

# A Model Study of Blended Learning in Vocational Education Based on the ADDIE Model

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**Abstract.** Under the information society, "Internet+Education" has become an important direction of education innovation, and information technology is changing the way of education. Using the technical advantages of the Internet, education is optimized and upgraded to meet the current requirements of society and promote the new development of society. Blended teaching not only reflects the active participation of students' online learning, but also gives full play to the leading role of teachers and the advantages of the penetration of various pedagogies. Blended teaching has been generally recognized in vocational education, but it still faces problems such as irregular implementation process, formalization of online learning, and teaching process not suitable for vocational education when it is actually used. In this paper, on the basis of integrative analysis of the value of vocational education and blended teaching, combined with the status quo of vocational education, the research design of blended teaching mode based on the ADDIE model has been carried out to make it more systematic, to make online and offline teaching complement each other and to enhance the teaching effect of vocational education.

**Keywords:** Blended Learning; Vocational Education; ADDIE Model; Model Study;

## 1. Introduction

In the information society, the state encourages vocational schools to use information technology to innovate the form of personnel training, teaching methods and teaching mode. Vocational education, as a kind of "type education" [1], should have a teaching mode with vocational characteristics. This paper integrates blended teaching with ADDIE model, takes into account the social requirements for vocational and technical talents, and designs a blended teaching mode with distinctive vocational characteristics and complete processes. And take "Mask Animation" in Flash course as an example to show the teaching process and teaching effect.

Blended teaching emphasizes combining the advantages of traditional teaching and E-Learning, playing the leading role of teachers and respecting the learning subjectivity of students [2]. The teaching model is a mix of active, receptive and exploratory learning for students, and a mix of online and offline interaction between teachers and students.

The author used "Blended teaching" as the keyword to check the literature in CNKI database, and visualized and analyzed the topics of the literature, and the results are shown in Figure 1. The research on blended education mainly focuses on the stage of general higher education,



learning styles of vocational students vary greatly, and the retention of online resources allows them to learn at any time, any place, and any number of times. Students at different levels can learn according to their own needs in terms of knowledge reserves before class, and with the help of teachers and the Internet, every student can reach a level of mastery through hard work.

## 2.2 The integrated integration of theory and practice emphasized in the blended learning model is at the heart of vocational education

Blended teaching allows students to master both theoretical knowledge and skill knowledge through simulated practical training with the help of Internet technology. The Internet of Things, VR, AR and other technologies are integrated into teaching to highly restore the operating environment, and the virtual laboratory supported by information technology provides a more flexible and safer experimental environment for vocational education students. It improves students' practical operation ability in constant practice, strengthens their perception and action experience, thus equipping them with appropriate vocational skills, integrating the industrial demand of creating material wealth and the educational demand of cultivating humanism into one, and realizing the training goal of vocational education.

## 3. Construction of the Blended Teaching Model based on the ADDIE Model

This paper draws on the ADDIE model to standardize and clarify the process of implementing the blended learning model.

ADDIE is a model for systematic development of instruction, which provides a systematic process for identifying training needs, designing and developing training programs, implementing training plans and evaluating training effects. The goal of the ADDIE model is to ensure that trainees acquire the required knowledge and skills to meet developmental needs. The ADDIE model divides the process of instructional design into five steps, namely, analysis, design, development, implementation and evaluation, as follows Figure 2 shows that the above steps are used to ensure the scientific and systematic nature of instructional design.

The integration of the ADDIE model and blended learning is designed in the context of vocational education, and the learning resources are designed and developed according to the teaching objectives of vocational education, so that the blended learning model can be applied to vocational education and have practical teaching effectiveness.

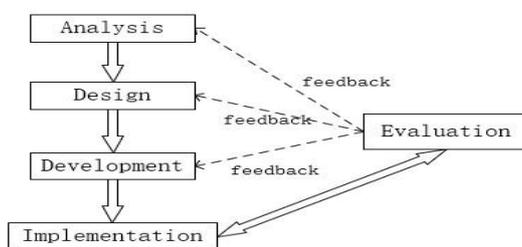


Fig. 2. ADDIE model diagram

### **3.1 Analysis phase**

To apply blended teaching in vocational education, it is important to ensure that the teaching system has a strong relevance to the students in vocational education, that the teaching content is scientific, and that it is compatible with the teaching environment. The teaching object, content and environment should be analyzed in the analysis stage.

The teaching object is mainly from the aspects of students' knowledge reserve, cognitive level, learning characteristics and so on. In consideration of vocational students' weak knowledge reserves and insufficient interest in learning, teaching strategies are determined, teaching content is organized, etc., so as to enhance students' sense of participation in learning.

Knowledge in vocational education programs comes from working knowledge, and vocationality is its essential attribute. Teaching content needs to include explicit knowledge forms such as knowledge of work situations, knowledge of work principles and knowledge of work rules, as well as tacit knowledge forms such as work skills, work know-how and work decisions [4]. Blended teaching uses different organizational methods to design teaching for different types of knowledge, determine teaching objectives, and grasp the important and difficult points. It allows students to acquire tacit knowledge while mastering explicit knowledge.

The teaching environment is an important vehicle for implementing teaching activities. Teachers need to develop environments that enable students to engage in constructive learning, and such environments should follow the principles of context, construction, cooperation and communication [5]. Vocational education emphasizes the mastery of students' technical skills, so it is important to give students scenarios and opportunities for hands-on practice. Blended teaching can be constructed through the network virtual environment to ensure that vocational education has a practical environment for students to practice.

### **3.2 Design phase**

Based on the results of the previous analysis stage, blended teaching should design the educational objectives, teaching media, organization of teaching activities, teaching resources and teaching evaluation, and direct the design results to the development stage.

The design of teaching objectives should be based on the cultivation objectives of vocational education, cultivating modern artisanal talents, strengthening students' artisanal spirit, and establishing a sense of lifelong learning [6]. Establish multi-dimensional teaching objectives and teaching key points from the "modern craftsmen". To make the educational objectives and social reality correspond to the real training to meet the needs of modern society, is conducive to the self-improvement and long-term development of vocational personnel.

Instructional media and teaching activities are organized in a student-centered manner. To visualize the expression of knowledge, students' "black boxes of learning" can be opened with the help of integrated media [7]. With the help of teaching media, the organization of teaching is designed taking into account the learning styles and cognitive bases of the students to ensure that they acquire knowledge through practice.

The design of teaching resources is an extremely important part of blended learning, which involves the design of all kinds of resources used for teaching, including online learning task

lists, videos, text resources and case designs. These resources form a library of curriculum resources to ensure ubiquitous and differentiated learning for vocational education students.

Teaching evaluation is an important factor to ensure the effectiveness of teaching and learning, and multi-dimensional design of evaluation ensures that the evaluation is comprehensive and fair. In the information society, big data is utilized to promote accurate teaching evaluation. The shortcomings of students can be shown by making multidimensional skill scoring charts for students, so as to carry out personalized teaching with goals [8].

### **3.3 Development phase**

The development of teaching resources is based on analysis and design.

The development of resources for student independent learning needs to be accomplished prior to class, including identifying task lists for each study to allow students to carry out their learning with purpose. Teachers need to choose different teaching methods such as video courses, online discussions, virtual labs, teaching games and so on according to the characteristics of the courses and the needs of students. Ensure that the resources needed for teaching are scientifically developed to form a systematic learning resource base. Let vocational education students utilize the learning resource base to learn independently according to their own situation.

### **3.4 Implementation phase**

The implementation phase is to combine online advantages with offline advantages after the above phases have been prepared and perfected, and to carry out teaching and learning activities with teacher-student cooperation to realize the teaching and learning objectives. The implementation of blended teaching in vocational education can be divided into three stages: before class, during class and after class, and the specific implementation details are discussed in the next chapter.

### **3.5 Evaluation phase**

Evaluation ensures that the value of the blended teaching model is realized. The teaching mode is corrected through process evaluation and summative evaluation. Process evaluation is mainly carried out through interviews, questionnaires, tests and other forms to correct the later teaching arrangements. Summative evaluation is a comprehensive assessment of students' knowledge mastery, learning style, ability development level and so on at the end of the course. Intelligent evaluation with the help of information technology can effectively reduce the interference of subjective factors and provide more fair and scientific evaluation results [9]. According to the feedback of the evaluation results to improve the first four steps of the teaching design, so that the blended teaching mode is more optimized, and the effect of teaching design is more prominent.

## **4. Specific implementation process**

This chapter provides an introduction to the specific implementation of blended teaching in vocational education. This paper draws on the excellent practical experience of information

technology teaching and the relevant mode of intelligent teaching [10] [11] [12], and puts forward a three-stage implementation process of blended teaching, as shown in Figure 3, Figure 4 and Figure 5. And take "Flash animation production" course "mask animation" as an example to introduce the specific process of blended teaching. The teaching was carried out in a secondary school in Jinan, and the computer application class 1 was selected as the control class and the computer application class 2 as the experimental class. There are 35 students in class 1 and 36 students in class 2. Class 1 is taught in the traditional way, and class 2 is taught in the blended teaching designed in this project.

#### 4.1 Pre-course phase

As shown in Figure 3, before the class, the teacher needs to prepare the online resources and create a course resource library, and the students do the preview.

The content of this lesson is "Masking Animation", the teaching object is computer application 2 class students. Teachers to determine the teaching case for the "spring city - Jinan", guiding students to use masking animation to make a short film to promote Jinan. First of all, the teacher designed the learning task list, clear "masking animation" of the important and difficult points. Then record a micro-lesson on "Masking Animation". The teacher prepares the audio-visual materials used in the animation and the self-study test exercises. Pack the above resources and upload them to the class resource library to remind students to do pre-study.

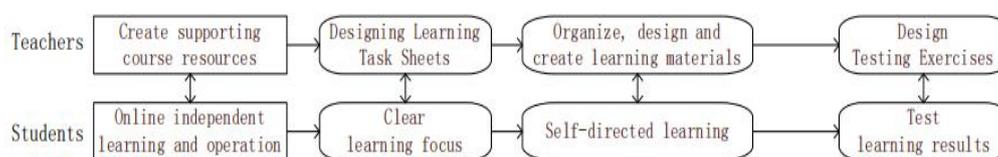


Fig. 3. Implementation process of blended teaching - Pre-course phase

#### 4.2 Mid-course phase

The classroom teaching stage is shown in Figure 4. In the offline classroom, the teacher mainly plays a guiding role, responsible for answering questions and solving puzzles, and students "learn by doing". Vocational education students have a high demand for teachers, so teacher guidance is essential in vocational education.

The teacher collects students' pre-study data through the online platform to clarify the students' existing knowledge and pre-study, so as to determine the key and difficult points of the offline teaching. In the class, the teacher utilizes the animation case of "Spring City - Jinan" to let students explore the use of mask animation skills in the context of promoting their hometown. Teachers first show the basic operation, show how to deal with the "mask layer" and "masked layer" relationship, to strengthen the students on the learning of the key points. Then in the students mastered the basic operation to encourage students to use the material to design their own "Spring City - Jinan" small animation. Guide students to design their own "mask layer" shape, independent selection of animation materials. Then through group work to improve and optimize the work, and finally submit the results to the teacher. Teacher

evaluation, encourage innovation, inappropriate places and then correct the explanation. Encourage students and groups to review each other's work and share their experiences.

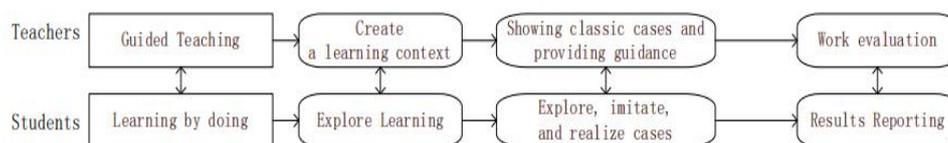


Fig. 4. Implementation process of blended teaching - Mid-course phase

### 4.3 Post-course phase

The post-course phase is shown in Figure 5. At the end of the lesson, the teacher provides post-course guidance and students internalize and absorb the knowledge. The teacher issues an online post-course task "Introduce your idol using masking animation". Students use what they have learned and combine it with what they already know to create something. If students encounter operational problems, they can review and learn from the micro-lesson videos in the course resource library. Teachers collect and summarize data from each step of the teaching process and reflect on it to optimize the teaching process. Students actively communicate with the teacher to summarize learning methods and complete the internalization of knowledge.

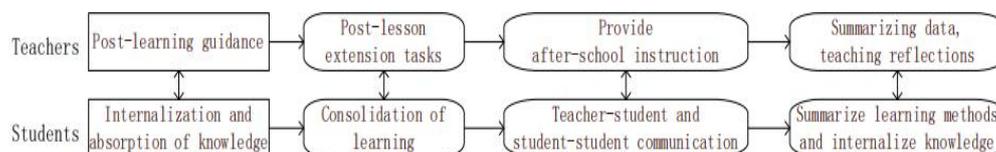


Fig. 5. Implementation process of blended teaching - Post-course phase

### 4.4 Evaluation of the effectiveness of the model

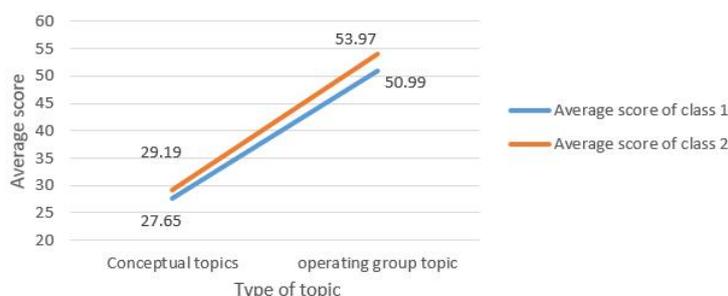
#### 1. Analysis of student learning outcomes

Student learning outcomes are an important factor in testing the strengths and weaknesses of an instructional model. This teaching evaluation was conducted by releasing pre-class pre-test questions, observing students' performance in class and post-class tasks.

Self-assessment questions with the same topics were released to students in Class 1 and Class 2. Class 1 students answered the questions after studying on their own before the class, and Class 2 students answered the questions after studying on the online platform. As shown in Figure 6, students in Class 2 scored slightly higher than students in Class 1 on both conceptual and operational questions, with a larger difference in performance on the operational questions. It can be seen that the online learning resources can help to improve the students' pre-study effect.

At the end of the lesson, the teacher issued the task "Introduce your idol using masking animation". Teachers scored the students' work in both classes, with an average score of 79 in Class 1 and 85.3 in Class 2. Among them, 36 students in Class 2 submitted complete works,

which contained more complete technical points and showed good performance. 5 out of 35 students in Class 1 submitted incomplete works, and some of the animations produced by the students were simple in operation and less aesthetically pleasing.



**Fig. 6.** Pre-course self-test question scores

Overall, students in class 2 performed better than class 1 in both the pre-course self-study test and the post-course task test. That is, this blended teaching has obvious advantages for improving students' pre-study effect as well as computer application skills.

## 2. Analysis of Students' Recognition of Teaching Models

A total of six topics were designed to analyze the teaching approval of the students in class 2. The students were scored on a scale from 1-5 based on their approval of the topic descriptions and the results are shown in Table 1.

**Table 1.** Recognition Questionnaire

test topic	average score
The resources on the online platform are highly focused and can increase the efficiency of pre-study.	4.39
Pre-reading is more effective when done through online resources	4.11
Pre-learning makes me more comfortable in class.	4.78
The micro-lessons in the course resource library are good for knowledge consolidation.	4.81
Blended Learning gives me more opportunities to communicate with the teacher.	4.00
I am satisfied with the blended learning model	4.44

The average score for this six-question survey was 4 and above, with micro-lesson videos as well as online pre-reading resources being more popular with students. Most students thought that pre-study through online platforms before class was more purposeful and efficient, prompting them to follow the teacher's pace more quickly. However, a very small number of students thought that pre-study before class increased their learning burden. In addition, students reflected that the micro-videos in the course resource library were very useful, and they could learn again through the micro-videos after they had forgotten certain operations.

Overall, this blended teaching is successful, the teaching effect is significant, the experimental class scores are significantly higher than the control class, and the experimental class students have a high degree of recognition of this teaching. It can be seen that the blended teaching mode based on ADDIE is effective.

## 5. Conclusions

In this paper, an innovative design of the blended teaching model in vocational education is carried out according to the ADDIE model, which makes the feasibility of blended teaching significantly higher and more effective in practice. The model emphasizes the joint efforts of teachers and students, and teachers need to develop appropriate curriculum and teaching resources to guide students in practice. At the same time, students need to actively participate in practical activities, communicate and cooperate with teachers and classmates. The author believes that the blended teaching model can create an ecological classroom in vocational education, make the classroom become a process of "sustainable generation of talents", and cultivate new era technical talents in the ecological classroom.

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