Research on Online Course Information Acquisition of Engineering Cost Based on Virtual Simulation Technology

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Abstract. The Ministry of Education proposed to deeply integrate higher education and information technology, and the traditional education mode also changed qualitatively with the introduction of virtual simulation technology, making educational technology more suitable for the development of modern society and the goal of talent training. Through the research on the application and practice of virtual simulation technology in the core course teaching of engineering cost specialty, virtual simulation teaching has the advantages of high efficiency, low cost, rich content, effective performance and safety, etc., and it can make the whole building change the observation through the 3d simulation animation display. By summarizing the teaching process of introducing virtual simulation technology into engineering cost course, this paper puts forward some problems that need to be further studied in the teaching process of introducing virtual simulation technology into engineering cost course, points out its advantages in the teaching process of engineering cost course, and summarizes the full text.

Keywords: Virtual simulation, engineering cost, online course, information acquisition

1. Introduction

Now as the project cost professional in higher vocational colleges, its talent training goal is to develop a can adapt to construction enterprises, real estate companies, construction units, engineering cost consulting institutions and the auditing department budget line need, such as strong practice ability [1], can in the field of engineering construction in the whole process of engineering cost management of the application of skilled talents. In the course teaching of engineering cost specialty in practice, students lack spatial imagination, have no perceptual knowledge of engineering structure, and cannot understand abstract theories, which brings bottlenecks to teachers' teaching and students' learning [2].

Virtual simulation teaching refers to the use of real objects and computer software to jointly simulate the real situation, so that students in the simulated situation to explore and learn [3]. This kind of classroom teaching mode is more suitable for the real work scene, which is beneficial to give play to students' spatial imagination ability, improve students' learning interest, make students play in learning and learning in playing, highlight the advantage of computer software, and enrich the classroom knowledge content [4], so that students can quickly master professional knowledge. Project cost professional core courses are the construction engineering measurement and valuation, the
reinforcement calculation and the double sample, etc., these core courses besides requires students to master the professional foundation courses, students also need to have strong space imagination [5], through the construction drawings to read accurate measurement valuation, and the professional core courses have a lot of practice [6].

The most common problems encountered by engineering cost students in class are the following two points: first, they cannot analyse drawings when they see them, and their ability to recognize drawings is poor [7]. The main reason for this problem is that the study of theoretical courses is impossible to allow students to directly observe the actual construction site at any time, which makes students lack of spatial imagination. When students see the plan, elevation, section and detail drawing of building construction drawings, they cannot establish the relationship between them. When they see the beam, plate, column and foundation reinforcement of structural construction drawings, they cannot make clear the clue. The study of engineering cost major is to calculate the amount of each component through drawing analysis. If only the calculation of a single component in the textbook and the budget of a whole set of construction drawings cannot be carried out, it is not in line with the requirements of training applied skilled talents in higher vocational colleges.

Second, the construction process, construction technology do not understand, calculation ideas are confused. This problem is also caused by students' limited contact with the site construction and the inability of classroom teaching resources to completely cover the entire construction process. If the engineering cost students are not clear about the construction technology and process, there will be deviation in the calculation thinking, and there may be more or less calculation in the calculation of the quantity of the project. When the quota sub items are taken, there will be missing items, wrong items or multiple sets of items, which makes the final budget statement of the project quantity and total price inconsistent with the reality.

2. Virtual Simulation

Although practical teaching of civil engineering is widely carried out in higher vocational colleges in China, students can visit and feel the practical training base, but the campus practical training base is restricted by the site, funds, teachers and other factors, so it is difficult to popularize it in a large area. For example, steel structure production and lifting, foundation engineering construction, scaffolding erection and dismantling, concrete component casting and other practical training base development need to spend a lot of manpower, material resources and financial resources, and the display is not comprehensive, the actual utilization rate is not high. Moreover, with the application of many new technologies and new processes in engineering, the existing training bases of the school may not meet the requirements and face elimination, so they have to be rebuilt and cannot be reused, resulting in a waste of resources. However, it is unrealistic for students to visit the construction site directly due to many factors such as safety, environment and practical conditions, which bring some inevitable problems to teachers' teaching and students' learning.

And with the development of virtual simulation technology, the use of virtual simulation technology in the teaching has been implemented on a lot of professional teaching, not only can fully mobilize the learner's feeling and thinking organ, make the observation of physical vivid display in front of students, can also allow learners to observe from different point of view, the development of simulation technology is regarded as a tool to solve the bottleneck of traditional teaching.

The metrological guidance enables students to understand the calculation rules and the deduction relationship in the calculation of component works through the virtual demonstration of the actual cases, which lays a good foundation for the correct measurement in the future. The test database in the virtual simulation system makes students' self-assessment more convenient and can quickly detect the learning effect. In reinforcement of quantities calculation, a virtual simulation is to show a strong technical force, to the national building standard design sets, through the three-dimensional model, the corresponding knowledge points, 4 d atlas of small classes, and other forms, the key to learn standard constructional detail knowledge ultimately enable students to master the method of atlas, and familiar with flat by case calculation method of the application of the amount of knowledge in the process.
Virtual simulation technology solves the problems existing in the previous teaching process, such as less supporting scene teaching resources, limited training space, and high operational cost of training. Meanwhile, teachers can assess the work tasks of each division project in the teaching process, enriching the teaching means and assessment methods.

Virtual simulation based on the actual construction process for each construction stage of professional division, the whole project shows the students the whole construction process, pointed, professional students through operation simulation software, not only have a clear cognition of the whole construction process, the various construction technology have full understanding of the impact on the students show the quota subtitle right and calculation of quantities the 07 of great help. Through the practical operation of simulation software and the analysis of practical cases, the teacher simplifies and systematizes the complex and boring single theoretical knowledge. Through the demonstration and analysis of 3-D animation, the students improve their learning enthusiasm, autonomy and understanding ability.

That is, let the students first of all have a preliminary understanding of the knowledge, and then through virtual simulation software to deepen the understanding and memory. We in construction engineering measurement and valuation of classroom teaching, the creation of real case to students, such as a small villa construction drawings, task is the exterior wall of quantities calculation, and the case also exist in virtual simulation system, the teachers lead students to analysis first drawings, interpretation of the brick wall engineering quantity calculation rules, and then let the student through the virtual simulation software in the same knowledge 4 d demonstration to deepen understanding, leak fill a vacancy.

3. Implementation
Project cost core course in partial engineering quantity calculation and deducting the relationship can be separation, through a simple 3 d animation with text and drawings, so that the students can more intuitive understanding of the whole train of thought and process calculation, accept more professional skills, more concrete, more complete information, more profound understanding of the application of professional skills, thus more firmly remember the learned knowledge, skilled and intuitive grasp of professional skills.

```csharp
void Update (){ 
    if (Input.GetAxis("Mouse ScrollWheel") != 0 ){
        part.transform.localScale = new Vector3(part.
transform.localScale.x + Input.GetAxis("Mouse
ScrollWheel"), part.transform.localScale.y + Input.
GetAxis("Mouse ScrollWheel"), part.transform.
localScale.z + Input.GetAxis("Mouse ScrollWheel"));
    }
    if (Input.GetMouseButton(1)){
        part.transform.Rotate(Vector3.down, Time.
deltaTime * 200 * Input.GetAxis("Mouse X"));
        part.transform.Rotate(Vector3.right, Time.deltaTime
* 200 * Input.GetAxis("Mouse Y"));
    }
    if (Input.GetMouseButton(2)){
        move.gameObject.SetActive(true);
        part.transform.Translate(Vector3.right * Input.
GetAxis("Mouse X"));
        part.transform.Translate(Vector3.up * Input.
GetAxis("Mouse Y"));
    }
}
```

In order to better show the auxiliary relationship between project cost process and parameters, text, animation and other information should be combined for auxiliary introduction. Since there are many knowledge points to be introduced, in order to improve the operating efficiency and development efficiency of the software, relevant functions should be written into functional scripts, which can be
configured freely by developers. By modifying the script configuration, the animation sequence of knowledge points and the text content of the introduction can be changed, as shown in Figure 1.

![Figure 1 Simulation scene and functional scripts](image)

The Introduce field is used to configure the introduction text of the part. The Part object field is used to configure the cost of the project shown earlier. The Need play animation field is used to control whether the animation needs to be played, the Need loop animation field is used to control whether the animation needs to be played in a loop, the Animation player field is used to configure the model to play the animation, and the Animation name is used to control the name of the current animation. The specific code is as follows:

```java
public void Knowledge_Points(){
    ui_introcuce.text = introcuce;
    part_onject.SetActive(true);
    if(need_play_anmiation){
        animation_player.GetComponent<Animation>().
        Play(animation_name);
        if (need_loop_anmiation){
            if (animation_player.GetComponent<Animation>().
                IsPlaying(animation_name) == false){
                animation_player.GetComponent<Animation>().
                Play(animation_name);
            }
        }
    }
}
```

The rapid development of economy and information age, the diversification of forms of new media, makes great changes have taken place in China in all walks of life, but also brought opportunities to China's education, the development of education in China is under the influence of Confucian culture, the Chinese traditional force-feeding education pattern, and this pattern is depend on the book or all basic education by reporting what words and thoughts of others, mainly through repetition of education and education content from the real life situation. The emergence of virtual simulation technology, improve the initiative of students, enhance the status of the main body of students, extremely urgent. With the support of Internet technology, printing technology, big data and other technological means, the interest points are cut into the course by high-tech means, and the ideas in people's minds are turned into reality through the Internet.

The comprehensive application practice of virtual simulation technology in the core courses of majors by improving the knowledge system and enhancing the post competitiveness has constructed the basic framework of students on buildings and improved the students' ability to accurately calculate the amount of civil engineering and reinforcement engineering. Students enter the whole project as a cost personnel, and form a complete knowledge system in the whole process from the calculation of the quantity of works to the selection of list items, the compilation of project features and the summary of group prices.
4. Conclusion
With the development of computer information technology, the application of virtual simulation technology in many fields has shown unprecedented advantages. In the whole process of learning, the construction drawing is accurately read, the calculation rules of the amount of work are accurately applied, the items of invoicing-valuation are accurately obtained and calculated, the way of thinking is fully expanded, the post competitiveness is obviously enhanced, and the company is truly trained for the practical working environment of excellent talents.

References
[1] Kellogg S, Edelmann A. “Massively Open Online Course for Educators (MOOC-Ed) network dataset”. British Journal of Educational Technology, vol.46, no.5, pp. 25-28, 2015.
[2] Knight L V, Steinbach T A. “Adapting Peer Review to an Online Course: An Exploratory Case Study”. Journal of Information Technology Education: Research, vol.10, no.1, pp. 81-100, 2019.
[3] Freeman M K, Schrimsher R H, Kendrach M G. “Student perceptions of online lectures and WebCT in an introductory drug information course”. American Journal of Pharmaceutical Education, vol.70, no.6, pp. 126, 2016.
[4] Yu P, Wang T, Zhang J, et al. “Design and Implementation of Inertial Measurement Information Acquisition System Based on XML”. IOP Conference Series: Materials Science and Engineering, vol.428. no.1, pp.6-12, 2018.
[5] Hazari S. “Strategy for Assessment of Online Course Discussions”. Journal of Information Systems Education, vol.15. no.4, pp. 349-355, 2014.
[6] Qingpu L. “Design of network engineering experimental teaching system based on virtual simulation”. Experimental Technology and Management, vol.12. no.3, pp.39-45, 2016.
[7] Xu W, Leng J. “Data transmission and real-time information acquisition based on fine-grained algorithm and wireless network”. Peer-to-Peer Networking and Applications, vol.2. no.2, pp.1-11, 2019.