Construction of a Virtual Simulation Teaching System for Basic Nursing Teaching Integration Using Collaborative CAD and Data Mining

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Abstract. Under the background of global informatization, all countries strive to promote their informatization and actively explore the teaching reform of deep integration of modern massage techniques and primary curriculum. To adapt to the improvement of the times, teachers must change from simply imparting knowledge to cultivating wisdom. The nursing virtual simulation teaching in this paper uses the intelligent teaching mode. Intelligent Classroom is a new learning trend in the "Internet +" era. It is a new classroom produced by integrating massage techniques and teaching. It represents the new direction of future classroom instruction improvement and reform. The means used in this paper is DM. DM extracts messages and knowledge hidden in many incomplete, noisy, fuzzy, and random data, which people do not know in advance but are potentially useful. DM is a major hot topic in the domain of computer science. It is widely used in various domains. The DM algorithm plays a vital role in realizing the DM technique and directly affects whether DM can be applied to a specific practice. After research, the research results of this paper are remarkable, which is 17.38% better than traditional teaching and suitable for wide use.

Keywords: Data mining; Collaborative CAD; Basic nursing teaching; Virtual simulation teaching system
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1   INTRODUCTION

In recent years, especially in the last decade or so, with the rapid improvement and unprecedented prosperity of Internet and mobile Internet techniques, people's lives have also undergone earth-shaking changes [18]. From once a flip phone to almost everyone has a smartphone, smartphones have become indispensable in people's lives. People use mobile terminals such as smartphones to actively or passively obtain various necessary messages and services. The improvement of society is manifested in the informatization of society, the

globalization of the economy, and the explosion of knowledge. It makes it impossible for people to learn all kinds of knowledge. Knowledge-based talents can no longer meet the needs of society. Society needs more innovative talents and talents with lifelong learning abilities [3]. The social concept of talent is changing, and teachers must also be reformed to adapt to social improvement and promote social improvement. From the perspective of society, in recent years, there have been many tragedies in school; some of them died in accidents and some committed suicide. Although the accident can not be attributed entirely to the school, the school has an unshirkable responsibility as the central place for students' life and talent training. In the graduation season of each year, we can see countless job fairs, but few students can sign contracts at the job fairs [20]. Just graduating means unemployment. Is it because too many graduates can't find a job? The answer is no because the company also emerges like spring after rain. We do not lack talents; we lack talents with strong innovation ability [21]. This social reality makes us realise that our Classroom must be reformed, and the first thing to change in the Classroom is the teaching objectives and concepts. We need to establish a wise teaching concept and cultivate "wise people."

Intelligent Classroom-oriented learning platform is a form of digital campus. It is a service platform that provides independent learning for school students and student management for teachers. A global knowledge connection is being formed. To a certain extent, an open knowledge repository can effectively alleviate unbalanced teaching [13]. In some areas, teachers are weak, and teaching means are backward, so it is impossible to cultivate talents to achieve social improvement. With the help of Internet communication techniques, high-quality teaching resources have been widely spread. Education has broken the limitation of time and space. The shared high-quality learning resources and teachers have improved the level of running schools in backward areas. Because the traditional Classroom is only based on the single teaching mode of the student teacher, and there is a lack of mutual communication between students and teachers in the teaching process, teachers can not understand students' various states and questions in real-time. Teachers can not forward targeted opinions on students' questions in time [19]. However, after introducing the learning platform of the intelligent Classroom into the traditional Classroom, the teaching mode has changed to student intelligent Classroom platform teacher, and the relationship between teachers and students has become closer. In the ongoing classroom activities, teachers and students can communicate with each other and learn through this platform anytime and anywhere. Teachers can also put forward personalised recommended learning plans according to the different situations of each student on this platform, thus significantly improving students' learning efficiency and teachers' teaching efficiency [14]. We are obsessed with accumulating knowledge but neglect the generation of wisdom. Knowledge is the basis of wisdom generation, and wisdom should be the ultimate goal of knowledge acquisition.

Knowledge acquisition is easy, especially in this "Internet +" era, but wisdom is precious. With the advent of life-long teaching, people's learning activities are no longer limited to the student era but run through their lives. When we leave the campus, our learning becomes a kind of self-study, and acquiring new knowledge depends on our learning. This learning ability is also called learning ability [11]. It is the only ability we have left after we forget all the knowledge we have learned in school. The acquisition of this ability requires an intelligent Classroom [7]. With the continuous advancement of the new curriculum reform, significant changes are taking place in both the research of classroom instruction theory and the improvement of classroom instruction practice. The change from the study of basic teaching questions to the discussion of specific classroom forms and questions can be a highlight of the new curriculum reform.

The innovation of this paper lies in the following:

1. studied intelligent Classroom. This paper's research is centered on intelligent Classrooms. So, I will first introduce them. From the intelligent Classroom based on the Internet of Things technique to the intelligent Classroom based on the e-book package and the intelligent Classroom

based on data cloud and network technique, the methods have enhanced classroom interaction and improved classroom instruction efficiency.

2. introduces the advantages of an intelligent Classroom. The reason why we value the wisdom class so much is that it is functional. The reason why we do not recommend traditional teaching is definitely because the intelligent Classroom is better. Therefore, the advantages of an intelligent Classroom are introduced here. Based on the Hadoop environment, the intelligent Classroom can form data according to the learning feedback set by students in each link in the Classroom and mine and analyse these feedback data in the smart system so that teachers can accurately and effectively understand the level of knowledge mastered by each student.

3. The means and results are introduced and explained here. This will help readers have a detailed understanding. Involve readers so they can also participate in the study of this article.

This paper is divided into five parts:

The first part is the background and summary; the second is related research and brief introduction; the third is the wisdom class and its advantages; the fourth is the means and results; and the fifth is the conclusion.

2   RELATED WORK

Chao suggested that the learning path is a description of children's thinking and process of learning in a specific domain, including a series of related teaching tasks to promote students' thinking [1]. Saini proposed a three-tier architecture of scenario awareness, including three levels of scenario awareness, scenario storage and management, and scenario use and service [16]. Porter suggested the "smart" conceptual model of the intelligent Classroom. Showing, being manageable, accessible, and having real-time interactive testing are the five functions of the intelligent Classroom [15]. Long proposed applying context awareness and ontology modelling techniques to PKS and proposed and implemented an adaptive PKS system architecture [12]. Chauhan suggested that from the perspective of audience response systems (ARS), through the analysis of different disciplines such as psychology, pedagogy, and communication, it is concluded that intelligent classroom instruction should study the relationship between various elements of classroom interaction and pay attention to them all the time, to form the structural mode of classroom interaction Teaching [2]. Liu suggested that based on the analysis of the scenario modelling technique and scenario-aware service discovery technique, a personalised scenario ontology model cable was constructed, and the scenario reasoning technique was combined with the semantic matching technique to actively provide users with services with high-demand matching [9]. I suggested that intelligent Classrooms and traditional classrooms have different education and technical characteristics. Relying on the new generation of message techniques, such as the Internet of things, data cloud, wireless communication, etc., the intelligent Classroom has created a teaching message ecosystem with the Internet of things, intelligence, perception, and ubiquity [6]. Scarani suggested combining the reliability with the ontology model and proposed ontology modelling means and uncertainty reasoning means based on the reliability [17]. Liu indicated that using artificial intelligence (AI) in teaching gradually matures. It participates in students' learning in a new way and helps teachers improve teaching efficiency [10]. Guo proposed a new ontology model by combining the hotspot ontology model, hotspot diagnosis ontology, and Semantic Web Rule Language [4]. Lin suggested that wisdom transforms data, messages, and knowledge. It needs to use relevant background, context, and tacit knowledge as data support to complete the transformation from data, knowledge, and message to wisdom. Of course, it also needs active human understanding. Wisdom requires knowledge, messages, data, and other past-oriented experiences to innovate in the future [8]. Collaborative CAD technologies have been widely explored in medical education. Anatomical models and simulations in 3D have

been utilised to enhance the understanding and visualisation of complex medical concepts. Kobayashi suggested that learners should learn to integrate "intelligence," "smart", and "wisdom" to become such talents [5].

Traditional teaching and learning evaluation is mainly measured by examination. For example, the final examination accounts for 70% of the evaluation system. Neglecting the students' learning process leads to the theory of only fractions. The intelligent Classroom provides an interactive and efficient learning environment for teaching and learning, makes it possible to share, explore, produce, and apply knowledge, provides environmental protection for cultivating innovative talents, and provides data support for the teaching process and teaching decisions. This paper studies the construction of a virtual simulation teaching system of primary nursing teaching based on data mining (DM), which has important significance.

3   INTELLIGENT CLASSROOM AND ITS ADVANTAGES

3.1   Intelligent Classroom

With the rapid improvement and wide use of modern techniques such as data cloud, Hadoop, Internet of things, mobile Internet, and AI, and with the continuous deepening of the informatisation of society, the domain of higher teaching is gradually developing towards informatisation and intelligence. With the advancement of the classroom instruction process, "data" is continuously produced. From the intelligent Classroom based on the Internet of Things technique to the intelligent Classroom based on the e-book package and the intelligent Classroom based on data cloud and network technique, the method has enhanced classroom interaction and improved classroom instruction efficiency. The Classroom is the central front of teaching and teaching and the main channel for teachers to preach, teach, and solve their doubts. How to build an effective, efficient, and intelligent classroom has become one of the hot spots and focuses of the new round of curriculum reform. The intervention of the Internet of Things, computer vision, mobile terminals, and other techniques provides technical conditions for normalising and natural collection of multimodal teaching data in the intelligent classroom environment.

In the era of Hadoop, the improvement of dynamic learning evaluation based on technique and the establishment of smart Classrooms Based on learning data analysis provide new ideas for constructing and using intelligent Classrooms in modern schools. The integration and penetration of "Internet +" and teaching are constantly deepening, and message-based teaching is also developing in terms of connotation, depth, and quality. The structure and form of the learning and teaching system are transforming. The intelligent classroom data with rich types and huge volumes contains specific teaching laws, some imperceptible teaching questions, and the behavior characteristics of some learners. However, one thing is obvious: there is no inevitable connection and result between "storage" and "discovery."There is no other way than to use words. The basic structure of classroom informatization structure is shown in Figure 1.

Educational wisdom is simply the ability and virtue to successfully solve practical and specific questions or correctly solve practical and particular questions, shown in the teaching process. Through online learning, students have selectively mastered some knowledge points and understand their shortcomings in what aspects. In the learning process, they know more about what they should learn, what they should ask, and what they should do, and their participation will be more robust. Make teaching more targeted by learning. In addition, there is a question about whether data should be used sooner or later. Although the data generated by the intelligent Classroom has potential value, which can be brought into play through use, the timeliness of use is another critical factor affecting data value. Like the depreciation of other goods, the value of teaching data will gradually decline with time.
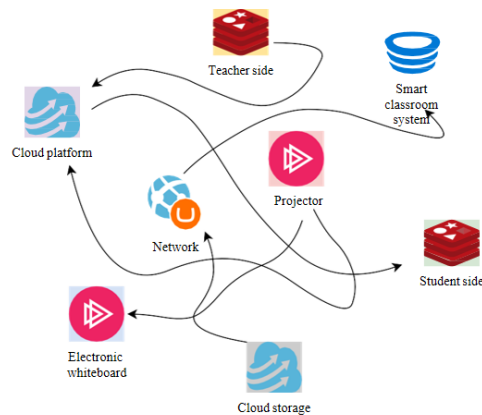
Figure 1: Basic structure of classroom informatization structure.

3.2 Advantages of Intelligent Classroom

The traditional Classroom is to learn knowledge in the Classroom and internalize understanding outside the Classroom. The conventional classroom instruction process is as follows: introduction of new lessons, knowledge explanation, assignment, homework completion, review and consolidation, and internalization of knowledge. We have always followed such a teaching process to complete our teaching tasks. The message generated in the process of classroom instruction is ever-changing. However, relying on the traditional teacher's experience to track the effective message in the Classroom in real-time to adjust the classroom instruction, it is often impossible to achieve all the insights, and the classroom instruction effect is challenging to achieve high efficiency. According to the correct rate and error points displayed by the iPad in the hands of the teachers, the questions existing in the students can be immediately and accurately corrected and solved.

If we study the process of internalizing knowledge, we will find that students are walking a difficult road. In traditional teaching, after the teacher imparts the knowledge to the students, the 45-minute teaching goal is completed. As for whether the students can use the knowledge (question-solving process), these are all completed by the students after class. Based on the Hadoop environment, the intelligent Classroom can form data according to the learning feedback set by students in each link in the Classroom and mine and analyse these feedback data in the smart system. According to the intelligent Classroom strategy, the data can be intuitively given through the intelligent Classroom platform (in the form of a learning progress curve, learning effect feedback animation, etc.), reflecting whether the teaching links are implemented and whether the teaching content is arranged reasonably, Whether the students are interested in the teaching case and whether the learning difficulty is grasped correctly so that the teachers can accurately and effectively understand the level of each student's knowledge. In the intelligent Classroom, students actively interact through online question answering, photo uploading, and answering and enjoy equal learning opportunities. Through accurate interaction with students, students change from passive receivers of knowledge learning to active receivers of knowledge learning and builders of knowledge structure and become real masters of learning. The combination of intelligent classroom and message techniques has resulted in multi-level and multi-directional integration. In traditional classroom instruction, teachers and students interact with each other. Due to the limitations of time, space, and other factors, the interaction frequency is

low, and the interaction surface is narrow. Therefore, the effect of classroom instruction cannot reach the expectation.

With the rapid improvement of modern message techniques, intelligent Classroom provides more choices for classroom instruction. Through the connection of tablet and smart platform, an operable, observable, and adjustable interactive environment appears in the Classroom, which makes classroom instruction diversified and rich, interesting, active, and effective teaching. Now, it is the message age. As front-line teachers, we should keep up with the trends of Hadoop and the data cloud. In the "intelligent Classroom," most questions can be solved, and some questions may not be solved. After class, teachers can also help students answer questions and solve some questions that can not be completely solved by online assignments, pushing learning resources, recording micro lessons, voice interaction, and photo answering through the "intelligent Classroom" platform.

4   METHODS AND RESULTS

4.1   DM

The means used in this paper is DM. Here is a brief introduction to DM. With the advent of message techniques, all kinds of data rapidly expand. Facing the massive storage of data, how to find valuable messages or knowledge from it is a challenging task. DM is based on many disciplines, such as pattern recognition, statistics, data banks, and AI. It is urgent to automatically and intelligently convert the data into valuable messages for decision-making. Therefore, DM came into being. The DM system is shown in Figure 2.
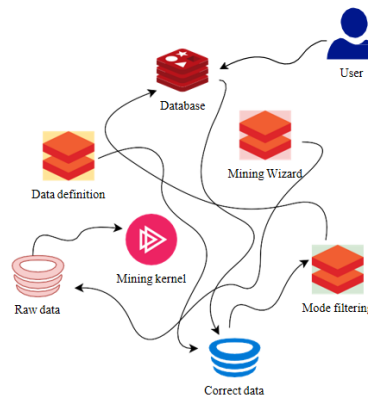

Figure 2: DM system.

We started to use DM to build intelligent Classrooms. Students' interests are modelled by recording the learning resources corresponding to their browsing, learning, testing, and other behaviors, and the learning resources are defined by the feature vector as follows:

$$R = \{(t_1, w_1, c_1), (t_2, w_2, c_2), \ldots (t_n, w_n, c_n)\} \tag{1}$$

In consideration of the long-term and short-term differences in interests, the feature vector is improved, and the learning interest model is defined as:

$$LIFSM = \{(t_1, W_1^S, W_1^L, d_1, c_1, parent_1), \ldots, (t_n, W_n^S, W_n^L, d_n, c_n, parent_n)\} \tag{2}$$

If there is no parent feature item, $parent_i$ will be 0.

Short-term interest refers to the interest of students in a relatively short period, and its calculation formula is:

$$W_i^S = \frac{1}{N} \sum_{j=1}^{N} \frac{1}{S_j} \sum_{k=1}^{S_i} w(t_i, p_k) \tag{3}$$

Where N is the statistical time size (usually in days); S_j is the number of system pages viewed by students on the jth day; $w(t_i, P_k)$ is the weight of t_i in the feature vector P_k of the current page, and the calculation formula is as follows:

$$w(t_i, p_k) = \frac{f(t_i, p_k) \times log\left(\frac{m}{mt_i} + 0.01\right)}{\sqrt{\sum_{p_k \in P}^{t \in T} tf(t_i, p_k) \times log\left(\frac{m}{mp_k} + 0.01\right)}} \times const(p_k) \tag{4}$$

The value formula of $const(P_k)$ obtained from the acquisition of learning interest messages, which are as follows:

$$const(p_k) = \begin{cases} 0, \frac{timep_k}{wnp_k} < TH \\ 1, \frac{timep_k}{wnp_k} \geq TH \\ 2, save, sownload, Print, M\,ark \end{cases} \tag{5}$$

where $timeP_k$ is the time taken by the learner to browse the page P_k; wnP_k is the total number of words o⬚⬚r the length of the content of the page P_k; and Th is the threshold value.

Long-term interest is a student's interest in learning for a long time. New long-term interest in learning will also appear, with an increasing interest in a specific short-term interest. Therefore, time and short-term interest should be integrated when assessing long-term interest. The calculation means is as follows:

$$W_i^l = W_i^{l-pre} \times e^{-\frac{ln\,2}{h \times l^{car}}}(d - d_i) + W_i^S \tag{6}$$

Find the position coordinates of the label to be located, and the weight factor is:

$$W_{1i} = 1 - \sum_{p=1}^{K} \frac{|S_p(T_i) - S_p(R)|}{K \times S_p(T_i)} \tag{7}$$

$$W_{2i} = \frac{p_i}{\sum_{i=1}^{n_a} p_i} = \frac{n_{ci}}{\sum_{i=1}^{n_a} n_{ci}} \tag{8}$$

Among them, in W_{1i}, $S_p(T_i)$ represents the $RSSI$ value of the ith reference tag on the pth reader, $S_p(R)$ represents the $RSSI$ value of the tag to be positioned on the pth reader, and the total number of readers and writers is K. W_{2i} is related to the distribution number (i.e., density) of the virtual reference tags, p_i represents the ratio of adjacent areas connected in the area space to be located, n_{ci} represents the number of adjacent areas connected and n_a represents the number of all adjacent areas.

The sum of the product of the weight factor and the position coordinates of the nearest label is calculated as follows:

$$(x, y) = \sum_{i=1}^{n_a} W_i \cdot (x_i, y_i) \tag{9}$$

$$W_i = W_{1i} \times W_{2i} \tag{10}$$

where open paren x,y, close paren represents the position coordinates of the tag to be located, and open paren x sub i.,y sub i., close paren represents the position coordinates of the ith nearest reference tag.

With the accumulation of data and the diversification of data bank types, the use prospect of DM is very broad. Each algorithm has limitations, and solving the corresponding questions with a single means is difficult.

4.2 Results and Discussion

As the main front to realise the ideal of education, in every period when human society undergoes significant changes, the Classroom will represent the challenges brought by teaching in a war society. The Classroom should adjust as soon as possible to adapt to the external environment full of contradictions and opportunities under the space-time discourse of the coexistence of differences. For human beings in a particular community, knowledge is the shining footprint left by wise people exploring the unknown world, and it becomes a force to drive away ignorance, intolerance, and ignorance. For individuals, knowledge is the process of opening the mind and gaining insight. If our teacher only cares about how many knowledge points the teachers have spoken, what teaching means the teachers have adopted, and what courses the school has arranged, without paying attention to whether the students have independent thinking, whether there are a lot of opportunities for expression and participation in the class, and whether they are interested in the courses arranged by the school, we will not have reached the understanding of the true meaning of knowledge and the profound nature of wisdom. Therefore, we will focus on generating wisdom through the deep integration of message technique and Classroom instruction in the "Internet +" era, and the intelligent Classroom should be born. It can be seen from Fig. 3, Fig. 4, and Fig. 5 that the research on learning experience in intelligent Classrooms is rising yearly.
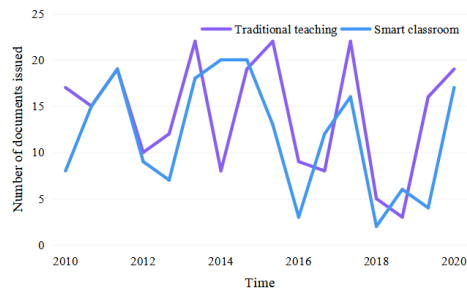

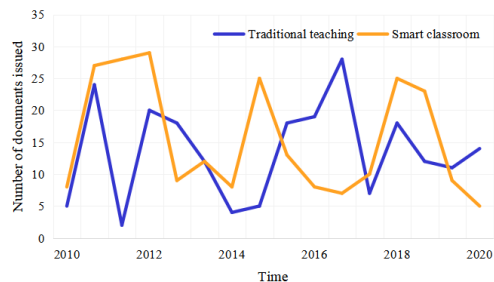**Figure 3:** Number of documents related to the core journal Intelligent Classroom.

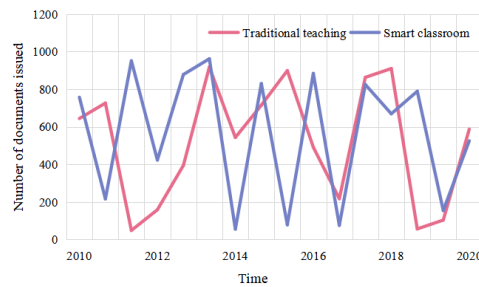**Figure 4:** Research trend of intelligent classrooms in China.

Figure 5: Research trend of learning experience.

Almost all of the few studies on "wisdom generation" are focused on Teachers' wisdom generation. In the intelligent classroom environment, it is an inevitable choice for the improvement of intelligent teaching how to move from teachers' wisdom to students' wisdom. At present, the construction demand for intelligent Classrooms is focused on supporting the teaching content and the teaching means of teachers. We can draw the same conclusion from the effect measurement. The effect measurement of intelligent Classroom is mainly based on the spatial attribute of intelligent Classroom, and the effect of the technique on supporting the established learning mode or thinking training mode is evaluated in different links. We should look at and grasp knowledge from the standpoint and height of wisdom. We should not only pay attention to the systematisation of knowledge but also regard knowledge as the symbol of human experience and culture. In that way, classroom instruction will lack lofty goals, become superficial, rigid, and mechanical, and lack thought and life. Let's examine and approve the construction orientation with the core meaning in the context of smart learning. We need to infer the process hypothesis of promoting the cultivation of students' wisdom through the support of a smart learning environment. We need to understand the essence of the intelligent Classroom, the generation and improvement of wisdom, and the process of connotation. Understanding the generation of wisdom from the process connotation can be discussed from two aspects: the relationship between technique and the generation of wisdom and their respective improvement needs. It can be seen from Tables 1, 2, 3, 4, 5, and 6 that the research results of this paper are significant, 17.38% better than traditional teaching, and suitable for wide use.

	0	20	40	60	80	100
Traditional teaching	14	50	14	22	76	29
Intelligent Classroom	89	69	48	30	31	67

Table 1: Student achievement curve.

	0	20	40	60	80	100
Traditional teaching	21	47	74	63	71	53
Intelligent Classroom	8	93	75	9	69	82

Table 2: Teacher's teaching quality curve.

	0	20	40	60	80	100
Prediction parameters	27	5	13	29	27	15
Actual results	15	9	27	9	11	7

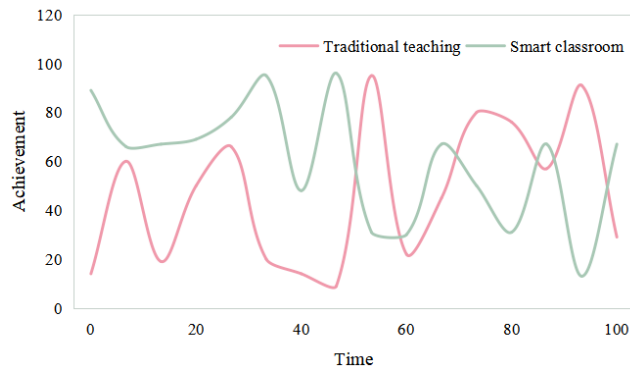**Table 3:** System operation effect curve.
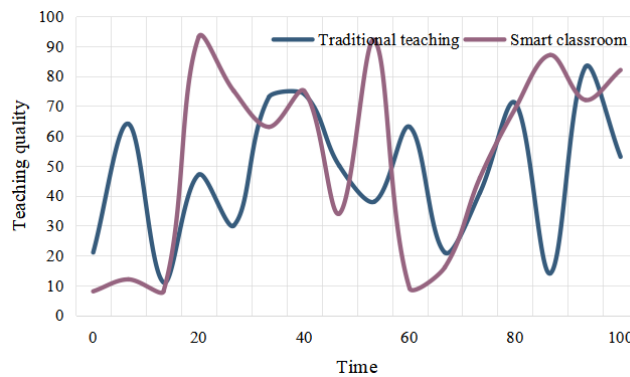
Figure 6: Student achievement curve.

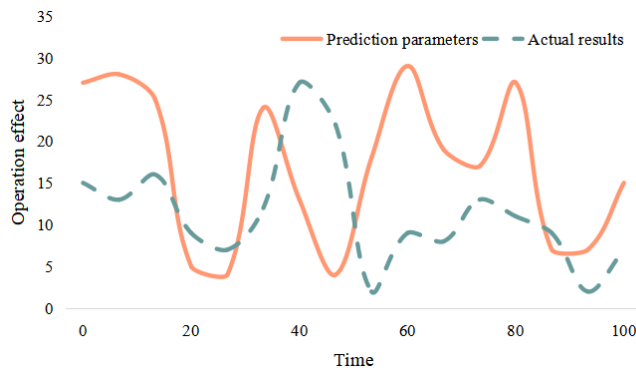**Figure 7:** Teacher's teaching quality curve.

Figure 8: System operation effect curve.

The intelligent Classroom uses science and technique to broaden the domain of teaching, expand ideas, and unlock new ways. From the perspective of the results of teaching, if teaching is regarded as the cultivation of human wisdom, the results of teaching will no longer be single, modular, and predictable but diversified, creative, and unexpected. The trained students can not

only adapt to the improvement of society but also realize the self-improvement of personality. The core of an intelligent Classroom is students' learning. Compared with traditional classrooms, students' learning process is the process of wisdom generation.

5 CONCLUSIONS

With the progress and improvement of all aspects of our society, the objectives of classroom instruction have also changed quietly. The rise of new curriculum reform has put forward new requirements and challenges for classroom instruction. Teachers' teaching should make students knowledgeable people who can adapt to social needs and improvement; this makes the focus and foothold of our classroom instruction point to the growth of students' lives and wisdom. The core of wisdom teaching is cultivating students' creative thinking and question-solving abilities. Therefore, the teaching strategy of teaching design needs to move from an alternative approach to a generative strategy. It is time to rely on the wind to urge people to advance and sail forward. In the face of the irresistible wave of education informatization, as a classroom in the teaching line, it is an inevitable trend and trend to inject technique. Creating a Virtual Simulation Teaching System for Basic Nursing, enhanced through integrating 2D and 3D elements using data mining, introduces a revolutionary paradigm in nursing education. This pioneering system harnesses state-of-the-art technologies to construct a dynamic and engaging learning environment, nurturing the acquisition of fundamental nursing skills and knowledge. This paper adopts the means of DM. After research, the research results of this paper are remarkable, which is 17.38% better than traditional teaching and suitable for wide use.

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