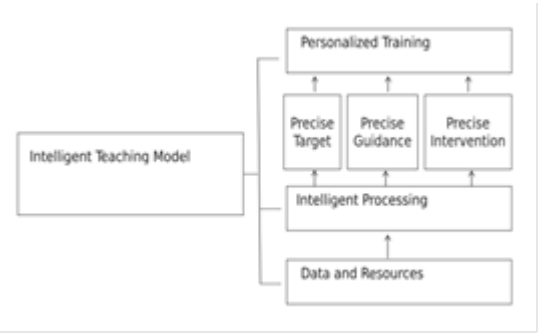

Figure 1. Schematic diagram of the intelligent teaching mode

The intelligent teaching model has three core points [4]. Firstly, data and resources serve as the foundation for implementing intelligent teaching. Various learning process behavior data generated based on teaching platforms, teaching spaces, etc. are aggregated into an educational big dataset, which, together with processed teaching plans, documents, videos, images, and other retrievable and guided educational resource pools, provides a basis and support for intelligent teaching; The second is the use of intelligent processing methods as a method path for implementing intelligent teaching. By analyzing teaching data through big data, classification features are extracted to form a dynamic personal profile that reflects students' learning situation. This is compared and analyzed with the training target model to assist in planning the training path and training methods. At the same time, teaching resources are uniformly identified and processed to form structured resources that can be called by the system, opening up a tunnel of effective correlation between teaching resources and the system, and providing tools and materials for intelligent teaching. The third is that personalized training is the goal concept of intelligent teaching. Based on the theory of humanism, the concepts of "people-oriented" and "teaching according to aptitude" are integrated into the teaching process. Through the introduction of big data and intelligent technology, it promotes the transformation of information education in universities to achieve the ideal state of personalized teaching. Through guidance and intervention, it promotes the "supply side" of talents in universities to fit the "demand side" of national strategic positions.

3.2. The advantages of intelligent teaching

The key to an intelligent teaching mode lies in exploring how to fully tap into students' initiative, enthusiasm,

and creativity from the perspective of creating an ideal teaching environment through modern teaching media. It has the following advantages.

3.2.1. Rich information sources are conducive to creating learning contexts

The intelligent teaching technology provides a teaching environment for classroom teaching, making the sources of information in teaching more abundant. Teachers and textbooks are no longer the only sources of information. The use of multiple media can not only expand the content of knowledge and information, but also fully mobilize students' multiple senses, providing students with a better learning environment.

3.2.2. Individualized teaching is conducive to teaching students according to their aptitude

The interactivity of information systems provides students with the possibility of personalized learning. Through intelligent teaching technology, students can fully present the content and process of learning, independently choose the difficulty and progress of learning content, and interact and discuss with teachers and learners at any time. In the information-based learning environment created by intelligent educational technology, students are gradually breaking away from the traditional teacher-centered model and shifting from passive learning to active learning, which is conducive to individualized teaching.

3.2.3. Mutual assistance and interaction are conducive to achieving collaborative learning

The interactive features of information systems and the universal characteristics of networks are conducive to cultivating students' spirit of cooperation and promoting collaborative learning for the development of advanced cognitive abilities. In the information-based learning environment, students participate in learning through various interactive forms such as collaboration, competition, or role-playing, which is of great significance for deepening understanding of problems and mastering and applying knowledge. It also has a significant promoting effect on the development of advanced cognitive abilities, the cultivation of cooperative spirit, and the formation of good interpersonal relationships [6].

4. Construction ideas for intelligent teaching interactive platforms in universities

The Regulations on Higher Education stipulate that universities should establish intelligent teaching, management, and service platforms, strengthen the construction of smart campuses and classrooms, develop information resources, and provide services for educational work in colleges and universities. To ensure the smooth implementation of teaching practices in universities and provide a high-quality learning environment for the cultivation of new talents, it is necessary to first build a smart teaching service platform that integrates "teaching, learning, management, and evaluation", and use information technology to quickly and efficiently transmit knowledge to students.

4.1. Building an online lesson preparation system to reform teaching methods through informatization

Focusing on the intelligent teaching concept of precision teaching and personalized teaching, educators aim to build an online lesson preparation system with the goal of "Golden Course" construction. Based on new models, methods, and concepts such as heterogeneous and asynchronous lesson preparation, educators rely on advanced technologies such as big data and cloud storage to comprehensively consider the needs of pre-

class learning situation statistical analysis, automatic matching and push of teaching resources, teaching design, lesson plan writing, and archiving. The system aims to serve teaching reform and innovation, and assist teaching management, providing support for teachers to comprehensively grasp student situations, coordinate lesson preparation with multiple people, share and optimize teaching resources, facilitate course preparation, and match classroom teaching activities with lesson preparation content. Based on the integration of individual and collective lesson preparation through the internet, the online lesson preparation system is designed according to the process of learning situation analysis, activity design, activity sequence design, teaching resource allocation, and electronic lesson plan review and release.

4.2. Building an online learning system to promote collaboration and communication through informatization

Build an online learning system that integrates resources, services, and data, supports sharing, interaction, and innovation, and achieves a "universal" online learning system. Space integrated teaching application, teaching content, teaching tools, personalized learning platform that can be used for teaching communication, customized, and editable, with core attributes such as digital resource and intellectual resource sharing, diverse interaction between people and machines, collaborative creation, and innovative creation. It has basic characteristics such as individualization, openness, connectivity, and adaptability. As a unified online learning system service for teachers, students, and administrators, the online learning system focuses on strengthening the spatial functions of administrators, members, applications, generative resource management functions, public application services, and data analysis services of institutional spaces. During the interactive teaching process, students continuously build knowledge, enhance skills, stimulate thinking, showcase individuality, and broaden their horizons. Based on the analysis of classroom interaction data, it empowers teachers to teach more accurately and according to their aptitude, and helps them form a scientific and systematic spiral development model.

4.3. Building a teaching resource system to support resource sharing through informatization

Build a teaching resource system to provide high-quality educational resources for teaching. Through service integration, gather digital resources from colleges and universities, access them according to unified technical standards, and record them according to unified metadata standards. Support the hierarchical distribution of resources according to unified user standards, resource standards, service standards, and management standards. Further improve the resource aggregation and sharing methods of independent aggregation, co governance, and sharing among platforms at all levels within the system, innovate the environment for resource supply and sharing mechanisms, break the "information island", expand resource coverage, push them to online lesson preparation systems and smart teaching systems according to the needs of each teaching system, achieve resource aggregation and sharing, and realize "one point access, full system sharing" of digital teaching resources.

5. Conclusion: Innovation in the application of intelligent teaching interactive platforms in universities

Universities are currently in a high-speed development stage of information and intelligent teaching

conditions construction, creating favorable conditions for the realization of intelligent teaching. To optimize and promote the implementation of intelligent teaching in universities, based on the research results of teaching practice experience in universities, a practical operation process for using an intelligent teaching interactive platform to achieve an intelligent teaching mode is proposed.

5.1. Pre-class: Teaching preparation, diagnosing the learning situation

Teachers obtain teaching resources, edit course plans and courseware, analyze student learning situations, optimize teaching plans, intelligently distribute and push pre-class learning resources, and publish preview tasks through the online course preparation system. Students use online learning systems to preview before class based on resources and tasks pushed by teachers, gain a preliminary understanding of course knowledge, interact and communicate with other students, and ask questions. Pre-class preparation enables teachers to grasp students' learning status, accurately grasp the key and difficult points of teaching, determine teaching objectives, select content, organize activities, intervene, and evaluate after students complete the preview.

5.2. In Class: Efficient interaction, diverse evaluation

Teachers create teaching scenarios according to the teaching plan and use interactive teaching systems to carry out multi-dimensional communication in flipped classrooms, remote collaboration, and intelligent classrooms. Record the classroom teaching process, intelligently edit and generate online courses, and dynamically improve the teaching resource library. Teachers post questions on the platform, and students participate in online discussions or group explorations to showcase their results. During the discussion and exploration, teachers provide real-time feedback to obtain formative assessment criteria. By using synchronous dependency behavior analysis technology, feedback data is generated from the teaching process to form a comprehensive classroom evaluation report, providing a basis for teaching reflection.

5.3. After class: Learn analysis and precise push notifications

Based on the analysis report of students' learning situation, teachers provide personalized exercises to help them identify and fill knowledge gaps. According to the training objectives, teachers track and guide students' learning to achieve personalized teaching. Students obtain resources through online learning systems, review after class, and learn independently through personalized recommendations. They build learning teams, organize joint research projects, and exercise higher-order thinking. At the same time, the platform automatically records students' learning, homework, communication, and training situations, combined with classroom performance and answer situations, comprehensively analyzes teaching effectiveness, evaluates weak links, and forms learning effectiveness analysis data, providing a scientific basis for teaching reform and classroom quality improvement.

6. Summary and outlook

Teaching in an information-based environment is not only an inheritance of traditional teaching, but also an exploration and construction of new teaching models in a technological environment. This article explores the construction of an intelligent teaching interactive platform based on the needs of intelligent teaching and training conditions in universities. Through system construction, it establishes a personalized learning

space for students to achieve unique talent literacy, helps managers and teachers accurately judge students' learning behavior, provides personalized learning resources, and assists universities in carrying out forward-looking talent cultivation teaching reforms. It provides data support for formulating teaching tasks, algorithm support for teaching intelligent applications, and condition support for the construction of key disciplines in universities such as "technology+".

Disclosure statement

The authors declare no conflict of interest.

References

[1] Han DS, 2023, Exploration and Practice of Research Feedback Teaching in the Course of Intelligent Technology for University Buildings. Higher Education Journal, 2023(22): 5–8 + 12.

[2] Lin MY, Ye WF, 2021, The Evolution of Classroom Teaching Environment Supported by Educational Informatization. China Education Technology Equipment, 2021(24): 25–27.

[3] Zhang L, Duan SL, 2023, Research on the Design of an Application Platform for Ensuring Teaching Needs of Teachers and Students Based on Smart Campus Support. Internet of Things Technology, 2023(9): 65–70.

[4] Zong M, 2022, Information Technology Teaching Design and Information Teaching Mode. Central China Normal University Press, Wuhan, 65–74.

[5] Zhou X, 2011, Research and Application of Online Teaching Platforms in Higher Education Institutions. Journal of Nanchang Vocational College, 2011(4): 169–170.

[6] Li ML, 2020, Research on Hybrid Teaching Interaction Based on Synchronous Interactive Platform, thesis, Yunnan Normal University, 39–43.