Scholar Publishing Group
International Journal of Multimedia Computing
https://doi.org/10.38007/IJMC.2023.040106
ISSN 2789-7168 Vol. 4, Issue 1: 86-100

# *Innovative Application of ERP Sand Table Teaching Method Based on Intelligent Multimedia and Human-computer Interaction Technology*

**Baiming Liu***

*Beijing Potential Big Data Research Institute (PRI), Beijing, China*

*Lait_liu@pri.ac.cn*

**corresponding author*

***Keywords:*** ERP Sand Table, Human-Computer Interaction Technology, Intelligent Multimedia, Teaching Means

***Abstract:*** With the rapid development of modern science and technology, intelligent multimedia system has gradually become an important part of people's daily life and office. Due to the poor flexibility of traditional multimedia systems, the requirements for intelligent multimedia systems are becoming lower and lower. This paper studied the Intelligent Multimedia Teaching (IMT) demonstration system based on the interactive means of face recognition. This paper aimed to study how to analyze and innovate the Enterprise Resource Planning (ERP) sand table teaching methods based on intelligent multimedia and human-computer interaction technology. Through the grouping experiment of 100 students, in the comprehensive ability analysis of the two groups of students before and after the experiment, before the experiment, the scores of skill application of the experimental group and the control group were 3 points, while after the experiment, the scores of skill application of the two groups were 8 points and 4 points respectively, and the scores of the experimental group were greatly improved. It can be seen that applying intelligent multimedia and human-computer interaction technology to ERP sand table teaching can effectively improve students' comprehensive ability. The erp sand table teaching method proposed in this paper can be further popularized and applied.

## 1. Introduction

Compared with the traditional teaching mode, IMT has greater advantages. The easier to use and more user-friendly IMT system can carry out teaching on the network to achieve the whole teaching process, thus replacing the traditional teaching mode. IMT teaching is a new teaching mode, which enables teachers, students and groups to communicate with each other through multimedia

technology. At this time, the interactive platform system they use as the medium of interaction and communication, and the quality of its design would help to improve teachers' classroom teaching effect, improve students' interest in learning, and improve their learning effect. IMT system adopts efficient human-computer interaction design, which can stimulate students' perception, learning interest and participation, from passive learning to active exploration learning.

With the continuous development of society, more and more research on ERP sand table. Zhang Chu explained how to reform and innovate the teaching methods and contents of ERP, and discussed the design of sand table simulation operation and training, practice design and evaluation design from three aspects [1]. The purpose of Chandrasekaran S's research was to determine the business process based configuration and programming. In order to better control and manage the data erp software package, he used descriptive research and random sampling method to sample 86 respondents [2]. Sutduean Jutamat focused on the latest manufacturing practices and their impact on organizational performance. The study also provided information related to Internet supported supply chains, and explored obstacles in supply chain integration. The literature related to the integration of supply chain and enterprise resource planning has been reviewed, and the theoretical background related to resource-based theory, technology, environment and organization has been summarized [3]. Patel Jigar K has studied that ensuring the successful implementation of ERP software depends on several key factors. Nowadays, ERP is usually used in large enterprises, but only a few small and medium-sized enterprises use this important tool [4]. Although these studies have achieved some results, more consideration should be given to the influence factors from reality.

At the same time, human-computer interaction technology is widely used in many fields. Aremu Adejare Yusuff aimed to explore the key success factors that affect the adoption level of enterprise ERP system, drew the implementation diagram of all industrial scales of Indonesian industrial departments, and described the proposed research model, including indicators of each variable [5]. Balasubramanian K completed a performance measurement project to determine the relevant key success factors from the perspective of manufacturing and operation measurement of small and medium-sized industries. Therefore, it helped to understand the weaknesses and strengths before the initial phase of deployment implementation. The important factor is to integrate operations and functions in a single system to successfully implement ERP. However, the company's measurement indicator report reduced unnecessary risk factors when implementing these systems, and provided more guidance for the planning of new ERP software for Indian SMEs [6]. The purpose of Epizitone Ayogeboh's research was to determine the following factors: the key to successful implementation of ERP system lies in the financial system of the organization. To achieve this, people need to first determine the common factors that affect the implementation of the ERP system, and then determine whether the identified factors are applicable to the financial system [7]. AlBar Adnan Mustafa investigated the factors influencing the adoption of cloud ERP in the Kingdom of Saudi Arabia by combining innovation diffusion theory and technology organization environment framework [8]. Although these studies have been explored in many aspects, sufficient data are needed to prove the reliability of the research.

The innovation of this paper is to combine human-computer interaction technology with intelligent multimedia teaching, and introduce the theory and related methods of face recognition in detail. Through the analysis of the experimental group and the control group, it is concluded that the application of intelligent multimedia and human-computer interaction technology in ERP sand table teaching is effecive.

## 2. Application Methods of Human-Computer Interaction in Teaching

### 2.1. IMT Introduction

After researching and analyzing the relevant materials of IMT in various countries, this paper summarizes some problems existing in the IMT method, and summarizes them as follows:

Due to the limited level of information technology of teachers, the selection of teaching content, the production of teaching content and the later video feedback all have certain technical difficulties. Therefore, teachers will have some operational problems in the teaching process. When implementing IMT teaching, teachers focus on multimedia teaching, which requires teachers to control their own abilities in the classroom. Individual teachers took chances and took a perfunctory attitude towards multimedia courseware. Some just take the students to watch, without clear explanations, and some even regard multimedia teaching as a formality, thinking that multimedia teaching method is wearing new shoes and going the old way. The teaching content of IMT lacks a unified selection standard for teaching materials, and the understanding of teaching materials varies from place to place, resulting in uneven quality of teaching materials. In the process of implementing IMT teaching, due to the sharing of teaching resources and the recordability of the teaching process, students will be lazy. The auxiliary facilities of the IMT method are not perfect or not maintained in time, which will affect the teaching process. There may also be the problem that the teaching time control ability of the IMT teaching method is not enough, which occupies the actual operation time of the students.

IMT method is designed for the implementation of established educational policies, and it is one of a variety of teaching methods. Before implementing IMT teaching, teachers should conduct repeated research and demonstration on IMT teaching from the aspects of classroom design, real classroom teaching situation, student development level, etc. In order to achieve the desired effect, the following four problems need to be solved, as shown in Figure 1:

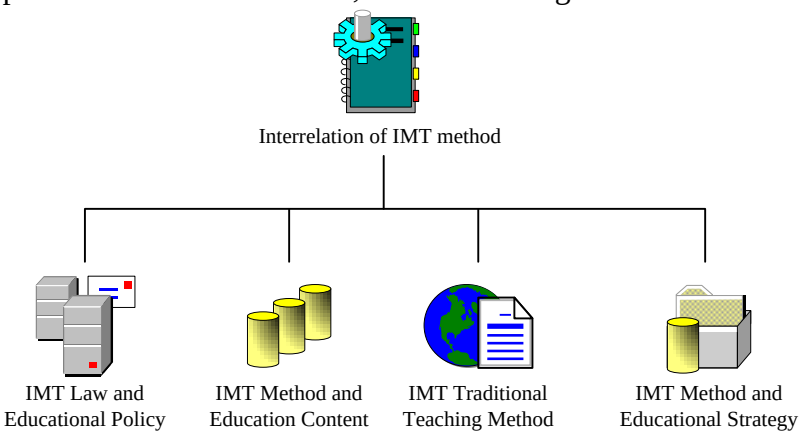



*Figure 1. Correlation of IMT methods*

As shown in Figure 1, teaching methods are diversified and constantly updated to better serve educational activities and realize their educational value. Different teaching methods play different roles, and corresponding teaching methods have emerged in different education periods. However, no matter how advanced and operable its teaching methods are, it cannot be separated from the guiding ideology. The IMT method is the same. It must follow and serve the teaching plan to ensure the smooth progress of teaching activities. On this basis, teachers should, under the guidance of teaching activities, enable teachers to better implement teaching programs in the classroom, and maximize the advantages of IMT. Therefore, people must correctly handle the relationship between

IMT law and education policy.

The whole process of education includes the subject of education, the educatee, the content of education and the method of education. As an important part of educational activities, the mutual contrast between teaching means and content is particularly important. A thorough and careful study of the teaching content and the use of IMT teaching methods can ensure the continuity of the teaching direction. In order to achieve the best combination of each link in the teaching process, people must correctly handle the relationship between IMT teaching and teaching content.

There is no teaching method that emphasizes the perfection of the form, and there is no fixed teaching process. In the real physical education class, the teaching situation is constantly changing, so people must adopt appropriate teaching strategies. Therefore, when implementing IMT teaching, people must correctly understand the relationship between IMT teaching and teaching strategies, and flexibly use teaching strategies according to the actual situation and development needs of students. In short, IMT teaching should be closely combined with education strategy to promote each other and improve teaching quality.

The traditional teaching method has been well applied in practice, but as time goes by, its teaching activities are also changing, and new teaching methods are also based on it. Under the modern education system, multimedia teaching presents new characteristics such as uniqueness, progressiveness and efficiency. However, this does not mean that the IMT method is effective for all courses, nor does it mean that the IMT method can achieve the maximum educational goal. Although IMT method has certain advantages, it has irreplaceable functions due to its wide application and operability. Therefore, when solving the relationship between IMT and traditional teaching methods, people must combine them as a whole. In the actual classroom teaching, people should not blindly pursue high-tech teaching methods, which leads to the misunderstanding that people cannot have good classes without multimedia. The quality of teaching depends on the students' mastery of knowledge and the improvement of their comprehensive quality. Only by improving students' learning efficiency, exercising their sports skills and enriching themselves can they become an excellent course.

## 2.2. Human-Computer Interaction

Human-computer interaction is a process of information exchange between people and computers in a specific interactive way. The traditional man-machine conversation mode is to control the computer and give corresponding instructions to it through a variety of pattern recognition devices such as mouse and keyboard. However, people find that the traditional human-computer interaction mode is often limited, unable to flexibly control the computer, and inconvenient to carry. Therefore, how to find a more friendly human-computer interface has become an important topic in the current computer industry. Since the 1960s, human beings have had the concept of human-computer interaction. Later, with the development of computer technology, it has formed its own knowledge system and architecture. In recent years, due to the rapid development of integrated chips and multimedia technology, people have paid more and more attention to human-computer interaction, which has changed from the device based interaction mode to the people-centered interaction mode.

With the rise and development of new media, a new round of information revolution is spreading to the field of education, which makes ERP sand table teaching face severe challenges. In ERP sand table teaching, correct and effective use of ERP sand table can not only enable students to master ERP knowledge and skills in a pleasant environment, but also improve students' interest in learning and cultivate their lifelong learning awareness [9-10]. IMT is a teaching method that combines text, audio, graphics, animation and other information carriers, as shown in Figure 2.

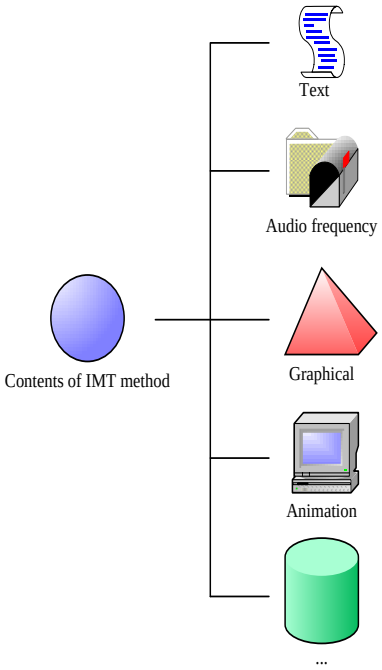



*Figure 2. Contents of IMT method*

Good human-computer interaction can improve students' sense of participation and help students obtain more information. At the same time, the emergence of interaction has also changed people's passivity in the learning process, and maximized their subjective initiative, thereby improving the efficiency of learning.

## 2.3. Application of Face Recognition

Face recognition technology is to classify the feature differences of different faces, that is, through processing the collected faces, judge whether there are faces in the obtained photos, and indicate the specific location in the photos, so as to recognize the faces in the images and obtain the recognition results. It is the crystallization of human wisdom. Through the analysis of facial morphology and expression, people can find facial features and expression features, so as to conduct in-depth research on them. Facial recognition technology contains unlimited scientific knowledge and practical value, so many scholars devote themselves to this field and have made great achievements. It is a hot research topic in many countries, which involves image recognition, image processing, biometrics and many other aspects. As a universal and easy to recognize technology, face recognition technology has been widely used in video surveillance, payment, access control, security and other fields. This paper applies this technology to the teaching demonstration system to control the opening of PPT, which is not only a breakthrough in intelligent control, but also a security guarantee for personal information.

Face detection refers to whether there is a face in a picture. If there is a face in a picture, it can judge the real position of a face and display its face. The pre-processing of human face image is to grayscale and standardize the face to remove non-human noise and reduce errors, and then use the corresponding face detection technology to determine.

First, the imaging function of Kinect sensor is used to collect the collected images. Due to the change of acquisition time, location and other environmental conditions, the acquired images would be affected to some extent, and the acquired images would also be processed. On this basis, the processed face is recognized and circled. Face images contain a lot of information. Finding useful

information in face images is an important link. Massive data requires high computing speed of the computer, so it is necessary to reduce the dimension of the face to reduce the amount of computing and improve the processing speed. The key of this method is to use a specific algorithm to determine the face recognition effect, and compare it with the image in the face database to get the correct recognition result. The flowchart is shown in Figure 3.

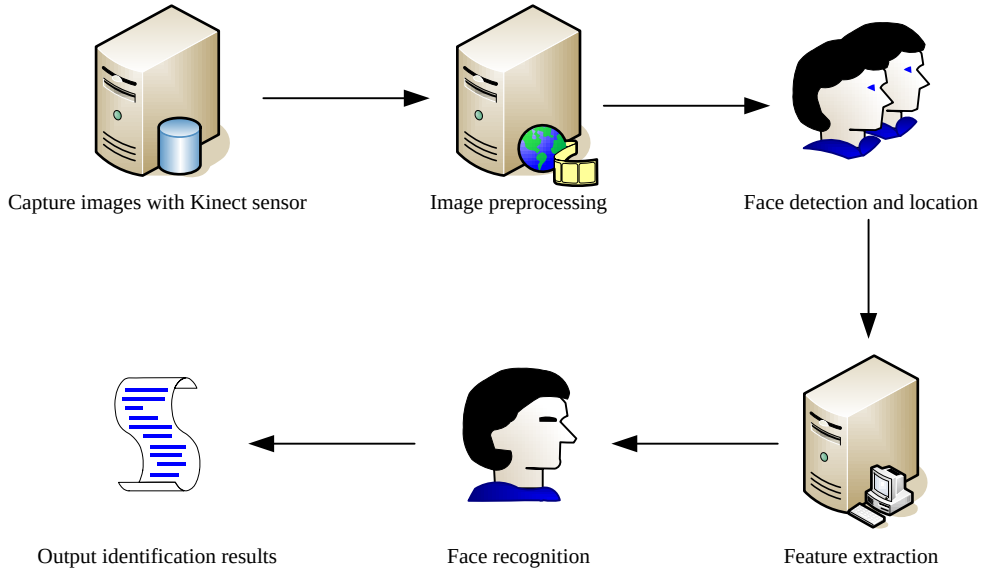



*Figure 3. Flow chart of face recognition*

Face image is a very complex graphics, which contains a lot of data, including face structure, contour, expression, and some information would change with time and space. At the same time, the image of the face would also be affected by the intensity of light, changes in clothing accessories, the brightness of the background and the complexity of the surrounding space. Therefore, how to extract and train facial features in this environment is very critical.

In facial feature extraction, the training sample set is set to $X=(X_1,X_2,...,X_M)$; $X_o$ is the face image of the o-th person; M is the total number of the entire image.

The Formula (1) is obtained by calculating the "average face" of face training samples:

$$\phi=\frac{1}{M}\sum_{o=1}^{M}X_o \tag{1}$$

The "average face" image is subtracted from each training sample image, and the difference between them is calculated. Formula (2) is as follows:

$$d_o=X_o-\phi(o=1,2,...,M) \tag{2}$$

The covariance matrix of a group of training samples is constructed. Formula (3) is as follows:

$$V=\frac{1}{M}\sum_{o=1}^{M}d_o d_o^T=SS^T \tag{3}$$

By solving the eigenvalues $\gamma_o$ and corresponding eigenvectors $b_o$ of the matrix $SS^T$, and using the singular value principle, the normalized eigenvector $i_o$ is obtained. Formula (4) is as follows:

$$i_o = \frac{1}{\sqrt{\gamma_o}} Sb_o (o = 1,2,...,a) \tag{4}$$

The characteristic vector corresponds to the characteristic value, and the characteristic vector has a contribution value of 99%. Formula (5) is as follows:

$$\varphi = \frac{\sum_{o-1}^{a} \gamma_o}{\sum_{o-1}^{M} \gamma_o} \tag{5}$$

To construct the feature face space, Formula (6) is as follows:

$$e = (i_1, i_2, ..., i_a) \tag{6}$$

The difference between the "average face" and the training sample image is calculated and projected into the feature face space. Formula (7) is as follows:

$$\Xi = e^T d_o (o = 1,2,...,M) \tag{7}$$

The difference between the "average face" and the recognized face is mapped to the space of the feature face. Formula (8) is as follows:

$$\Xi = e^T (X - \phi) \tag{8}$$

By comparing the projection coefficients of the two methods, the image type to be recognized is determined.

This paper applies face recognition technology to the intelligent multimedia ERP sand table teaching demonstration system. It is convenient and safe to use face recognition technology to open PPT demonstration documents, which can prevent personal data from leaking and tampering. At the same time, it uses multimedia technology to realize the assistance to speakers. The flow chart of face recognition in the teaching demonstration system is shown in Figure 4.

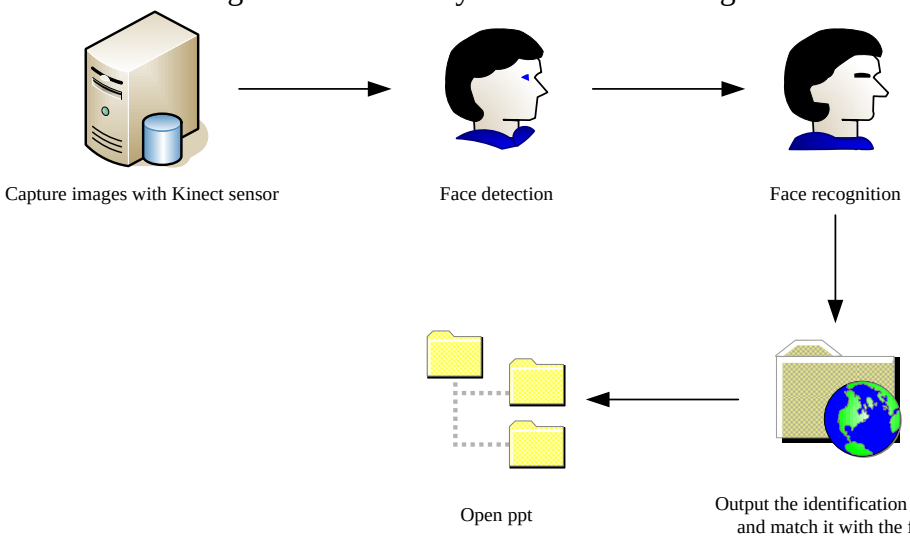



*Figure 4. Application of face recognition in teaching demonstration system*

As shown in Figure 4, users need to create a PPT file in advance, name it after their own name,

and then turn on the Kinect sensor. When users stand in front of the Kinect sensor, they can get real-time color video pictures. Through face detection and recognition of facial features, the results obtained would be fed back to the video screen, and when the confirmation results are consistent with the PPT file, the PPT file can be opened and demonstrated.

## 3. ERP Sand Table Teaching Experiment and Evaluation

### 3.1. Current Situation of ERP Sand Table Teaching

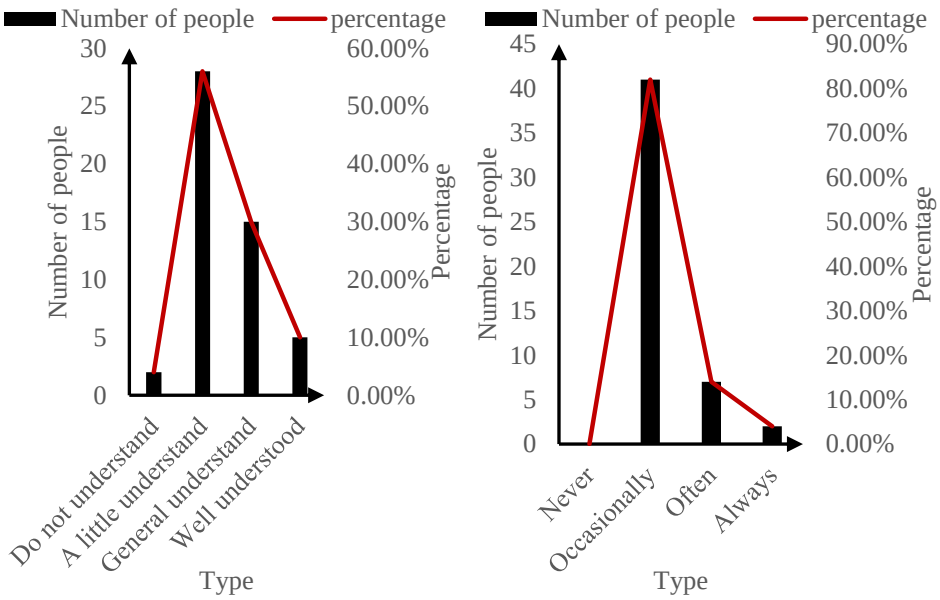
The application of modern educational technology to the teaching practice of various majors has been extensively and profoundly developed. Multimedia technology is a new teaching method, which has changed the traditional teaching method. The role of multimedia technology in improving teaching quality and teaching effect is obvious.

Due to the restriction of teaching methods, the traditional teaching mode of ERP is mostly abstract theoretical explanation and simple software demonstration, so students are easy to get involved in complex software operation and can't really understand the role of ERP in the operation of enterprises [11-12]. While the real market environment is changing rapidly, an experienced manager would use ERP to plan the resources of the enterprise according to the external environment dynamics of the enterprise. However, this kind of experience cannot be copied. The experience of others can enlighten people, but cannot replace their practice [13-14]. Therefore, the case teaching, which has been widely used in recent years, has stimulated students' enthusiasm for learning to a certain extent and enhanced their ability to analyze and solve problems. After all, it is just talk on paper, and it is difficult for students to carry out in-depth learning in the classroom.

In this paper, 50 teachers and 100 students of ERP sand table teaching were investigated and analyzed. 50 and 100 questionnaires were collected. After sorting out and screening, 50 and 100 valid questionnaires were obtained.

Figure 5 shows teachers' understanding of teaching objectives and their participation in practical exercises. According to the statistical analysis of the data in Figure 5 (a), 4.00% of ERP sand table teaching teachers did not understand the teaching objectives; 56.00% said they only knew a little; the proportion of teachers who knew well and generally was 30.00% and 10.00% respectively.

According to the statistical analysis of the data in Figure 5 (b), 82.00% of the teachers said that they would occasionally go to the enterprise for project post practice after work. Due to the heavy workload of teaching and research, many teachers are "theoretical cultivation, but lack of practical operation", which has a great impact on the quality of teaching. In addition, 14.00% and 4.00% of the teachers said they often and always participated in practical exercises.

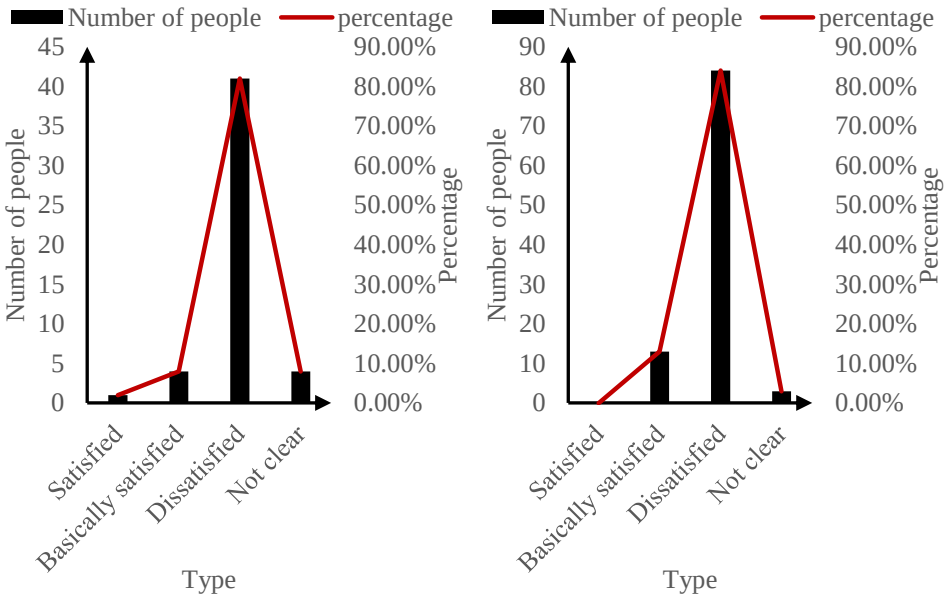



*(a) Understanding of teaching objectives* *(b) Participation in practical exercises*

*Figure 5. Teachers' understanding of teaching objectives and their participation in practical exercises*

In Figure 6 (a), 82.00% of teachers expressed dissatisfaction; 8.00% of teachers' evaluations were unclear; only 2.00% of teachers' evaluations were satisfied; 8.00% of teachers' evaluations were basically satisfied.

In Figure 6 (b), 84.00% of the students were dissatisfied; 3.00% of the students could not explain clearly; 13.00% of the students were basically satisfied; none of the students was satisfied. The questionnaire data in Figure 6 shows that both students and teachers have low satisfaction with the evaluation of the current ERP sand table teaching method.

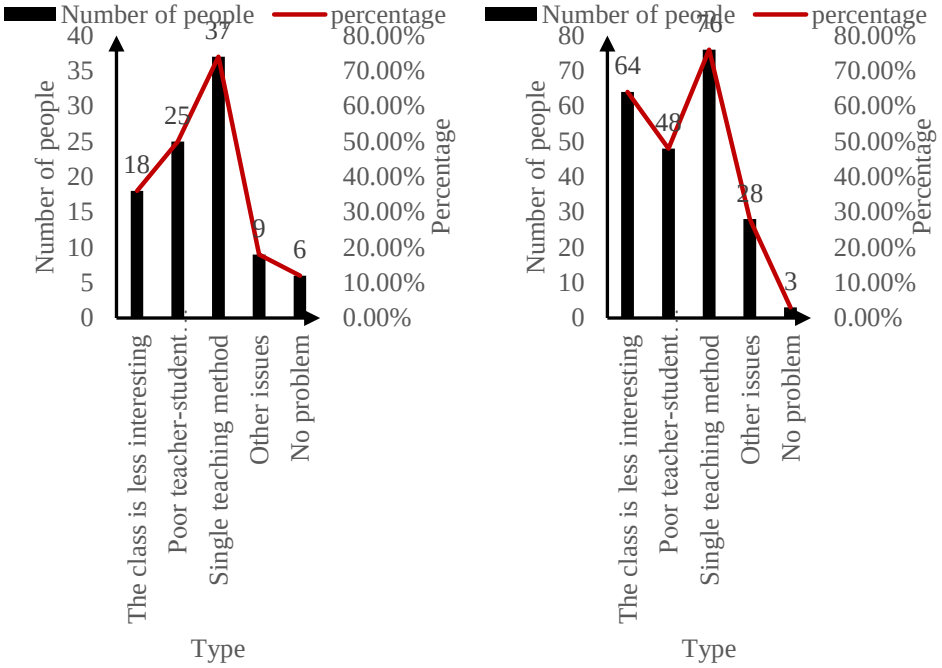



*(a) Teacher* *(b) Student*

*Figure 6. Teachers and students' evaluation of current teaching methods*

Figure 7 shows the problems in ERP sand table teaching (multiple choices are allowed). It can be seen from Figure 7 (a) that 74.00% of teachers thought that there was a single teaching method in the current ERP sand table teaching method; 50.00% thought that the teacher-student interaction was poor; 36.00% thought that the classroom was less interesting; 12.00% thought that there was no problem; 18.00% thought that there were other problems.

It can be seen from Figure 7 (b) that 76.00% of the students believed that there was a single teaching method in the current ERP sand table teaching method; 64.00% of the students thought that the classroom was less interesting; 48.00% thought that the teacher-student interaction was poor; 3.00% thought that there was no problem; 28.00% thought that there were other problems. It can be seen that the single teaching method is the biggest problem in the current ERP sand table teaching methods.




*(a) Teacher data* *(b) Student data*

*Figure 7. Problems in ERP sand table teaching (multiple choices)*

### 3.2. ERP Sand Table Teaching with Intelligent Multimedia

In this paper, intelligent multimedia and human-computer interaction technology are applied to ERP sand table teaching, and ERP simulation confrontation training is one of them [15]. Completely different from the traditional teaching method, it uses a visual enterprise operation model to simulate the operation of the company.

In order to prove the advantages of human-computer interactive intelligent multimedia teaching, this paper investigated these 100 students, and divided them into experimental group and control group. The experimental group was a teaching method combining intelligent multimedia and human-computer interaction technology, and the control group was a traditional teaching method, with 50 students in each group. The teaching experiment was conducted for 30 weeks. After 30 weeks of ERP sand table simulation training, a questionnaire survey was conducted among students, and 100 questionnaires were valid.

Table 1 shows that before the experiment, only 6 people in the experimental group were

interested in ERP sand table courses, and only 5 people in the control group were interested. After the experiment, in the experimental group, 38 people were interested in the ERP sand table course; 8 people said it was average; 4 people said they were not interested. In the control group, 8 people were interested in the ERP sand table course; 30 people said it was average; 12 people said they were not interested.

*Table 1. Are people interested in ERP sand table courses*

| | | Experience group(Person) | Control group(Person) |
|---|---|---|---|
| Before experiment | Be interested | 6 | 5 |
| | Commonly | 12 | 15 |
| | No interest | 32 | 30 |
| After experiment | Be interested | 38 | 8 |
| | Commonly | 8 | 30 |
| | No interest | 4 | 12 |

It can be seen from Table 2 that before the experiment, no matter the experimental group or the control group, they thought they had little ability, and most students did not choose any of them. After the experiment, there were 21, 26 and 31 students in the experimental group who knew about the actual business operation process, were proficient in various professional skills, and were able to handle simple accounts. However, there were still many students in the control group who did not choose any of them.

*Table 2. Acquired capabilities*

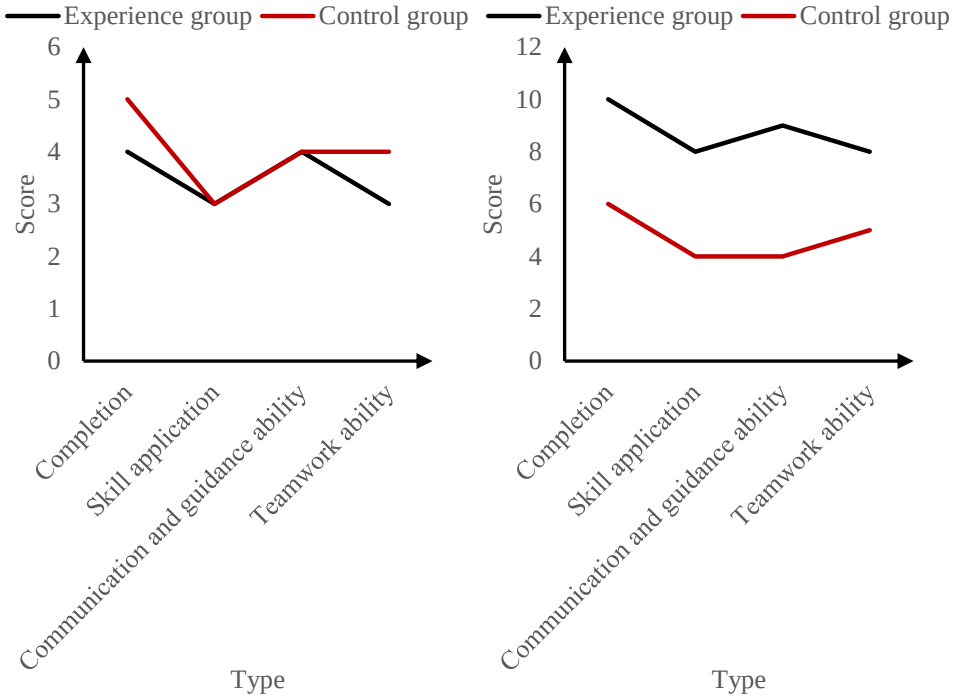
| | | Experience group(Person) | Control group(Person) |
|---|---|---|---|
| Before experiment | Understand the actual enterprise operation process | 2 | 1 |
| | Skilled in various professional skills | 5 | 6 |
| | Able to handle simple accounts | 8 | 9 |
| After experiment | Understand the actual enterprise operation process | 21 | 3 |
| | Skilled in various professional skills | 26 | 7 |
| | Able to handle simple accounts | 31 | 8 |

Students' abilities under different teaching methods of ERP sand table were scored from four aspects: completion, skills application, communication and guidance ability, and team cooperation ability. The comprehensive ability evaluation of the two groups before and after the experiment is shown in Figure 8:

It can be seen from Figure 8 (a) that before the experiment, the scores of the completion, skill application, communication and guidance ability and team cooperation ability of the experimental group were 4, 3, 4 and 3 respectively, while the scores of the completion, skill application, communication and guidance ability and team cooperation ability of the control group were 5, 3, 4

and 4 respectively. There was no significant difference between the two groups before the experiment.

It can be seen from Figure 8 (b) that after the experiment, the scores of the completion, skill application, communication and guidance ability and team cooperation ability of the experimental group were 10, 8, 9 and 8 respectively, while the scores of the completion, skill application, communication and guidance ability and team cooperation ability of the control group were 6, 4, 4 and 5 respectively. After the experiment, the score of the control group did not change much, but the score of the experimental group was greatly improved.




*(a) Before experiment* *(b) After experiment*

*Figure 8. Comprehensive capability assessment*

### 3.3. Problems in IMT

When implementing ERP sand table teaching, we should pay attention to the completeness of each link, which is consistent with the thinking logic of students, so as to ensure the cultivation of students' learning ability. On the other hand, by combining the work characteristics of each major and according to their respective job responsibilities, by classifying the students' comprehensive abilities, they can cultivate professional skills suitable for themselves in practice, and attribute them to the comprehensive professional abilities of accounting majors.

In IMT, there are still many problems:

(1) Lack of teachers who implement multimedia teaching

Teachers are practitioners of promoting and developing IMT, and the development of teachers' basic information technology directly affects the implementation of IMT. At present, the development of basic information technology for teachers in China presents an unbalanced situation, which has many causes. First of all, the development of teachers' basic information quality is unbalanced among regions. In more developed regions, teachers' basic information quality is relatively high and can be skillfully mastered and applied to practical teaching; secondly, teachers' acceptance of IMT teaching has a certain impact. In the process of IMT promotion, some teachers

cannot fully grasp the key points of IMT implementation due to their own acceptance ability. In addition, it also puts forward higher requirements for teachers' own code of conduct.

(2) Lack of necessary guidance of system theory

At present, the application of IMT in educational practice is still in its infancy, lacking systematic theoretical guidance. Compared with traditional technical training, IMT has developed in China for a short time, lacks in-depth research, and lacks a unified reference standard for different types of basketball technical movements. At present, IMT is only tested in a few regions and schools, with only some experience for reference, lacking systematic and universal theoretical guidance.

(3) Related facilities of unmatched IMT

There are mainly two kinds of IMT related equipment: one is multimedia equipment, IMT venues and other hardware equipment; one is the software and hardware equipment of IMT, such as the latest trends of IMT and the training and learning approaches of sports teachers. The mismatch between the two types of related facilities makes the implementation of IMT lag behind.

(4) Inadequate changes in IMT's educational ideas

Compared with the traditional teaching method, IMT's educational concept has not changed enough. First of all, at the level of education leadership, there is a lack of attention to IMT, financial support and corresponding training; secondly, at the leadership level of the school, IMT cannot be implemented because IMT has not been developed and perfected. Equipment is not perfect, and even there are potential security risks.

## 4. Conclusion

Based on Kinect sensor, this paper designed an object-oriented face recognition technology, and combined it with PPT technology to develop a multimedia teaching demonstration system with intelligent control. The erp sand table teaching is in line with the teaching purpose of cultivating students' comprehensive quality, and has the characteristics of participatory learning, which is welcomed by all major teachers. ERP sand table training is to organize enterprises, production, investment, research and development, marketing, financial accounting, human resource management, enterprise production, production, investment, research and development, marketing, finance, human resource management and other aspects. A set of sand table teaching aids would be used for all links such as enterprise formation, procurement and production, investment and research and development, marketing, financial accounting, and human resource management, so that students can effectively integrate the understanding and application of relevant knowledge and skills in the learning process. The article only analyzed and discussed the related problems of ERP from the perspective of teaching methods, but did not conduct in-depth research on the feedback of related enterprises, software companies, employers, etc., which is the focus of future work. It is believed that ERP sand table teaching would be more perfect and developed in the future development.

## Funding

This article is not supported by any foundation.

## Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

## Conflict of Interest

The author states that this article has no conflict of interest.

## References


[1] *Chu Zhang. Class thought and Politics Helped the Instruction Reform and Innovation of ERP Sand Table Simulation Operation Training. Curriculum and Teaching Methodology. (2022) 5(2): 1-7.*

[2] *Chandrasekaran S, R K N Manimegalai, J Deepak. Technology Transformation through Enterprise Resource Planning (ERP) towards Small and Medium Enterprises (SME), Tamilnadu. Turkish Journal of Computer and Mathematics Education. (2021) 12(11): 532-549.*

[3] *Sutduean Jutamat, Ayoruethai Singsa, Thanaporn Sriyakul, Kittisak Jermsittiparsert. Supply chain integration, enterprise resource planning, and organizational performance: The enterprise resource planning implementation approach. Journal of Computational and Theoretical Nanoscience. (2019) 16(7): 2975-2981. https://doi.org/10.1166/jctn.2019.8204*

[4] *Patel Jigar K. Critical Success Factors for Implementation of Enterprise Resource Planning Software. International Journal of Computer Science and Engineering. (2021) 8(2): 1-5. https://doi.org/10.14445/23488387/IJCSE-V8I2P101*

[5] *Aremu Adejare Yusuff, Arfan Shahzad, Shahizan Hassan. Examining factors affecting success of enterprise resource planning system adoption on organisation performance among medium-sized enterprises sector. International Journal of Business and Systems Research. (2021) 15(2): 200-213. https://doi.org/10.1504/IJBSR.2021.113408*

[6] *Balasubramanian K, V Selladurai. Contemporary ERP solution to Indian small and medium scale enterprises through constructive performance metrics. International Journal of Business Excellence. (2018) 15(4): 445-466. https://doi.org/10.1504/IJBEX.2018.093871*

[7] *Epizitone Ayogeboh, Oludayo O. Olugbara. Critical success factors for ERP system implementation to support financial functions. Academy of Accounting and Financial Studies Journal. (2019) 23(6): 1-11.*

[8] *AlBar Adnan Mustafa, Md Rakibul Hoque. Factors affecting cloud ERP adoption in Saudi Arabia: An empirical study. Information Development. (2019) 35(1): 150-164. https://doi.org/10.1177/0266666917735677*

[9] *Taghipour Mohammad, Shabrang Matin, Machiani Hassan Habibi, Shamami Nader. Assessment and Analysis of Risk Associated with the Implementation of Enterprise Resource Planning (ERP) Project Using FMEA Technique (Including Case-Study). Management. (2020) 3(1): 29-46.*

[10] *Malik Muhammad Omar, Nawar Khan. Analysis of ERP implementation to develop a strategy for its success in developing countries. Production Planning & Control. (2021) 32(12): 1020-1035. https://doi.org/10.1080/09537287.2020.1784481*

[11] *Tarigan Zeplin Jiwa Husada, Hotlan Siagian, Ferry Jie. The role of top management commitment to enhancing the competitive advantage through ERP integration and purchasing strategy. International Journal of Enterprise Information Systems (IJEIS). (2020) 16(1): 53-68. https://doi.org/10.4018/IJEIS.2020010103*

[12] *Kiran T, A Reddy. Critical success factors of ERP implementation in SMEs. Journal of Project Management. (2019) 4(4): 267-280. https://doi.org/10.5267/j.jpm.2019.6.001*

[13] *Alam Mohammad Sarwar, Md Aftab Uddin. Adoption and implementation of enterprise resource planning (ERP): An empirical study. Journal of Management and Research. (2019) 6(1): 1-33. https://doi.org/10.3390/joitmc6010002*

*[14] Zadeh Amir Hassan, Akinyemi Bolaji Akinsola, Jeyaraj Anand, Zolbanin Hamed M. Cloud ERP systems for small-and-medium enterprises: A case study in the food industry. Journal of Cases on Information Technology (JCIT). (2018) 20(4): 53-70. https://doi.org/10.4018/JCIT.2018100104*

*[15] Zhengzhong Shi, Gang Wang. Integration of big-data ERP and business analytics (BA). The Journal of High Technology Management Research. (2018) 29(2): 141-150. https://doi.org/10.1016/j.hitech.2018.09.004*