

Under the Perspective of the OBE Concept, Exploring Teaching Models in Secondary Vocational Education Based on Large Language Models.

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Abstract: The transformation brought by large language models to teaching models has revitalized the education system, making the integration of large language models with teaching a hot research topic. This paper proposes combining large language models with the OBE concept to enhance secondary vocational teaching models, better meeting students' self-development and teaching implementation. Specifically, it examines the challenges faced by traditional secondary vocational teaching models from two aspects: talent cultivation mechanisms and building high-quality teaching teams. Based on the OBE concept, the study aims to improve secondary vocational teaching models through large language models in three dimensions: tiered teaching, interactive intelligent teaching assistants, and enhancing teacher competencies. To further optimize teaching models, it is necessary to support students' continuous learning and ensure appropriate technology application.

Keywords: OBE Concept; Large Language Model; Secondary Vocational Education Teaching Model.

1. Introduction

With the rapid advancement of technology and big data, large language models (LLMs) have become a research hotspot in computer science and are progressively integrating deeply with educational activities, driving the education sector toward intelligent transformation. In this context, secondary vocational education—as a crucial pathway for cultivating technical talent—faces mounting pressure to keep pace with the times. Moreover, the technical professionals trained through secondary vocational education must not only meet current market demands but also develop successors capable of thriving in future intelligent and digital societies [1]. Consequently, teaching models must align with cutting-edge technologies and embrace "intelligence + education." The critical question is how to explore LLM-based teaching models for secondary vocational education under smart education requirements, guided by clear objectives. This endeavor impacts not only students' personal development but also the quality of future skilled and innovative talent cultivation [2].

Thus, this study employs LLMs and the Outcome-Based Education (OBE) framework to innovate secondary vocational teaching models, analyzes existing pedagogical challenges, proposes improvement strategies, and addresses the evolving demands of intelligent-era education.

2. Research Background

Current research shows that with the advantages of rapid development in the AI era and big data industry; we can actively apply large language models to reform teaching models and methodologies. For example, Ma Fangyuan et al. [3] transformed the teaching approach of primary school Chinese by utilizing the learning environment of large language models. Xu Kang et al. [4] addressed issues such as weak programming skills and communication barriers among international computer science students by proposing a

ChatGPT-based practical method for compiler principles courses.

In recent years, Outcome-based Education (OBE) has gained significant attention in education and technology fields. Its core principle advocates using outcomes as the ultimate goal while emphasizing student-centered approaches and continuous improvement throughout the process. The OBE concept focuses on peak learning outcomes, highlights student participation and teacher guidance, and reforms teaching models in actual teaching practice to improve education quality. For instance, Liu Xiaoyan et al. [5] reconstructed the framework of a teaching quality monitoring system based on OBE principles and further proposed optimization methods. You Sisi et al. [6] integrated large language models with OBE concepts to reform C language algorithm and data structure courses, while using intelligent methods to identify students' programming problems and dynamically adjust teaching content and difficulty levels. Currently, there are numerous application examples of large language models combined with OBE concepts across different educational stages and various courses. However, reforms targeting secondary vocational education teaching models are still in the development phase.

Therefore, this paper proposes an OBE-oriented approach that leverages large language models to enhance secondary vocational education through three aspects: tiered teaching, interactive intelligent teaching assistants, and teacher competency improvement. It further optimizes the teaching model by supporting students' continuous learning and ensuring appropriate technology application, aiming to provide valuable references for the development of secondary vocational education teaching models.

3. Challenges in Traditional Secondary Vocational Education Teaching

A teaching model is constructed based on educational philosophy or fundamental pedagogical theory, thereby establishing a relatively stable instructional framework and

activity procedures. It represents the integration of practical reality with theoretical conception, providing both teachers and students with clear teaching methods and structures, aiming to conduct teaching activities under optimal conditions.

The teaching models in secondary vocational schools possess their own uniqueness and practicality, emphasizing the integration of theory and practice to provide students with diversified learning pathways, thereby cultivating students' professional skills and vocational qualities. Ultimately, the continuous optimization and innovation of teaching models can provide students with higher-quality educational resources and broader development opportunities.

3.1. Challenges in Talent Cultivation Mechanisms

In traditional secondary vocational education teaching models, on one hand, the adherence to a "one-to-many" standardized collective teaching approach - which emphasizes uniform content and synchronized progress for all students - fails to adequately fulfill each student's self-actualization needs and cannot properly address the impacts on learners progressing at different paces [7]. Consequently, this model neglects individual student differences and is detrimental to balanced student development.

On the other hand, experimental teaching constitutes an indispensable component of vocational specialized courses. However, due to issues such as insufficiently diverse experiment designs and lack of effective, timely guidance, students often struggle to deeply comprehend theoretical knowledge in their specialized courses. This impairs the integration of theory and practice, ultimately resulting in failure to achieve the intended teaching outcome of practically applicable skills.

3.2. Challenges in Building High-Quality Teaching Teams

Large Language Models as an Emerging Technology. On one hand, many teachers lack sufficient understanding of the technical principles, practical applications, and usage scenarios of large language models (LLMs). This makes it difficult for them to master LLM operational techniques, preventing them from effectively leveraging the rich resources provided by these models to enhance work efficiency, improve their own capabilities, and optimize teaching practices.

On the other hand, the OBE (Outcome-Based Education) concept emphasizes research-oriented teaching rather than rote instruction, placing greater focus on fostering student agency. This shift has transformed the traditional role of teachers. In conventional teaching, teachers were viewed as authoritative figures and primary knowledge providers. However, with the introduction of LLMs, teachers must transition into facilitators and organizers of student learning—a change that some educators struggle to adapt to. Additionally, there is a tendency among teachers to over-rely on their own knowledge reserves during instruction. This hinders their ability to effectively guide students in utilizing LLMs for self-directed and collaborative learning.

4. Approaches to Enhance Teaching Models in Secondary Vocational Education

To solve the above-mentioned difficulties, it is necessary to take reflecting on old concepts as the thinking starting point, and the OBE concept precisely provides sufficient inspiration [8]. In the core idea of the OBE concept, the goal orientation is learning outcomes, with the learner at the center. In this process, continuous improvement is carried out (Figure 1). Generally speaking, when carrying out a teaching activity, we must first clarify what learning outcomes students will achieve, and then use this as the basis to reversely organize the curriculum structure, design the course content, implement teaching and provide feedback evaluation, ensuring students' continuous learning and achievement of learning outcomes.

At the same time, the OBE concept is significantly different from traditional concepts (Table 1). The OBE concept adheres to the philosophy of pragmatism, where learning outcomes include not only what students know and master, but also their ability to apply knowledge in practice. Therefore, the teaching model under the OBE concept is highly compatible with employment and vocational education.

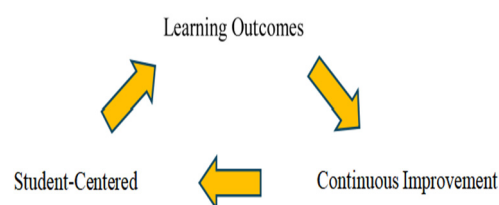


Figure 1. OBE Concept Diagram

Large language models (LLMs) currently represent a cutting-edge domain in artificial intelligence. With their formidable capabilities in information generation and data processing, they are progressively permeating various aspects of secondary vocational education [9]. For secondary vocational education specifically, LLMs can not only drive technological innovation in traditional teaching models but also, when integrated with the Outcome-Based Education (OBE) concept, explore new possibilities for vocational teaching methodologies.

Table 1. Comparison Between OBE Concept and Traditional Educational Concepts

	OBE Concept	Traditional Educational Concepts
Clear Focus	Learning Outcomes	Curriculum Structure
Outcome-Oriented	Personalization	Competition-Based
Core Objective	Continuous Learning	Exam Scores
Culminating Outcomes	Applied Knowledge	Knowledge Itself

4.1. Personalized Learning Path Planning

Since the traditional teaching mode cannot solve the problem of individual differences in the unified curriculum, based on the OBE concept, this paper focuses on individual students and uses a large language model to continuously plan personalized learning paths for students of different levels [10].

First of all, students should be classified into beginner,

intermediate and advanced levels based on their mastery of knowledge, and plans should be made for students at different levels that suit them. Secondly, beginners should focus on consolidating and reinforcing the basic knowledge points. Intermediate-level learners should focus on the integration of subject knowledge points before and after as well as their practical applications. Advanced practitioners should focus on the innovation of subject knowledge points and the improvement of personal abilities. And through continuous dynamic adjustment, ensure that students' abilities are improved simultaneously. Here, taking the C language professional courses in secondary vocational schools as an example, we will make a step-by-step plan. Beginners should aim to master the basic knowledge. They should use large language models to provide assessment of basic concepts, video explanations, and training with simple codes to ensure their steady progress. Intermediate learners should aim at the practical application of knowledge. Large language models can provide code practice from beginner to advanced levels, enabling students to engage in deep learning and maintain their motivation continuously. Meanwhile, by means of practical project assignments, students can deeply understand through actual application and promote the integration of knowledge. Advanced learners should aim at enhancing their capabilities. Large language models will take competitions as an internal driving force for students, recommend competition questions, provide the process of simulated competitions, train students' ability to think independently and solve high-difficulty problems, and lay a foundation for their future participation in competitions and practical work.

4.2. Interactive Intelligent Teaching Assistant

Due to the influence of relatively single teaching content and inability to provide one-on-one and timely guidance in the experimental teaching link of professional courses in secondary vocational schools, this paper designs a relatively comprehensive solution based on a large language model, hoping to provide reference for teaching in secondary vocational schools.

On the one hand, the use of large language models can design diverse exercise cases, generate complex texts and codes, and also generate appropriate exercises based on students' specific abilities to solve the problem of single teaching content. Meanwhile, in the traditional teaching mode of secondary vocational schools, the presentation of content is often rather monotonous, with text as the main form and pictures and videos as supplementary. This presentation method can only meet the basic learning needs of students and cannot achieve their personalization, resulting in better teaching effects [11]. The emergence of large language models has precisely enriched the presentation forms of teaching content. For highly operational skill training, large language models can provide detailed operation videos for explanation, allowing students to intuitively experience the steps of the entire process. During this process, simple diagrams and video demonstrations are provided for basic students, while complex example problem analyses and operation demonstrations are offered for high-level students. This more abundant resource not only enhances the inclusiveness of secondary vocational education but also better aligns with the goal of individualized teaching in secondary vocational education.

On the other hand, to address the issue of the inability to provide one-on-one and timely guidance in teaching, multi-

level learning team groups can be established and large language models can be integrated as an aid. First of all, students are grouped based on their specific abilities to ensure the diversity of academic levels among group members. Secondly, within the group, the senior members play the role of "group teachers", whose responsibilities are to answer questions and guide the practical operations of the junior members, while the large language model serves as a work assistant. During this process, each member can use the large language model to check the code exercises, identify errors in grammar, logic, etc., and seek help from group members based on specific problems. Meanwhile, during the process of previewing knowledge, the study group can also make use of the knowledge base of large language models to practice with actual examples, ensuring the combination of theory and practice. Finally, each member of the group should have corresponding responsibilities. The "group teacher" is responsible for overall coordination. There should be a recorder among the group members to record and summarize the learning progress of each member, and a presenter is needed to present the achievements. During the presentation, accept questions from other groups and teachers, discuss solutions with group members, continuously improve in practice, and internalize knowledge.

4.3. Improve Teachers' Digital Literacy and Build a High-Quality Teaching Staff

In the current era of rapid development of intelligent technology, digital literacy has become a new quality that teachers must possess. Teachers are required to recognize and adapt to the changes in new teaching methods and roles, and thereby build a higher-quality teaching staff.

On the one hand, we should advocate that teachers participate in the learning activities of large language models. The application of large language models by the entire group of teachers will present four progressive levels: "awakening - experience - practice - dissemination" [12]. First, during the awakening stage, let teachers understand the huge potential of large language models, stimulate their interest from the bottom of their hearts, and clearly feel that large language models are tools for improving teaching quality. Secondly, during the experience stage, schools should provide teachers with opportunities to experience and practice large language models. For instance, using large language models to intelligently grade test papers can quickly provide feedback on students' homework situations. By searching for various data resources, experience the convenience and speed of the model and feel the improvement in work efficiency. During the practical stage again, after teachers have accumulated certain experience, they can proactively integrate large language models with their daily teaching work. For instance, they can use the models to integrate high-quality educational resources and enhance teaching quality. It is also possible to analyze the difficulties of each student through their homework and then provide targeted assistance. During this process, not only can teaching be optimized, but also the cutting-edge knowledge of one's own course can be acquired, enabling the continuous improvement of the teacher's own abilities. Finally, during the dissemination stage, after teachers have accumulated experience, they are encouraged to communicate and share within the teaching team to help more teachers apply intelligent technologies and adapt to new teaching methods.

On the other hand, cultivating teachers' awareness of role

transformation is also an important part of educational reform. Teachers are no longer merely knowledge transmitters; rather, they take on the role of guides. [13] Teachers can make use of large language models and the concept of human-machine collaboration to achieve the teaching structure of "teacher-machine-student", enhance their own abilities, and lead students to conduct better autonomous learning. For example, models can be used to provide corresponding tests for different students, giving them the opportunity to verify what they have learned. When students have appropriate learning opportunities, they will gain continuous motivation and achieve the expected learning outcomes. In addition, teachers should help students analyze the obtained information with a critical eye, guide them to find the content they need from a large amount of information, and improve their autonomous learning ability.

5. The Optimization Path of the Teaching Mode

5.1. Scientific Evaluation Helps Students Keep Learning Continuously

The teaching evaluation based on the OBE concept focuses on learning outcomes, emphasizing individual learning progress. It conducts targeted evaluations based on students' different levels from unskilled to excellent, rather than comparisons among students. While traditional assessment relies on teachers' observations, although it can reflect students' certain levels, with the help of large language models, more objective and scientific observations can be obtained. The model can not only provide students with information such as the time they take to complete exercises, the accuracy rate and the error rate, but also avoid errors caused by subjectivity through the presentation of data. Thus, it can accurately identify the learning level of students, recommend appropriate exercises, give personalized suggestions and evaluations, and provide students with the motivation for continuous learning.

5.2. Ensure the Rational Application of Technology

With the rapid development of large language models, it seems that we have entered an era where "all questions can be answered". However, we are well aware that no matter how powerful technology is, it cannot be fully integrated into the growth of individual lives in education. Especially for students in secondary vocational schools who are minors, they are at an age when they are exposed to a large amount of complex information but still need guidance. The content output by large language models is often constrained by the current social culture, resulting in a rather one-sided understanding and certain limitations. Therefore, it is necessary to prevent the shaping of students' personalities from being negatively affected. Therefore, we need to clarify the specific role that intelligent technology plays in education to ensure that large language models serve the improvement of students' knowledge and abilities. Meanwhile, when teachers use the model, they need to explain to students how to determine the authenticity of the information, require students to mark the source of the information when using the model to obtain information, develop good academic habits, and guide students to establish correct values.

6. Conclusion

The purpose of this article is to discuss the exploration of the teaching mode in secondary vocational schools under the combination of large language models and the OBE concept. This paper first analyzes the problems of talent cultivation and the construction of a high-quality teaching staff in the traditional teaching mode of secondary vocational schools. Under the combination of the two, it proposes personalized learning planning, interactive intelligent teaching assistants, and improving teachers' qualities to enhance the teaching mode of secondary vocational schools. Then, the teaching mode is optimized from two perspectives: assisting students in continuous learning and ensuring the rational application of technology, so as to improve the teaching effect of secondary vocational schools, hoping to provide a powerful reference for the teaching research of secondary vocational schools.

References

- [1] He Bailue, Liu Yanfeng. Application of General Large Language Models in Vocational Education: Value Proposition, Risk Identification, and Optimized Governance[J]. Chinese Vocational and Technical Education, 2024, (28): 52-62.
- [2] Wang Beilei. Exploring an OBE-Based College English Teaching Model for Cultivating Outstanding Engineers[J]. China University Teaching, 2024, (07): 38-44.
- [3] Ma Fangyuan, Yu Wei. Transforming Primary School Chinese Language Teaching Approaches for Large Language Model-Based Learning Environments[J]. Educational Science Research, 2024, (09): 57-64.
- [4] Xu Kang, Jiang Lingyun, Huang Haiping, et al. A ChatGPT-Based Practical Approach for International Students' Compiler Principles Course[J]. Software Guide, 2023, 22(09): 227-231.
- [5] Liu Xiaoyan. Research on an Integrated "Supervision-Evaluation-Guidance" Teaching Quality Monitoring System in Higher Vocational Colleges Based on OBE Concept[J]. Chinese Vocational and Technical Education, 2024, (02): 90-95.
- [6] You Sisi, Dai Hua, Bao Bingkun. Exploring C Language Algorithm and Data Structure Course Reform Driven by Large Language Models and OBE Educational Concept[J]. Chinese Character Culture, 2024, (22): 178-180. DOI: 10.14014/j.cnki.11-2597/g2.2024.22.052.
- [7] Wang Chanchan, Shao Yunna, Hou Xiaohua. Reverse Construction of Talent Cultivation Curriculum System Based on OBE Outcome Orientation[J]. Computer Knowledge and Technology, 2021, 17(05): 162-164+176. DOI: 10.14004/j.cnki.ckt.2021.0567.
- [8] Sun Lin. On the OBE-Based Talent Cultivation Model for Translators in China[J]. Chinese Translators Journal, 2020, 41(06): 107-111.
- [9] Xue Xin. Application of AI Large Language Models in the Education Sector[J]. Telecommunications Information, 2024, (03): 33-38.
- [10] Wan Jing, He Yue. Research on Constructivism-Based Vocational Education Teaching Model from the Perspective of Artificial Intelligence[J]. Journal of Tianjin Radio & TV University, 2024, 28(01): 10-19.
- [11] Huang Ronghuai. Integrating Large AI Models into Education: Conceptual Shifts, Structural Transformation, and Key Initiatives[J]. People's Forum·Academic Frontiers, 2024, (14): 23-30. DOI: 10.16619/j.cnki.rmltxsqy.2024.14.003.

- [12] Liu Bangqi, Yin Huanhuan. AI-Empowered Enhancement of Teachers' Digital Literacy: Strategies, Scenarios, and Evaluation-Feedback Mechanisms[J]. Modern Educational Technology, 2024, 34(07): 23-31.
- [13] Chu Leyang, Pan Xianglin, Chen Xiangdong. Ethical Risks and Countermeasures of AI Large Language Models in Educational Applications[J]. Journal of Soochow University (Educational Science Edition), 2024, 12(01): 87-96. DOI: 10.19563/j. cnki. sdjk. 2024.01.009.