Teaching Quality Through Virtual Simulation Technology in Guangxi Vocational University of Agricultual

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Abstract. The objectives of this research are to study the current situation of teaching quality through virtual simulation technology in Guangxi Vocational University of Agriculture, and to provide the guideline to improve teaching quality by using virtual simulation technology. The sample group was selected by random sampling. There were 312 students who had participated in virtual simulation teaching activities, 45 teachers included 37 teachers who used virtual simulation technology in their classes and 8 administrators of Guangxi Vocational University of Agriculture. The results are as follows: 1. Establishing a sound virtual simulation teaching management system; 2. Increase the quantity and variety of teaching equipment; 3. Developing virtual simulation teaching resources; 4. Strengthen the construction of the teaching staff through internal training and external recruitment channels.

Keywords: Virtual simulation technology, Teaching quality.

1 Introduction

In recent years, the country pays more and more attention to virtual simulation teaching, and has issued a series of national policies. On September 21, 2020, the Ministry of Education of China issued the Notice on the Construction of Exemplary Virtual Simulation Training Bases for Vocational Education, and on September 16, 2020, the Ministry of Education of China and nine other departments issued the Action Plan for Improving the Quality of Vocational Education (2020-2023). Virtual modern information technology has played a great role in promoting education reform and teaching model innovation. The use of virtual simulation technology can create a variety of simulated learning environments, which has outstanding advantages in experimental teaching (Liu Lei, 2021)[1].

However, because the virtual simulation technology is still a new technology, it is still in the initial stage for most universities. The virtual simulation experiment shows a wide range of applications, advanced technology and widespread promotion, but there

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construction, lack of teaching resources and insufficient teachers. Based on this, the author puts forward some countermeasures, such as strengthening the teaching concept, improving the teaching system, promoting the platform construction, increasing the construction of teaching resources and speeding up the construction of teachers. (Ren Xuejing, 2022)[2].

2 Definition of Terms

Virtual Simulation Technology refers to a computer system that can create and experience a virtual world. Using virtual simulation technology can create various simulated learning environments, which not only enable learners to feel the realistic existence of scenes and experimental objects, but also make real-time responses to learners' instructions, actions, and operations. Its application in experimental teaching has outstanding advantages.

Teaching quality refers to the level of teaching activities and the quality of teaching effects carried out by universities through virtual simulation technology. There are 4 dimensions to improve teaching quality, including teaching management system, teaching equipment, teaching resources, and teaching staff.

3 Related Research

The use of virtual simulation technology in education and teaching activities is the perfect embodiment of constructivism theory, and a teaching mode that truly integrates "teaching", "practice", "learning" and "examination" (Luan Fei, 2015) [3]. Stevens (2015) pointed out that, The use of virtual simulation-based training continues to expand, as organizations explore alternative methods to reduce the cost of training [4]. From the school's point of view, the improvement of teaching quality can focus on teaching management system, teaching equipment, teaching resources and teaching staff. Teaching quality includes four parts: teaching condition quality, teaching work quality, teaching management quality and teaching result quality. (Li Hongting,2013) [5]. Jiang Hui (2017) believes that the establishment of virtual simulation training room requires hardware equipment related to virtual reality technology [6]. Tolarba, J.E. (2021) argues that teaching using virtual simulation is highly effective in improving students' knowledge, skills and emotional outcomes [7].

To improve the virtual simulation teaching level, we should improve the authenticity of environmental simulation, implement the effect evaluation feedback, and carry out special skills training (Jin Yinfeng, 2021)[8]. Open and sharing strategies can be formulated from the aspects of top-level planning and design, classified construction and management to solve the problem of low open and sharing degree of virtual simulation teaching resources (Liu Yafeng, 2016) [9]. Strengthening the construction of "curriculum group", training "double-qualified" professional teachers, increasing investment in hardware and software facilities, and introducing school-enterprise cooperation mode are strong guarantees for improving the teaching effect of virtual simulation platform (Jiang Zhan, 2019) [10].

Measures for the construction of virtual simulation teaching in colleges and universities mainly include strengthening information management, strengthening information equipment, and improving management system to meet students' learning needs (Guan Hong, 2021)[11]. The construction of virtual simulation training bases in higher vocational colleges should deepen the combination of production and education, strengthen overall planning, pay attention to the construction of virtual simulation resources, and build the integration of resource sharing (Li Xiuli, 2023)[12].

4 Research Methodology

The population of the study were teachers and students of Guangxi Vocational University of Agriculture, which are mainly including 1,415 students who participated in virtual simulation teaching activities, 49 teachers included 41 teachers who used virtual simulation technology in their classes and 8 administrators. Based on Yamane's formula proposed by Taro Yamane in 1967, the sample size of this study was 312 students, 45 teachers included 37 teachers and 8 administrators, totally 357 people. The sample was drawn based on the principle of simple random sampling.

Design and develop questionnaires for collecting data, which consists of three parts. The first part is the basic information of the respondents; The second part is a survey on the current status of virtual simulation technology teaching quality. The questions are set as a Likert five level scale, and 18 questions are designed from four dimensions: teaching management system, teaching equipment, teaching resources, and teaching staff. The third part is open-ended questions. Interpret the data using mean, standard deviation, and score sorting.

5 Presentation& Results of Data Analysis

It can be seen from Table 1 that teachers and students have a lower evaluation of the incentive system and the lowest evaluation of the open sharing system.

Table 1. Statistical table of teaching management system

Item	Teacher opinion			Student opinion			Overall			Ranking
	M	SD	interpretation	M	SD	interpretation	M	SD	interpretation	
Assessment system	3.31	0.82	average	3.73	0.69	high	3.68	0.72	high	1
Incentive system	3.22	0.77	average	3.41	0.72	average	3.39	0.72	average	3
Feedback system	3.60	1.05	high	3.65	0.71	high	3.65	0.76	high	2
Open sharing system	2.58	0.75	average	3.09	0.84	average	3.02	0.84	average	4
Total	3.18	0.86	average	3.47	0.61	average	3.43	0.65	average	

From Table 2, teachers and students have low evaluations on the beauty and comfort of the environment, the quantity and type of teaching equipment.

Table 2. Statistical table of teaching equipment

Item	Teacher opinion			Student opinion			Overall			Ranking
	M	SD	interpretation	M	SD	interpretation	M	SD	interpretation	
Teaching operation status	3.89	0.94	high	3.81	0.86	high	3.83	0.87	high	1
New equipment configuration	3.80	0.92	high	3.66	0.82	high	3.69	0.83	high	2
Type of equipment	3.22	0.85	average	3.25	0.88	average	3.25	0.87	average	5
Number of equipment	3.00	0.77	average	3.32	0.77	average	3.28	0.78	average	4
Environment being beautiful and comfortable	3.47	0.84	average	3.34	0.78	average	3.36	0.79	average	3
Total	3.47	0.85	average	3.48	0.72	average	3.48	0.74	average	

From Table 3, teachers and students have slightly lower evaluations on the interesting, simulation and interactivity, resource type and resource coverage of virtual simulation teaching resources.

Table 3. Statistical table of teaching resources

Item	Teacher opinion			Student opinion			Overall			Ranking
	M	SD	interpretation	M	SD	interpretation	M	SD	interpretation	
Ease of operation	3.53	0.87	high	3.69	0.81	high	3.67	0.82	high	1
Interesting	3.44	0.84	average	3.45	0.71	average	3.45	0.73	average	2
Simulation and interactivity	3.38	0.89	average	3.40	0.72	average	3.40	0.74	average	3
Resource types	3.29	0.79	average	3.30	0.83	average	3.30	0.82	average	4
Resource coverage	2.33	0.98	low	2.87	1.12	average	2.80	1.12	average	5
Total	3.20	0.94	average	3.34	0.79	average	3.33	0.82	average	

As table 4, teachers and students rated the proficient use of teaching equipment and teaching methods as low.

Table 4. Statistical table of teaching staff

Item	Teacher opinion			Student opinion			Overall			Ranking
	M	SD	inter-preta-tion	M	SD	inter-preta-tion	M	SD	inter-preta-tion	
Teaching ability	3.58	0.72	high	3.49	0.73	aver-age	3.50	0.73	high	2
Proficient use	3.49	0.66	aver-age	3.50	0.70	high	3.49	0.70	high	3
Teaching methods	3.60	0.72	high	3.46	0.72	aver-age	3.47	0.72	aver-age	4
Information literacy	3.47	0.81	aver-age	3.51	0.70	high	3.51	0.72	high	1
Total	3.53	0.53	high	3.49	0.51	aver-age	3.49	0.51	aver-age	

6 Conclusion

Based on the above statistical analysis of the survey data, it can be concluded that: Regarding the current situation of teaching quality through virtual simulation technology in Guangxi Vocational University of Agriculture, Teachers and students think that the teaching management system should be further improved; Virtual simulation teaching equipment can not meet the teaching needs; The construction of virtual simulation teaching resources is not enough. The training and construction of teaching staff need to be further strengthened.

The guideline to improve teaching quality through virtual simulation technology in Guangxi Vocational University of Agriculture has 4 guides, which are as follows: 1) establishing a sound virtual simulation teaching management system; 2) Increase the quantity and variety of teaching equipment; 3) Developing virtual simulation teaching resources; 4) Strengthen the construction of the teaching staff through internal training and external recruitment channels.

References

1. Liu, Lei. (2021). Preliminary Exploration of Virtual Simulation Technology in Informatisation Teaching of Leather Discipline (Master's thesis, Qilu University of Technology).
2. Ren Xue-Jing, Yan Guo-Dong, Li Hui & Ren Qin-Xuan.(2022). Application status and development trend of virtual simulation experiment in university teaching: Based on CiteSpace Knowledge Graph Analysis. Reform and Opening Up (15),30-39. Doi: 10.16653 / j.carol carroll nki. 32-1034 / f 2022.015.005.
3. Luan Fei. (2015). Development of Virtual Simulation Teaching System for Hydraulic Transmission based on Unity3D (Master's thesis, Shandong Jianzhu University).

4. Stevens, J. A., & Kincaid, J. P. (2015). The relationship between presence and performance in virtual simulation training. Open Journal of Modelling and Simulation, 3(02), 41.
5. Li H T. (2013). Research on developmental teaching quality assurance system in rural middle schools. Chinese Journal of Education (02),56-59.
6. Jiang Hui, Lu Xuan & Yi Min.(2017). Application research of Virtual simulation technology in practical garden training teaching. Science Tribune (on the ten-day) (01), 101-102 + 129. Doi: 10.16400 / j.carol carroll nki KJDKS. 2017.01.047.
7. Tolarba, J.E. (2021). Virtual Simulation in Nursing Education: A Systematic Review. International Journal of Nursing Education.
8. Jin Yinfeng. (2021). The construction of virtual simulation "golden class": path, problems and countermeasures. Journal of Hebei Normal University (Education Science Edition) (05), 115-121. doi: 10.13763/j.cnki.jhebnu.ese.2021.05.014.
9. Liu Yafeng, Su Li, Wu Yuanxi, Tang Zhaohui, Zhang Rixin, Zhao Yuandi & Yu Longjiang. (2016). Exploration of open sharing strategy of virtual simulation teaching resources. Experimental Technology and Management (12), 137-141+145. doi: 10. 16791/ j. cnki. sjg.2016.12.034.
10. Jiang, Zhan & Qin, Xi. (2019). Construction and guarantee of virtual simulation teaching platform for finance and accounting profession. Laboratory Research and Exploration (10), 238-241.
11. Guan H. (2021). Construction and practice of virtual simulation practice teaching Center in undergraduate universities. Heilongjiang Science (05), 82-83.
12. Li, Xiuli, Li Shen, Fang Wei & Ji Wu. (2023). The construction path of virtual simulation training base in vocational colleges with integrated resource sharing. China Vocational and Technical Education (14), 92-96.