Path and Development Strategy of Intelligent Teaching Based on OBE Concept

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Abstract: *Firstly, based on the OBE concept, this article introduced the basic principles and core elements of the OBE concept, emphasizing its emphasis on students' learning outcomes and ability development. Next, the application of intelligent teaching in the OBE framework was explored, and the compatibility between intelligent teaching and OBE was pointed out. The importance of intelligent teaching in improving students' learning effectiveness and cultivating comprehensive abilities was also elaborated. On this basis, a method for constructing an intelligent teaching path based on the OBE concept was proposed, including goal setting, teaching design, evaluation strategies, and other aspects. Finally, the challenges that intelligent teaching may face in the implementation of OBE were discussed, and corresponding development strategies were proposed, including providing technical facilities and resource support, strengthening teacher training and development, and improving educational policies and management. This shows that promoting the integration and development of intelligent teaching and OBE has important theoretical and practical significance.*

Keywords: *OBE Concept, Intelligent Teaching, Teaching Methods, Teaching Design, Process Design*

1. Introduction

In the field of education, improving the quality of teaching has always been a goal pursued by everyone. With the continuous promotion of "Internet plus education", the education quality and teaching environment of colleges and universities have been constantly improved and developed [1]. In this context, the OBE concept emerged as an important ideological, institutional, and cultural force to promote the improvement of education quality [2]. It is leading the new trend of talent cultivation mode and teaching reform [3]. In the development of education in the new era, intelligent teaching has become the main battlefield. The design of intelligent teaching activities, as a core component of intelligent teaching [4], is even more crucial. Exploring and practicing appropriate teaching methods can not only improve students' learning efficiency, but also provide reference for improving teaching quality [5]. However, the solution to educational problems begins with quality training for teachers. This is because the quality of future professionals mainly depends on the teaching level of teachers [6]. Currently, more and more teachers are abandoning traditional teaching methods and choosing more progressive and innovative methods [7]. Therefore, the research on the path and development strategies of intelligent teaching based on the OBE concept is particularly important.

The scholars in the previous text emphasized the important position of intelligent teaching in the development of education in the new era, as well as the impact of innovative teaching methods on improving students' learning efficiency and teaching quality. At the same time, it is pointed out that the primary task to solve educational problems is to provide quality training for teachers, and more and more teachers are choosing innovative teaching methods.

2. Application of intelligent teaching in the OBE Framework

2.1 OBE Framework

The OBE (Outcome Based Education) model is a learning output based education model that fully embodies the concept of "student-centered" [8]. It regards students' learning outcomes as the core of teaching and guides teaching and learning processes through clear goals and evaluation standards.

The OBE concept emphasizes student-centered and output oriented [9]. In the OBE framework, the

three parts of before class, in class, and post class are used to promote students' learning (as shown in Figure 1). The main functions include:

Emphasizing students' learning outcomes: The OBE framework places students' learning outcomes at the core of teaching, clarifying the learning goals that students should achieve, making teaching more clear and targeted.

Improving students' learning motivation: The OBE framework clarifies learning goals and evaluation criteria, enabling students to have a clear understanding of their learning goals and expectations, and stimulating their learning motivation and enthusiasm.

Promoting students' self-directed learning: The OBE framework encourages students to actively participate in the learning process, cultivating their self-directed learning and self-management abilities.

Developing students' practical application abilities: The OBE framework focuses on cultivating students' practical application abilities, enabling them to apply the knowledge and skills they have learned to practical situations through problem-solving and practical activities.

Promoting the improvement of education quality: The OBE framework makes the education process more scientific, systematic, and standardized through clear goals and evaluation standards, which helps to improve the quality and effectiveness of education.
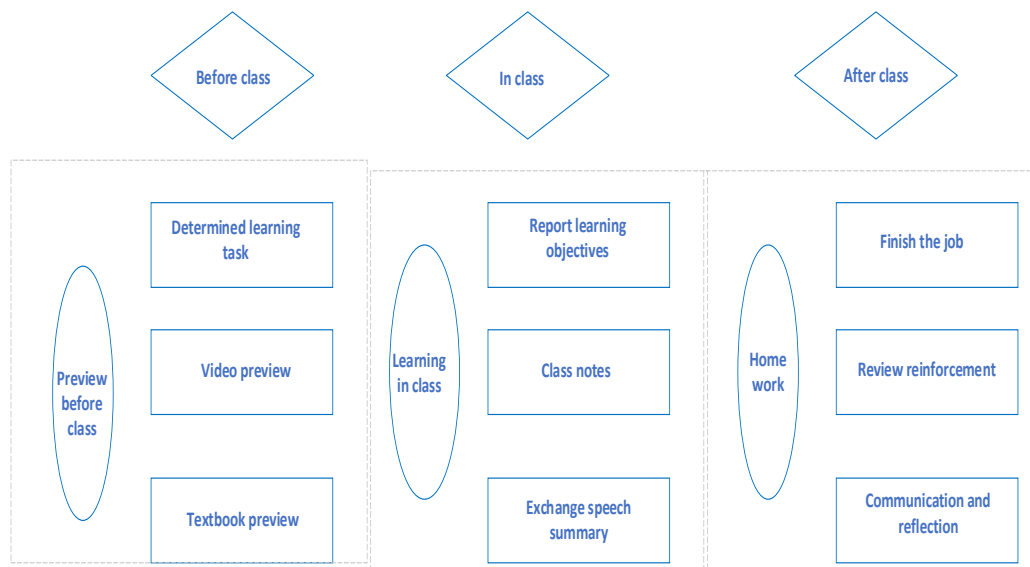

Figure 1: OBE Implementation Framework

According to the corresponding suggestions of preview, study and review given in Figure 1 before, during and after learning, the learning task can be completed to maximize the learning effect. And the OBE concept is a new measure for universities to implement the cultivation of high-quality applied talents and promote transformation and development [10].

2.2 Application Process

OBE is a result-oriented reverse design concept, which designs talent training objectives, models and curriculum systems based on the needs of the country, society and enterprises [11]. The core idea of OBE is to place learning outcomes at the core of teaching, emphasizing the practical results and abilities that students achieve in the learning process.

Intelligent teaching is an innovative teaching model applied under the framework of OBE. It combines the concept of intelligent teaching with output-oriented education to provide more scientific, personalized and effective teaching guidance. Intelligent teaching emphasizes the use of technology tools and resources, personalized learning, and collaborative learning. By leveraging smart education technology, teachers can provide personalized learning support and feedback based on students' individual differences and learning needs. At the same time, intelligent teaching also encourages collaborative learning among students, cultivating students' cooperation ability and social skills through teamwork and mutual learning.

The combination of intelligent teaching and OBE framework makes the teaching process more flexible and personalized. Teachers can choose appropriate intelligent educational tools and resources according to the learning objectives and evaluation criteria to help students achieve the set learning outcomes. Through the intelligent education platform, students can conduct personalized learning, learn according to their own learning progress and interests, and obtain better learning experience and results.

In short, the application of intelligent teaching under the framework of OBE provides more scientific, personalized and effective guidance for teaching. It emphasizes the use of technological tools and resources, personalized learning and collaborative learning, aiming to develop students' comprehensive abilities and the ability to adapt to future developments. This combination will provide more possibilities for education and promote the improvement of students' learning effect and learning experience.

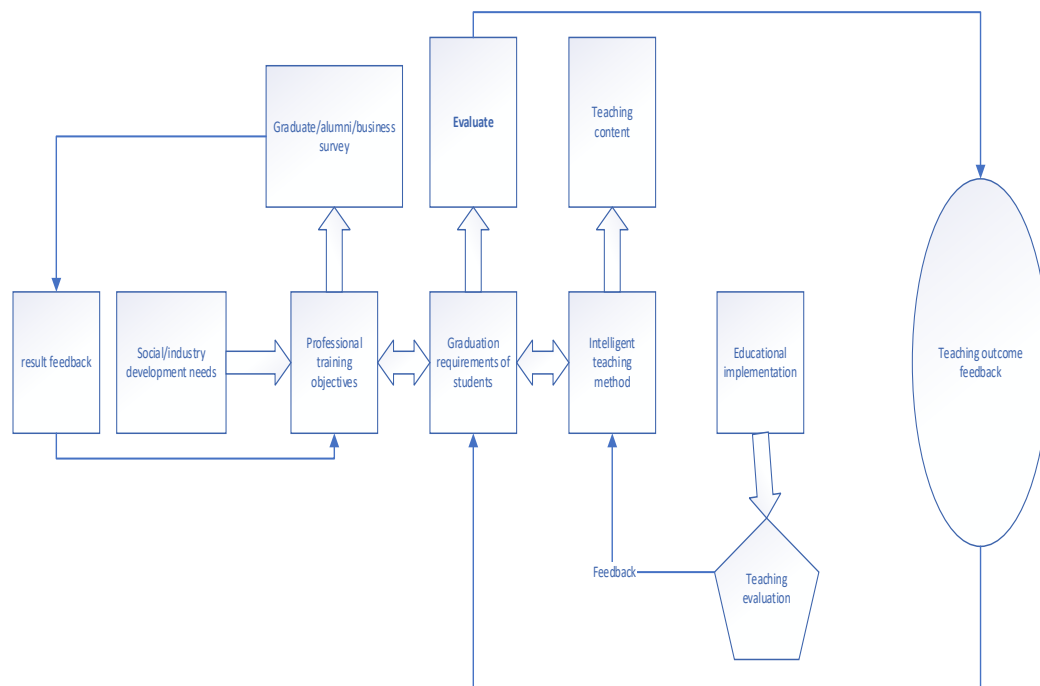The process of intelligent teaching under the OBE framework is shown in Figure 2.

Figure 2: Flowchart of intelligent teaching under the OBE Framework

Figure 2 shows the framework structure of higher Education combined with intelligent education based on the concept of OBE. The core idea of this framework is that professional training should pay close attention to the development needs of society and industry, and be oriented to students' professional training goals and learning results.

Under this framework, the design of professional training program and curriculum system is based on students' professional training objectives. This means clearly identifying the knowledge, skills and attitudes students should have and the learning outcomes they should achieve by the time they graduate. These learning effects can include the mastery of professional knowledge, problem solving ability, innovation ability, teamwork ability, etc.

In order to achieve these learning effects, we have built a complete set of professional training programs and curriculum system. These schemes and systems include curriculum setting, teaching methods, practice links and so on. Through the course of study, students can acquire the necessary theoretical knowledge and subject foundation. Through professional practice, students can apply their knowledge to practical problems and develop the ability to solve engineering problems. Through professional scientific research innovation training, students can carry out scientific research and innovation practice, and improve their scientific research ability and innovative thinking. Through graduation design, students can comprehensively apply their knowledge and skills to solve practical engineering problems and demonstrate their professional qualities.

In the whole training process, we focus on cultivating students' sustainable development quality.

This includes developing students' ability to learn independently, to think critically, to collaborate across disciplines, and to have a sense of social responsibility. We want our students not only to have professional skills, but also to be socially impactful and sustainability-conscious professionals.

By combining the OBE concept with the smart education framework, we are committed to cultivating professionals with comprehensive qualities and adapting to the needs of future development. We will continue to improve and optimize the education and teaching model, cooperate with the industry, and pay close attention to the changing needs of society to ensure that our education and training system keeps pace with The Times and provides the best support for the future development of students. OBE emphasizes the achievement of students' core professional abilities and has been applied in the field of education in recent years [12]. However, in order to achieve the training goals and expected learning outcomes of OBE professional education, it is necessary to support the learning outcomes of each course. Therefore, course learning has become a fundamental unit of professional development. From the perspective of curriculum teaching, the curriculum teaching plan needs to shift from "improving teaching quality" to "improving learning quality", and be designed based on the contribution rate of curriculum effectiveness to graduation requirements.

Modern teaching is becoming increasingly intelligent. Intelligent teaching helps to identify learning situations and is of great significance for teaching management [13]. The intelligent teaching plan includes course teaching objectives, teaching content, teaching models, and evaluation methods. It is guided by course effectiveness, implements the teaching process, and analyzes and summarizes students' learning outcomes. Through this approach, suggestions and experiences can be provided for the continuous improvement of the next round of course teaching.

In short, the intelligent teaching path based on the OBE concept should be guided by students' professional training goals and learning outcomes, and take course learning as the basic unit. The design and implementation of course teaching plans can improve students' learning quality and achieve professional development goals. This learning effectiveness oriented teaching approach helps to continuously improve course teaching, improve teaching quality, and contribute to the comprehensive and sustainable development of students.

3. Construction Method of the OBE Concept's Intelligent Teaching Path

3.1 Target Assignment Process

With the development of mobile internet, the traditional classroom teaching mode is quietly changing and gradually being replaced by smart classrooms [14]. However, when designing the goal setting in intelligent teaching paths, it is necessary to clarify the learning field and theme, as well as specific learning objectives and evaluation standards. Only in this way can one ensure that teaching activities and students' learning outcomes match each other, achieving efficient teaching results. And the intelligent teaching model has been continuously applied in professional course teaching [15].

The lack of appropriate guidance and reference in the design or creative process of teaching processes may also affect the quality of students' learning [16]. In the design of intelligent teaching paths under the OBE framework, goal setting is a very important step. The following is the process of goal setting (as shown in Figure 3).

Determine the implementation direction of education: Firstly, determine the implementation direction of education, and clarify the knowledge, skills, and abilities that students need to achieve. The direction of education implementation is not just a momentary shock or turmoil [17].

Decompose learning objectives: Decomposing learning areas and topics into specific learning objectives. Each learning goal should be observable and measurable, able to clearly describe the learning outcomes that students should achieve.

Determine evaluation criteria: Determine the corresponding evaluation criteria for each learning goal, that is, the standards or indicators used to evaluate whether students have achieved the goals. The evaluation criteria should be clear, measurable, and verifiable. Teaching evaluation, as an important component of teaching quality management, has a significant impact on talent cultivation [18].

Design learning activities: Design corresponding learning activities based on learning objectives and evaluation criteria. Learning activities should help students achieve their learning goals and provide rich learning experiences and opportunities.

Integrate technical tools and resources: In intelligent teaching, teachers can utilize various technical tools and resources to support the achievement of learning objectives. Select appropriate technical tools and resources based on learning objectives and students' needs, such as online learning platforms, multimedia textbooks, simulation experiments, etc.

Provide personalized support: Provide personalized support and guidance based on students' different learning needs and ability levels. Teachers can utilize the personalized learning function of intelligent teaching to provide students with suitable learning resources and activities.

Conduct evaluation and feedback: Students' learning outcomes can be evaluated based on learning objectives and evaluation criteria. Through the data analysis and feedback mechanism of intelligent teaching, it can timely understand students' learning situation and provide targeted feedback and guidance.
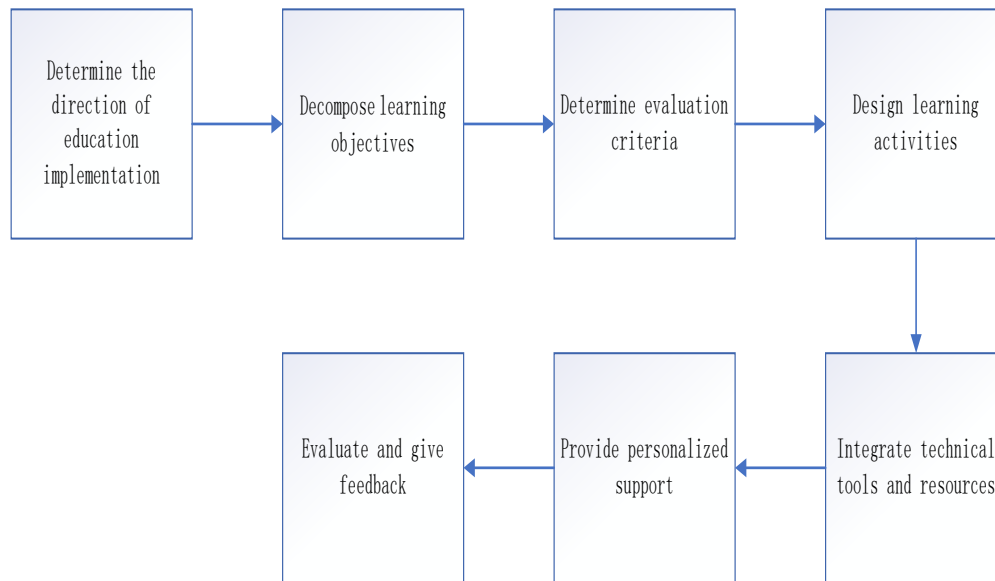

Figure 3: Flow Chart of Intelligent Teaching Goal Setting for OBE Concept

Through the goal development design method shown in Figure 3, teachers can determine the knowledge, skills, and abilities that students need to achieve based on specific learning areas and themes. At the same time, teachers can also provide personalized support and guidance based on individual differences among students. Through the data analysis and feedback mechanism of intelligent teaching, teachers can timely understand students' learning situation and make teaching adjustments based on the evaluation results to improve students' learning effectiveness and outcomes.

3.2 Teaching Design and Implementation

The "Smart Classroom" teaching model is a new model for talent cultivation, highlighting the cultivation of students' innovative spirit and ability, and more in line with the needs of personalized learning for students [19]. Teaching design and implementation are crucial links in building a teaching path for smart education. In the teaching design stage, teachers need to consider students' learning needs and backgrounds, clarify teaching objectives, and design appropriate teaching strategies and activities based on the characteristics of the subject and teaching content. At the same time, teachers also need to utilize smart education technology and online education platforms to choose appropriate teaching resources and tools to provide a rich and diverse learning experience. Based on the previous analysis, the implementation mechanism of the completed teaching design is shown in Figure 4.
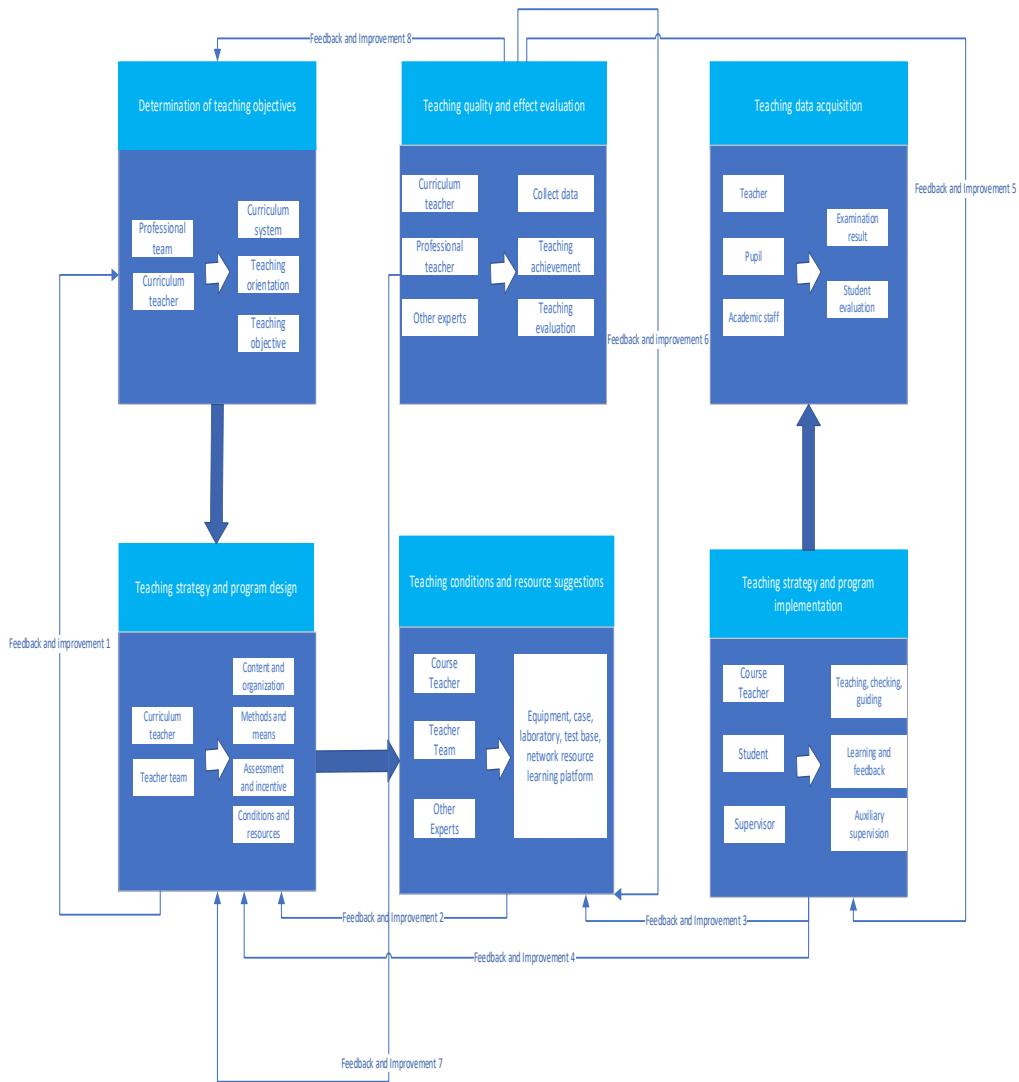
Figure 4: Teaching Design and Implementation Mechanism Diagram

Actively integrating new teaching methods into daily teaching and effectively transforming traditional teaching methods has become a top priority [20]. Figure 4 adds as many feedback processes as possible, allowing users to identify and correct deficiencies in a timely manner during use and daily teaching by teachers. The system maximizes the effectiveness and efficiency of teaching by adding corresponding functions to students, teachers, other supervisors, and other academic staff, enabling coordination and cooperation from multiple aspects.

4. Formulas and Experiments

4.1 Formula

Intelligent teaching path formula:

$$S = (G + D) \times (I + T) / (F + A) \tag{1}$$

In equation (1), S represents the intelligent teaching path, G represents the teaching objectives, D represents the course design, I represents the integration of teaching tools, T represents the design of learning tasks, F represents the feedback and evaluation mechanism, and A represents the implementation of teaching activities.

Equation (1) calculates the weighted sum of each element in the formula to obtain a comprehensive evaluation value, which is used to measure the quality and effectiveness of the intelligent teaching path.

Development strategy research formula:

$$R = (B + E) \times (P - V) / C \tag{2}$$

In equation (2), R represents development strategy research, B represents teacher training and professional development, E represents educational technology research, P represents teaching practice reflection, V represents effectiveness evaluation, and C represents continuous improvement.

Equation (2) can obtain a comprehensive evaluation value by calculating the weighted sum of each element in the formula, which can be used to measure the quality and effectiveness of development strategy research.

Generally speaking, the smaller the R-value, the higher the quality and effectiveness of development strategy research. Continuous improvement refers to the continuous reflection and improvement in the process of development strategy research in order to improve the quality and effectiveness of research. Therefore, if the R-value is small, the effect of continuous improvement is better.

The increase of teacher training and professional development, educational technology research and other factors will lead to the increase of R value, which indicates that these factors have a positive impact on the quality and effectiveness of development strategy research. In other words, if teacher training, professional development, technical resources and other factors are fully developed and applied, the R-value will increase correspondingly, indicating that the quality and effectiveness of development strategy research will also be relatively improved.

4.2 Experiment on the Intelligent Teaching Path System of OBE Concept

The experiment randomly selected 100 students and 100 teachers from a certain school, and designed an intelligent teaching path system for the experimental group. The system includes six aspects: teaching objectives, course design, teaching tool integration, learning task design, feedback and evaluation mechanism, and teaching activity implementation. The evaluation includes two options: satisfactory and unsatisfactory. The experiment lasts for one week.
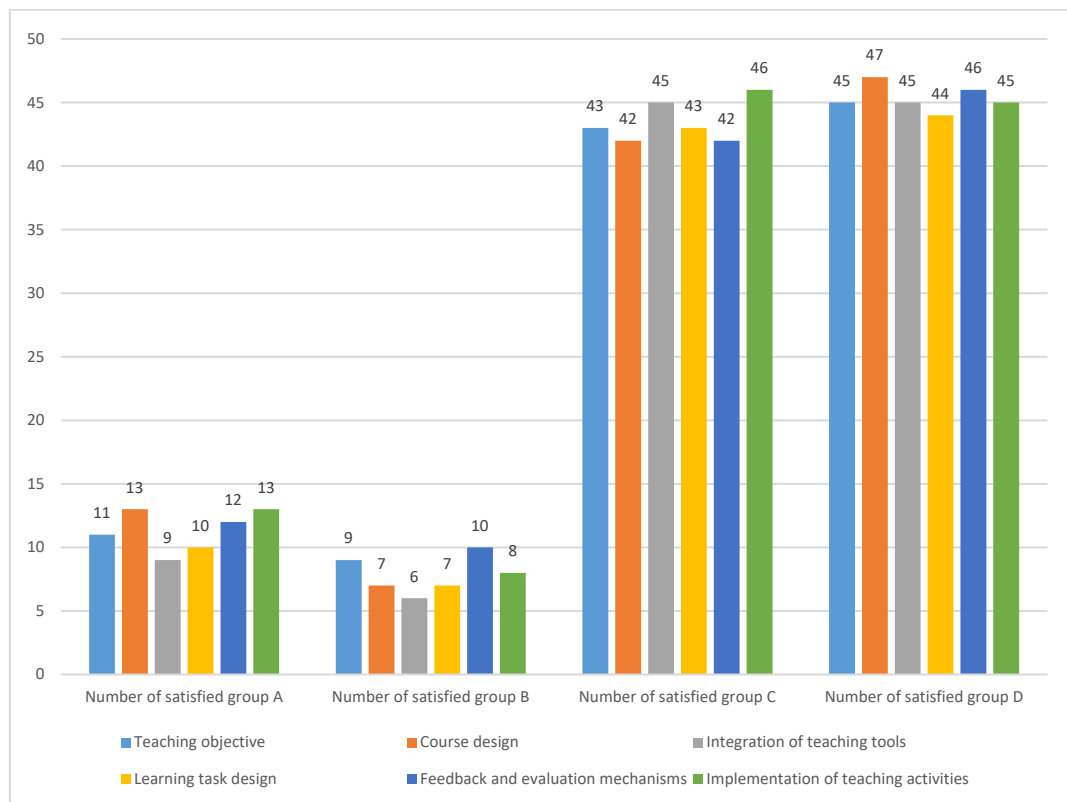

Figure 5: Experimental Comparison Data

The experimental subjects were randomly divided into 4 groups. Group A consisted of 50 students who used traditional teaching methods, Group B consisted of 50 teachers who used traditional teaching

methods, Group C consisted of 50 students who used the OBE concept intelligent teaching path system, and Group D consisted of 50 teachers who used the OBE concept intelligent teaching path system experiment.

Finally, collect data on the number of people satisfied with the system used by each group after the experiment, as shown in Figure 5.

According to the experimental data in Figure 5, it can be seen that the number of students and teachers who are satisfied with traditional teaching methods is less than 14, while the number of satisfied students and teachers using the OBE concept intelligent teaching path system is over 40. It can be seen that both students and teachers have a higher preference for the OBE concept's intelligent teaching path system.

5. Conclusions

From the experimental results, it can be seen that the satisfaction rate of using the OBE based intelligent teaching path system is significantly higher than that of using traditional teaching tools. This indicates that promoting the integration of intelligent teaching and OBE has important theoretical and practical significance. The intelligent teaching path system can provide personalized learning support, promote students' active participation and in-depth learning, thereby improving learning effectiveness and cultivating students' comprehensive abilities. In the future, it can further study the application of intelligent teaching path system in different disciplines and educational stage, and explore how to give full play to the potential of intelligent teaching and improve the quality and effect of education. In addition, it is necessary to strengthen teacher training and development, improve teachers' abilities and literacy in intelligent teaching, in order to better support students' learning and growth. At the same time, it is also necessary to improve educational policies and management to provide better support and guarantee for the promotion and application of intelligent teaching.

References

[1] Pan Jusu, Liu Rui. Strategies for Improving teachers' Informatization Teaching ability in Higher Vocational Colleges based on Intelligent Teaching environment. Journal of Ningbo Vocational and Technical College, 2020, 24(4):1-6.
[2] Zhang Nanxing. Promoting the quality improvement of college Professional Education with the concept of OBE. University Education Science, 2019, 000(002):11-13.
[3] Zhang Rui, He Jiangchuan, Zhang Zhan. Research on Improvement of Youth Education Competition in Higher vocational and applied Colleges based on OBE concept -- A case study of Beijing Union University. Journal of Beijing Vocational College of Finance and Trade, 2023, 39(1): 54-57.
[4] Liu Zheyu, Zhou Jihui, Zhou Jiaxian. Design of intelligent teaching activities to promote flow experience from the perspective of educational neuroscience. Modern Educational Technology, 2022, 32(7):14-21.
[5] Cheng Yongbo, Wang Peiliang. Analysis on teaching methods of undergraduate medical students in South Asia. Health Vocational Education, 2021, 39(2):3-5.
[6] Evald F. Zeer, Vera S. Tretyakova, Vasily I. Miroshnichenko. Strategic directions of pedagogical personnel training for the system of continuing vocational education. The Education and science journal, 2019, 21(6): 93-121.
[7] Numonjonov Shakhzod Dilshodjon Ugli. Innovative methods of professional training. ISJ Theoretical & Applied Science, 2020, 1(81): 747-750.
[8] Yang Yan, Ma Jie, Zhang Lijuan, et al. Exploration on the construction of Biochemistry curriculum System of TCM and Western Clinical Medicine under the concept of OBE . Modern distance Education of Chinese Medicine 2022, 20(4):4-7.
[9] Zhao Zilin, Zhao Jing. Analysis on Optimization of Teacher Training Model for Ideological and Political Education Major based on OBE Concept. Journal of Yichun University, 2022, 44(1): 110-115.
[10] Gu Han, Zhang Huiguo, Zhou Bukun. EDA technology project teaching reform and practice based on OBE concept. Journal of Changshu Institute of Technology, 2022, 36(5):116-119.
[11] Liu Shipeng and Wu Zheng. Research on Curriculum System Design for Cross-border E-commerce based on OBE concept. Journal of Computer Application Abstracts, 2022, 38(7):1-3.
[12] Yu Ying, Wang Xin, Zhao Yue, et al. Research on the teaching of Integrative Practice Course of

Formulology based on OBE Concept . Modern Distance Education of Chinese Medicine 2022.20(3), 13-16.

[13] Wang Yunyan. Learning Situation Recognition and Teaching Management in Intelligent teaching Environment. Journal of Higher Education, 2022, 8(31):17-20.

[14] Zhang Chen, Xiang Xiangqin, Zhang Xin. Teaching Design and Implementation of Intelligent Teaching in the Era of "Internet +": A case study of Software Engineering curriculum. Computer Knowledge and Technology: Academic Edition, 2019, 15(6):112-113.

[15] Wu Ying. Exploration on intelligent teaching mode of Insurance curriculum based on Learning. Science and Technology Entrepreneurship Monthly, 2022, 35(6):152-155.

[16] Zhong Shuheng, Zhou Wenlong. Inquiry and experiential mixed teaching method is effective way to cultivate high-quality innovative talents. International Journal of Information and Education Technology, 2019, 9(9): 613-617.

[17] Eniwati Khaidir, Fitriah M. Suud. Islamic education in forming students' characters at as-shofa Islamic High School, pekanbaru Riau. International Journal of Islamic Educational Psychology, 2020, 1(1): 50-63.

[18] Gao Fumeng. Establishment of college English teachers' teaching ability evaluation based on Clementine data mining. Journal of Intelligent & Fuzzy Systems, 2020, 38(6): 6833-6841.

[19] Liu Qian. Application of curriculum Ideological and political Education in the teaching of Computer Programming under the Wisdom teaching model. Industry and Technology Forum, 2022, 21(1):136-137.

[20] Luo Shusheng. Analysis on the transformation of junior Middle School English Classroom Teaching Mode under the Information environment. China New Communications, 2022, 24(17): 191-193.