

Micro Course Design and Online Education Strategies of Information Fusion Technology in Smart Education Environment

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Abstract: Online classrooms require massive intelligent learning resources and big data support, and micro course resources in universities are also one of the digital resources. As one of the digital resources in universities, the educational resources in online classrooms have the characteristics of numerous subjects, single forms, large quantities, and uneven quality, making it difficult to fully support the needs of intelligent learning. Its characteristics include openness, sharing, intelligence, interactivity, collaboration, and ubiquitous availability, which require rapid and in-depth development and improvement to become intelligent resources. Based on the "Internet plus" model, this paper discusses the core elements of intelligent teaching under the "Internet plus" model, and studies and designs them. This realizes the overall framework of the online teaching "smart classroom" support platform, and divides the functions of each subsystem. This article provides specific solutions from the technical implementation level. This article has certain reference significance for the development and improvement of intelligent teaching. The data analysis results of the questionnaire survey indicate that the average scores of student performance, student participation, student satisfaction, knowledge mastery, learning enthusiasm, and teaching efficiency in the experimental group are 72.17, 73.4, 73.03, 79.23, 78.11, and 78.03, which are 11.99, 7.86, 10.06, 9.57, 17.25, and 8.73 higher than those in the control group.

1. Introduction

The rapid development of information and multimedia technology has brought about revolutionary changes in the way students learn. How to cultivate more intelligent learning methods for students has become a very important research topic. While vigorously promoting the concept of smart education in the education sector, new technological environments are also rapidly and sustainably developing. More and more researchers are exploring how smart education can support new technological environments and create new forms of smart classrooms.

In Chapter 3, this article introduces the construction of teacher teaching center, student learning

center, resource integration and mode optimization, and smart teaching evaluation and feedback system. In Chapter 4, the analysis results of the questionnaire survey are presented, and a summary of the entire article is made.

2. Related Works

For smart classrooms, experts have long conducted specialized research on this topic. In order to clarify the moral challenges faced by artificial intelligence in teaching, Akgun S briefly defined artificial intelligence from two aspects: machine learning and algorithms, and elaborated on the application of artificial intelligence technology in teaching environments. He discussed the auxiliary role of artificial intelligence in student learning and the moral challenges encountered when applying it to the field of education [1]. Chen X used a thematic based bibliometric method to identify trends and thematic research related to the application of artificial intelligence in the field of education. The results showed that research on the use of artificial intelligence in teaching is increasing [2]. Lazarus M D discussed five contradictions regarding the potential and risks of integrating artificial intelligence into anatomy teaching, including anatomy educators, public health scholars, medical ethicists, and educational technology scholars. This contradictory phenomenon highlights that artificial intelligence is currently not suitable for including the inherent uncertainties in anatomy teaching: human diversity, medical practice, diversity and social equity, student support, and promoting student development [3]. Ouyang F reviewed the role of artificial intelligence in empirical research, discussed the algorithms used in empirical research, and discussed the impact of experimental results. The research results indicate that the main role of artificial intelligence technology in online university teaching is to predict learning status, academic performance, or satisfaction. Traditional artificial intelligence technologies have been widely applied, while more advanced artificial intelligence technologies such as genetic algorithms and deep learning have not been fully utilized [4].

Nemorin S explored how artificial intelligence is conceived, widely promoted, and applied globally in the education system. He mainly explores three topics: (1) gaining geopolitical advantages through education and technological innovation; (2) Opening up and expanding niche markets; (3) Business Narrative, Philosophy, and Norms [5]. Schiff D studied 24 national artificial intelligence policy strategies and examined the role of education in global discussions on artificial intelligence issues. Research has found that there is almost no mention of the use of artificial intelligence in policy dialogues, and its instrumental value as a human resource to assist artificial intelligence and cultivate more AI professionals has been given top priority [6]. Liang J C explored the positioning and research hotspots of intelligent technology in language education. Research has found that from the perspective of application technology and algorithms, the main applications of artificial intelligence in the field of Chinese language teaching are ITS (Intelligent Tutoring System) and natural language processing. In the study of AILEd (Artificial Intelligence in Language Education), students' abilities in advanced thinking, problem-solving, critical thinking, and collaborative learning have not received sufficient attention [7].

Chaudhry M A provided an overview of the high-end industry and academic community of artificial intelligence education. He proposed hot topics in artificial intelligence teaching in recent years, such as reducing teacher burden, student situational learning, evaluation reform, and developing intelligent teaching systems. He also discussed the ethical issues of AIEd (Artistic Intelligence in Education) and the potential impact it may have on AIEd research and practical operations [8]. Vartiainen H held a practical seminar on using text to image generative artificial intelligence for creative production, to stimulate discussions about generative artificial intelligence and capture relevant imagination. The research results indicate that artificial intelligence production

has stimulated teachers to think about the uniqueness of handicrafts, as well as the contradictions and trade-offs of using artificial intelligence generation technology in handicraft practice [9]. Holmes W first reviewed some artificial intelligence systems currently used in the field of education, as well as their teaching and instructional design. He divided the artificial intelligence education and development system into several categories and elaborated on various ways in which artificial intelligence can be applied to teaching and learning. He also elaborated on the differences in understanding between "what is artificial intelligence" and "what could be artificial intelligence", as well as the obstacles encountered on this basis [10].

Skavronskaya L aimed to explore the feasibility and limitations of using the artificial intelligence chatbot Chat GPT in tourism teaching. He explores the issue of artificial intelligence plagiarism in tourism teaching from the perspective of cognitive science, providing a theoretical basis for solving the problem of artificial intelligence plagiarism in tourism education [11]. Bozkurt A proposed a speculative narrative about the future, focusing on the educational environment, attempting to discover some emerging topics and explore their role in education in the 21st century. Research has found that the possibility of artificial intelligence education and its potential negative impacts have been discovered and discussed [12]. Yau K W used phenomenological research methods to examine the concept of intelligent education among primary and secondary school teachers. The research results indicate that there are six types of teacher perspectives: (1) technological bridges, (2) knowledge transfer, (3) interest, (4) moral construction, (5) ability development, and (6) intelligent development. In the result space, six concepts were classified according to a certain hierarchical relationship. This space presents a set of shallow to deep concepts, allowing people to understand how teachers understand artificial intelligence education through their teaching experiences [13]. Shamir-Inbal T examined the self-regulated learning process, strategies, and challenges of information and communication technology leaders in the context of micro course learning, blended training, and development courses [14]. Khong H K briefly described the background of ML (micro learning) and evaluated its advantages and disadvantages in the field of general education. Secondly, through a detailed examination of the conceptual characteristics and empirical observations of metalanguage, three established theories have been clearly discussed [15]. The above research on smart classrooms is only qualitative and has not been supported by data, let alone questionnaire surveys. The conclusions of the literature are not convincing.

3. Methods

3.1 Teacher Teaching Center

The Teacher Teaching Center is a platform for teachers to use information technology to carry out teaching activities. This platform breaks through the traditional multimedia classroom and teaching mode, realizes the full process integration of pre class preparation, teaching, homework, etc., and supports teachers to develop professional abilities based on work performance. The functions include:

(1) Course production

It can provide tools for creating online courses, including setting course guides, creating and uploading course videos, setting learning tasks, supplementing and expanding materials, and providing interactive communication.

(2) Online teaching

A course learning plan can be established to push courses to relevant students for online teaching, including guidance, online learning, quizzes, assignments, extensions, discussions, etc.

(3) Interactive teaching and research

It can provide functions such as online teaching and research information, teaching and research

forums, management of renowned teacher studios and backbone teachers, teacher training, teaching and research videos, and online online teaching and research.

3.2 Student Learning Center

The Student Learning Center integrates students' pre class preparation, online classroom, post class review, and homework, and can record real-time data of the entire teaching and learning process. Its functions include:

(1) Online learning

A course learning directory can be provided, and students can view the standard course learning directory structure online. At the same time, they can also view the special learning structure directory created by the main lecturer of this course. Online course learning content can be provided, and students can learn the course content pushed by teachers online. At the same time, the main lecturer of the course can also upload detailed relevant resources of the organization for this course.

(2) Online homework

An online homework platform can be provided, and students can follow the homework requirements assigned by the teacher. It can complete homework tasks online and view the completion status of homework in real time, and statistically analyze the mastery of knowledge [16-17].

3.3 Resource Integration and Model Optimization

The system displays a knowledge scenario or environment formed by knowledge through videos, images, and other means, allowing students to watch, experience, and think. These resources can be integrated from the perspective of the curriculum to make them more diverse. This can help students develop good habits of information-based learning, concretize educational wisdom, and deepen the integration of information technology and subject teaching. For example, in the new lesson introduction part of "*Old Mountain World*", teachers can select three pictures through the Internet, namely, Mao Zedong's "*Seven Laws, the Long March*", and the footage of Mao Zedong, Zhou Enlai, Zhu De and others climbing mountains and grass in the TV series "*Long March*". In this way, it can successfully lead out the old mountain boundary, which is the first high mountain of the Red Army's Long March. In the twelfth paragraph, the "spectacle" of "torches arranged in many zigzag shapes, all the way up to the sky... This is a spectacle that I have never seen before in my life" can be specifically selected from a short section of the TV series "*Long March*", which allows students to have a deeper understanding of the magnificent momentum, strong revolutionary will, and optimistic attitude of the Red Army, and thus to have a deeper understanding of the techniques of description [18-19].

3.4 Construction of a Smart Teaching Evaluation and Feedback System

The grading evaluation system of "promoting learning through evaluation" is aimed at enabling teachers and students to have real-time grasp of phased teaching outcomes, and to make corresponding adjustments and improvements to teaching based on the progress of teaching and existing problems. At the same time, based on the concept of "scientificity, diversity, process, and motivation", a "multiple evaluation" system can be constructed, adopting multi-level evaluation criteria to objectively evaluate students' online and offline learning behavior and learning effectiveness. Evaluation focuses on understanding the learning outcomes and individual progress of students, without emphasizing horizontal comparisons between individual students. After two years of "Multidimensional Digital Reading Ability" project based experiments, a

multi-dimensional evaluation and feedback mechanism has been established in terms of text, guidelines, examples, tools, and deep reading. This provides practical examples and teaching methods for implementing blended learning in practice [20].

Taking My Favorite Season as an example, in the teaching environment of smart classrooms, the created learning scenarios can help students integrate into learning more quickly. Teachers can use pre class preview videos to awaken their feelings about the four seasons in the classroom, and can also push classroom quizzes to their hands on the teacher's terminal. This allows them to consolidate and digest the vocabulary they have learned, using character dialogues to help them learn to express their love for the four seasons in a simple and independent way. For example, teachers can use "love" as an example and the word "love" as a starting point to train students' sentence structure. Smartiser can ask "What's your favorite reason" and provide students with some words and phrases related to it, so that they can adjust their sentence structure according to their preferences in the next step. The evaluation system on the smart classroom platform can automatically generate student answers, allowing teachers to control the teaching content and progress of the classroom based on their own learning situation. In this continuous learning activity, the focus can be on highlighting the learning subject status of students and the guidance and promotion role of teachers. In the environment of a smart classroom, the interaction between teachers and students is no longer limited to written communication, but rather a more three-dimensional and diverse interaction online.

4. Results and Discussion

4.1 Survey Methods and Samples

This study conducted a questionnaire survey on 116 people from three classes of A city university, and collected 114 responses. Two invalid questionnaires were excluded, resulting in a total of 112 valid questionnaires. In order to ensure the objectivity and authenticity of the survey, the questionnaire was distributed anonymously. Finally, SPSS 17.0 can be used for final statistical analysis. Firstly, the results of the first two surveys can be compared using SPSS 17.0 software. The Cronbach's alpha reliability of the first survey questionnaire is 0.911, and the Cronbach's alpha reliability is 0.899. The reliability coefficient of the obtained data is 0.911. A scale or questionnaire with a good reliability coefficient should have a reliability coefficient greater than 0.80. The closer it is to 1, the higher the reliability, indicating a high level of reliability in the questionnaire. The students in the experimental group received online classroom education mode, while the students in the control group received traditional model teaching. The specific design is shown in Table 1.

Table 1: Setting of Experimental Students

	Experimental group	Control group
Male	30 people	31 people
Female	25 people	26
Learning achievement	55 ±5	54 ±3.5
Knowledge of online classroom	None	None

4.2 Experimental Results

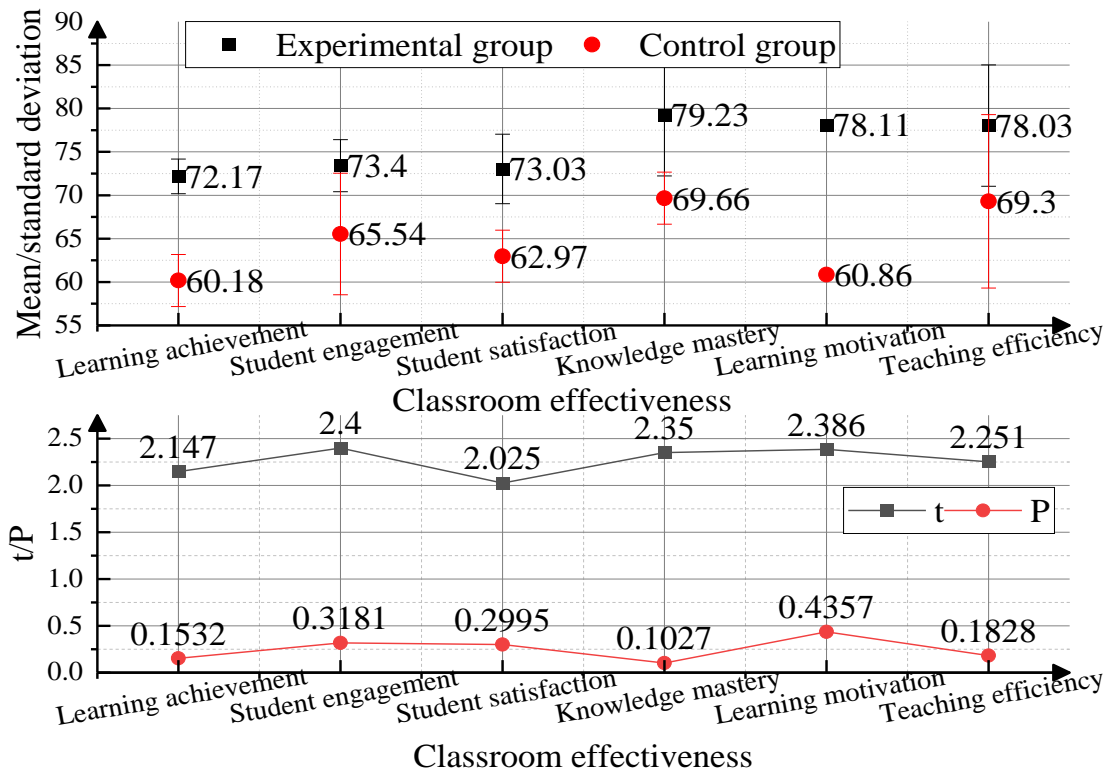


Figure 1: Analysis of differences in basic understanding of online classrooms

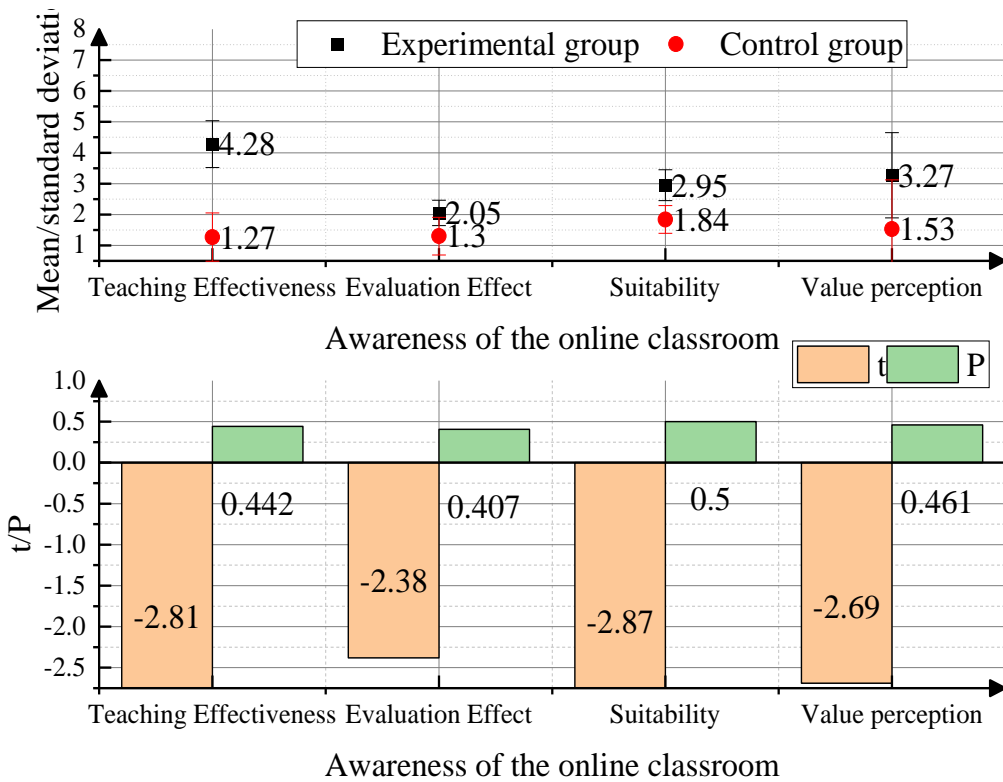


Figure 2: Analysis of Differences in Understanding the Value of Online Classrooms

From Figure 1, it can be seen that the average scores of student performance, student participation, student satisfaction, knowledge mastery, learning enthusiasm, and teaching efficiency in the experimental group are 72.17, 73.4, 73.03, 79.23, 78.11, and 78.03, which are 11.99, 7.86, 10.06, 9.57, 17.25, and 8.73 higher than those in the control group. From the above data, it can be seen that online education can improve students' classroom enthusiasm, improve their grades and knowledge mastery, and at the same time improve the teaching efficiency of teachers. From the graph, it can be seen that the t-value is greater than 2 and the p-value is less than 0.05, indicating a significant difference between the two groups of samples.

From Figure 2, it can be seen that the average scores of students in the experimental group on the teaching effectiveness, evaluation effectiveness, suitability, and value recognition of online classrooms are 4.28, 2.05, 2.95, and 3.27, which are 3.01, 0.75, 1.11, and 1.74 higher than the scores of the control group. The above data demonstrates that the implementation of online classrooms enables students to recognize the value and significance of smart classrooms, which is beneficial for future promotion.

The statistics of the teaching group's implementation data is to calculate the realization index of "ability" by combining the scores of the questions related to the outline ability in the final examination (unified examination) of the whole school, the students' competition scores and usual scores (activities such as recitation, dubbing, oral debate, speech, academic reading notes essence contest, classic works analysis report, academic reading report contest, etc.) with the scores of online classes. This has an important driving role in cultivating students' humanistic qualities and academic abilities. At the same time, it can also improve students' abilities in communication, cooperation, empathy, design, search, reading, reasoning, induction, and output (Figure 3).

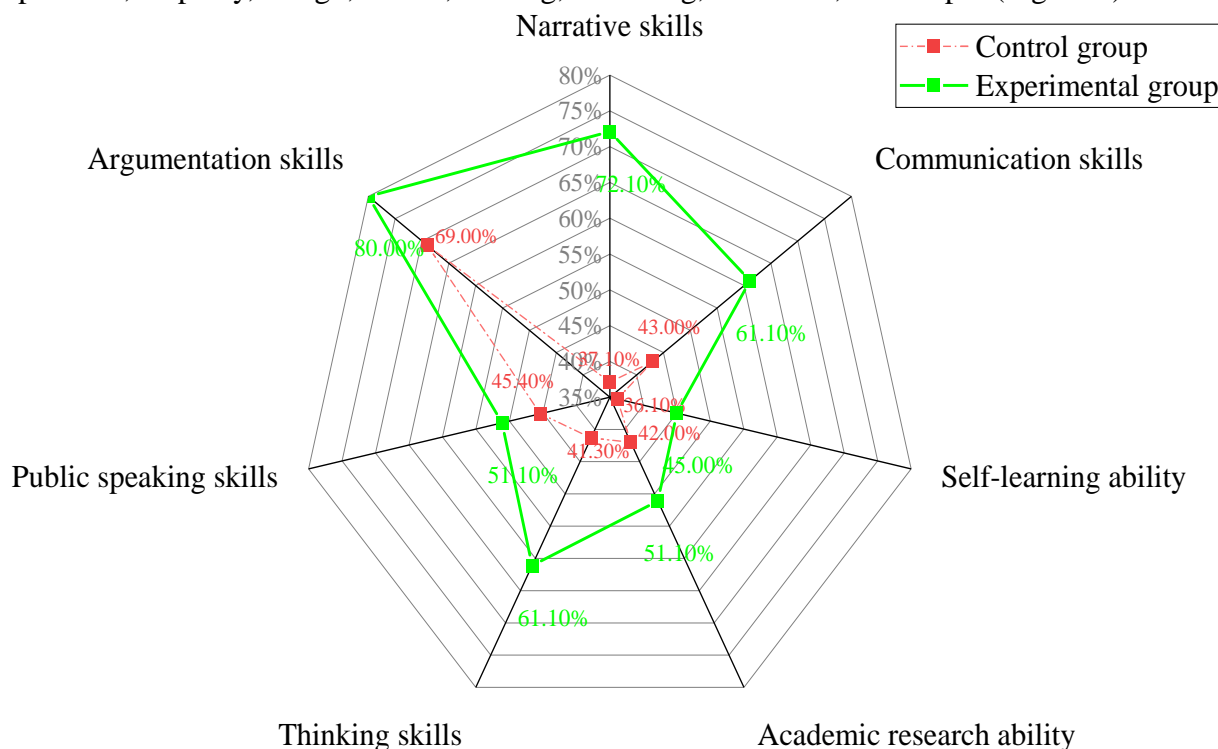


Figure 3: Distribution of the "Seven Abilities" in the Multivariate Digital Reading Experiment

From Figure 3, it can be seen that the students in the experimental group have higher narrative ability, communication ability, self-learning ability, academic research ability, thinking ability, public speaking ability, and argumentative ability than the control group.

5. Conclusions

With the continuous development and popularization of information technology, the field of education has gradually ushered in the era of smart education. Smart education, supported by information technology, provides more possibilities for education and teaching through the Internet, big data, artificial intelligence and other advanced technologies. Information fusion technology, as an important component of smart education, is of great significance for the research of micro course design and online education strategies. This article enables students to learn anytime, anywhere through online platforms and mobile devices. Information fusion technology can achieve the integration and sharing of online educational resources, providing students with richer and more diverse learning resources. At the same time, information fusion technology can also monitor and evaluate the online learning process, timely identify students' learning problems, and provide personalized guidance. The application of information fusion technology can improve the quality and efficiency of online education, and promote student learning outcomes.

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