World Journal of Educational Studies
ISSN: 2959-9997
DOI: https://doi.org/10.61784/wjes3047

PROMOTING DEEP LEARNING: SMART CLASSROOM TEACHING STRATEGIES

Jie Huang[1,2]
[1]*Hunan Provincial Engineering Research Center for Missile Maintenance, Changsha 410024, Hunan, China.*
[2]*Department of Aviation Electronic Equipment Maintenance, Changsha Aeronautical Vocational and Technical College, Changsha 410024, Hunan, China.*
Corresponding Email: huangjie918@163.com

Abstract: In the new era, artificial intelligence (AI) technology is effectively empowering the development of higher vocational education. Within this context, smart classrooms, evolved from the iteration and upgrading of multimedia classrooms, have become an essential and routine teaching environment in higher vocational institutions. Utilizing smart classrooms to promote deep learning among vocational students has emerged as a crucial approach for enhancing talent development quality in the future. This paper constructs a new model for smart classroom teaching in higher vocational education, which effectively standardizes the implementation of smart classroom teaching activities. Furthermore, the implementation requirements of this model are elaborated. This model demonstrates significant potential in effectively promoting deep learning among students.
Keywords: Smart classroom; Deep learning; Teaching strategy

1 INTRODUCTION

Currently, a prevalent phenomenon in classrooms of higher vocational institutions is that teachers merely impart knowledge and skills to students through direct instruction, while students engage in rote learning and passive reception. In such classroom environments, student participation rates are significantly low, and their understanding of knowledge remains at the surface learning stage. Literature analysis of existing research indicates that the instructional design for pre-class and in-class phases has a crucial impact on the effectiveness of smart classrooms. However, research specifically integrating smart classrooms with deep learning is relatively scarce. Nevertheless, the consistent annual increase in related studies demonstrates that this field holds substantial research value and potential. Therefore, it becomes particularly important to study smart classroom teaching strategies that promote deep learning, as this addresses the key questions of how to enhance the teaching effectiveness of specialized courses in higher vocational institutions, guide students in achieving knowledge transfer [1], deepen their learning orientation to attain the outcomes associated with deep learning [2], and ultimately improve students' core competencies.

2 DEEP LEARNING-ORIENTED THREE-DIMENSIONAL TEACHING OBJECTIVES

American educational psychologist Benjamin Bloom categorized educational objectives into three domains: cognitive, affective, and psychomotor. The cognitive domain pertains to intellectual development, encompassing objectives related to imparting knowledge to students and training their cognitive abilities such as comprehension, reasoning, and judgment. The affective domain refers to objectives aimed at shaping students' dispositions, cultivating their sentiments, and fostering emotional attitudes. The psychomotor domain involves objectives concerning the development of students' technical skills [3].

Aligned with China's educational context, teaching objectives can be categorized into three dimensions: Knowledge and Skills, Process and Methods, and Emotional Attitudes and Values. Specifically:

The Knowledge and Skills dimension includes fundamental subject knowledge, as well as basic abilities such as acquiring, collecting, processing, and utilizing information.

The Process and Methods dimension emphasizes students' positive experience during the learning process and the mastery and internalization of scientific methods. It requires teachers to pay attention to students' individual differences and, based on their physical and mental development patterns, guide them to proactively explore learning methods.

The Emotional Attitudes and Values dimension entails teachers creating opportunities for students to participate in activities, allowing them to gradually perceive, experience, and internalize values over time [4].

Clearly defined teaching objectives serve as a beacon guiding teachers in conducting instructional activities and are also one of the standards for evaluating teaching effectiveness.

Currently, in most smart classroom teaching practices, teachers across the pre-class, in-class, and post-class phases tend to overemphasize the Knowledge and Skills objectives, focusing on cultivating students' basic abilities. The objectives related to Process and Methods and Emotional Attitudes and Values are frequently neglected, which is detrimental to the development of students' core competencies [5].

Therefore, within the smart classroom teaching model designed to promote deep learning, it is imperative to transform classrooms focused on singular objectives into those embracing multiple objectives. The three-dimensional objectives

must be integrated and implemented throughout the actual teaching process. This approach must not only promote students' continuous construction and refinement of their knowledge frameworks but also guide students to develop effective learning habits and explore suitable learning methods during the learning process. Furthermore, it must guide students in establishing sound value systems, maintaining an optimistic outlook on life, a pragmatic scientific attitude, and a tolerant attitude towards others.

3 PROMOTING DEEP LEARNING: CURRICULUM DESIGN AND IMPLEMENTATION

To better facilitate students' deep learning of knowledge, teachers should base their instruction on learning objectives, thoroughly analyze the course content, and provide students with more structured and hierarchical knowledge centered around the core concepts of the discipline. Through this knowledge, students will find it easier to construct an overall framework of the subject's knowledge. As their learning progresses and with effective guidance from teachers, the content within this framework will become increasingly rich, and their knowledge system will gradually become more comprehensive. This process will cultivate students' higher-order thinking skills. Moreover, a solid grasp of the core knowledge in the discipline will help students categorize and summarize the fragmented knowledge they acquire later, integrating it under existing relevant conceptual frameworks. This will promote the understanding, integration, and consolidation of both new and prior knowledge.

For specialized course instructors, making course knowledge more structured and hierarchical is not an easy task. It requires teachers to accurately grasp the key content of the course and be able to present the logical relationships between pieces of knowledge to students through certain methods. Existing research indicates that disciplinary mind maps play a significant role in helping students construct knowledge and achieve the internalization of disciplinary thinking. Compared to traditional mind maps, disciplinary mind maps place greater emphasis on structured thinking, focusing on the logical relationships between concepts. The process of creating disciplinary mind maps can also serve as a training ground for students' logical thinking skills [6]. Therefore, specialized course instructors can fully leverage disciplinary mind maps as a teaching and thinking tool during the instructional process. By using diagrammatic representations primarily based on hierarchical structures, they can achieve a structured representation of disciplinary teaching content. This also necessitates specialized course instructors accurately grasping the key knowledge of the course and clarifying the logical relationships between various pieces of knowledge. In the process of practical application, teachers should also pay attention to guiding students to understand the knowledge concepts and logical relationships within the disciplinary mind maps, thereby promoting students' deep understanding of the learned content.

4 TEACHING ACTIVITIES TO PROMOTE DEEP LEARNING

Under the goals of deep learning, smart classroom teaching activities not only include in-class group cooperative inquiry learning but also encompass students' independent learning activities before class and teachers' individualized guidance activities after class. Regarding the independent learning activities before class, it is both a learning method and a teaching approach, and is an essential component for students to achieve deep learning. Students in vocational colleges often have weaker self-directed learning abilities, making it even more necessary for teaching activities to stimulate and maintain their learning motivation. This requires teachers to have a very clear understanding of each student and guide them to take responsibility for their own learning [7]. Before class, teachers mainly use teaching platforms to monitor students' learning progress. If they rely solely on monitoring by the teacher to urge students to study before class, the effectiveness of students' independent learning will certainly not be good, and it may even lead to negative feelings towards the teacher and the subject. Only by transforming students' external learning motivation into internal motivation, allowing them to explore learning methods on their own, reflect on and regulate their own learning process, can their core competencies be effectively improved, and the achievement of the three-dimensional teaching objectives be promoted. This poses a challenge to teachers' teaching philosophy and teaching abilities.

The traditional teaching philosophy holds that teachers only need to impart the key knowledge for course exams to students, and then students can simply pass the exam standards by rote memorization in the days leading up to the exam, which might be the most convenient learning method for them[8]. This philosophy is deeply flawed. Although some specialized courses are highly theoretical, and students can pass the exams in a short time through last-minute rote memorization, thereby earning credits, during this process, students do not engage in much thinking or understanding of the actual content, remaining stuck in surface-level learning, and the effectiveness of specialized course education cannot be realized[9]. Therefore, specialized course teachers should, based on an understanding of their students, integrate students' interests into teaching activities before, during, and after class, while also setting highly contextualized questions to maintain students' long-term learning enthusiasm and stimulate their internal motivation for in-depth learning [10]. The teaching model for a smart classroom that promotes deep learning is shown in Figure 1 below.

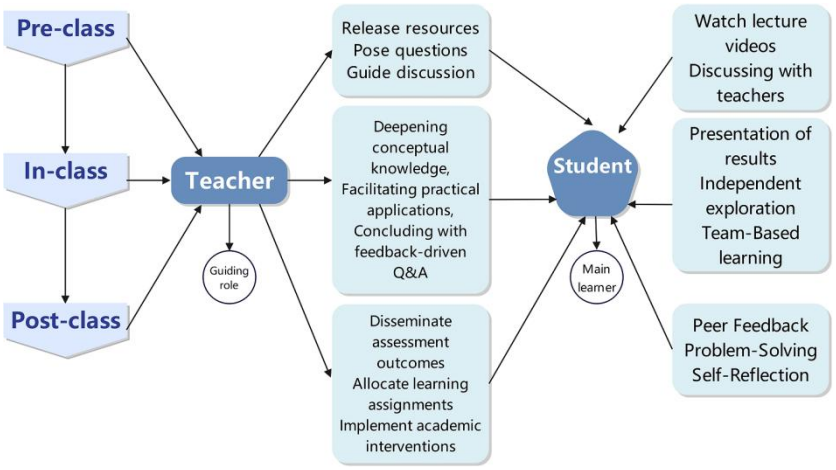

Figure 1 The Teaching Model for a Smart Classroom

5 DIVERSE TEACHING EVALUATION BASED ON DEEP LEARNING OBJECTIVES

Teaching evaluation is an important indicator for students to understand their own learning situation and for teachers to identify issues in their teaching. For students, it is only through teaching evaluation that they can recognize their specific performance during the learning process, understand their strengths and weaknesses, and thereby engage in more targeted learning and improvement. For teachers, teaching evaluation helps identify areas in their teaching that require optimization and gain a deeper understanding of each student's learning abilities and characteristics, which in turn provides scientific guidance for future teaching work. Therefore, the evaluation system for smart classrooms based on deep learning objectives has two requirements: first, clear evaluation criteria must be established so that students understand the standards they should meet in their learning, thereby striving harder to reach the goals and promoting the occurrence of deep learning; second, appropriate evaluation strategies must be selected to make scientific and objective judgments about the effectiveness of students' deep learning, enhance their sense of self-efficacy, and continuously improve their level of learning engagement. This study adopts a combination of summative and formative evaluation to assess students' overall performance, paying attention to both the students' performance during the learning process and not neglecting their learning outcomes. This approach provides a more scientific evaluation of the effectiveness of students' deep learning. Summative evaluation is primarily based on the completion of students' post-class extension tasks and their final assessments, while formative evaluation is mainly based on self-assessment, peer assessment, and teacher feedback during the pre-class, in-class, and post-class learning processes. Diverse evaluation subjects allow students to receive feedback on their learning from different perspectives, enabling them to view their learning process more objectively and reasonably, and consequently make adjustments to their learning methods and goals.

6 CONCLUSIONS

Constructing a smart classroom teaching model for higher vocational education that promotes deep learning is beneficial for students to achieve it. Through the statistical analysis of questionnaire data and the analysis of interview results, it can be observed that students who implement the smart classroom model exhibit greater learning engagement during the learning process, can better master the core knowledge of professional courses, and are able to apply critical thinking to analyze problems in group cooperative learning. They can also communicate effectively with other group members and collaborate to solve problems together. Their independent learning abilities have also improved; they not only learn the knowledge conveyed by teachers but, more importantly, have learned how to learn, enabling them to maintain their learning enthusiasm for extended periods. Therefore, compared to traditional classrooms, smart classroom teaching is more conducive to achieving students' deep learning and promoting the development of their comprehensive abilities.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

FUNDING

This study was funded by 2023 Key Project of Higher Education by Hunan Educational Science Researchers Association: "Design and Implementation of a Deep Learning-Oriented Smart Classroom Teaching Model for Higher Vocational Education" (Grant number: XJKX23A044).

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