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Investigation and Analysis on the Effect of Digital Teaching Means in Western Universities

-- Take the Virtual Simulation Experiment Project of Universities in Yunnan as an Example

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Abstract: With the continuous development of modern information technology, promoting the digitalization of education has become a strategic action. In this paper, the Logit model of virtual simulation experiment project satisfaction is constructed, and the empirical analysis is carried out based on the survey data of virtual simulation experiment project in Yunnan universities. The results show that: the project characteristics and experimental content of virtual simulation experiment have a positive effect on student satisfaction; The overall satisfaction of students with the development of virtual simulation experiment project is low; The development of digital teaching means in western universities is still hindered and its use effect still needs to be improved. Based on this, this paper puts forward relevant suggestions from various aspects, in order to strengthen the construction of virtual simulation experiment projects in western China, so as to further improve the use effect of digital teaching means in western colleges and universities.

Keywords: Western Universities; Digital Teaching; Virtual Simulation Experiment; Logit Model.

1. Introduction

1.1. Research Background

To build a modern socialist country in an all-round way, science and technology are the key, human resources are the foundation, and education is fundamental. With the promotion of higher education teaching reform and the rapid development of information technology, digital teaching means usher in new development opportunities on the basis of the further formation of Internet cloud teaching environment. At present, China is at the key node of the leap from 1.0 to 2.0 stage of education informatization [1]. Experimental virtual teaching is an important project in the technical construction of higher education in China. The content and depth of virtual experimental education will change the quality of higher education through diversified teaching methods, innovative, efficient and reliable experimental technology [2].

In 2017, the Ministry of Education proposed in the Notice on the Construction of Demonstration Virtual Simulation Experimental Teaching Projects from 2017 to 2020 (No.4 of the Office of Education and Higher Education (2017)) that about 1,000 demonstration virtual simulation experimental teaching projects would be identified by 2020 [3]. By February 6, 2023, 3,438 virtual simulation experiment courses had been launched on the national Virtual Simulation Experiment Teaching project sharing platform, and 728 of them had obtained national accreditation.

1.2. Research Significance

The 2022 National Education Work Conference clearly proposed to implement the strategic action of education digitalization [4]. Accelerating the promotion of digital teaching is the strategic support and power engine to realize the modernization of education. Practice shows that digital teaching can not only realize intelligent education and teaching, but also promote the balanced allocation of high-quality resources. Under the new situation, the traditional education mode has been unable to meet the objective teaching needs, but under the development of virtual simulation experiment teaching, it can make up for the defects of traditional teaching and effectively integrate the experimental teaching resources. The virtual simulation experimental teaching project in the new era has the following three important functions: First, enrich the experimental teaching content and optimize the experimental teaching form. The virtual simulation experiment project breaks the time and space limitation in the traditional experimental teaching projects. Based on the construction of the virtual simulation experiment platform, the traditional experimental project problems of "can't be done, can't be done, can't be done" are solved through the integration of information technology and experimental teaching. Secondly, theory and practice should be combined to promote the development of students' innovative and creative ability. With the help of the Internet, animation and virtual scenes, the experimental knowledge points, methods and steps can be vividly displayed, which greatly arouses students' interest in learning. Students change from passively accepting knowledge to actively constructing knowledge and emotional experience, forming the habit of independent exploration and cooperative learning, and improving their creativity and comprehensive ability [5]. Third, the means of information can be applied to education and improve the level of building a team of teachers. Through the introduction of virtual simulation experimental education project, we will make full use of the existing resources to improve the efficiency of experimental education, and help teachers improve their work and scientific research ability[6]. At present, virtual simulation experiment project provides an important opportunity for promoting the reform of education mode, and at the same time, the reform of education mode also puts forward higher requirements for the development of virtual simulation experiment project.

In view of the importance of the construction of virtual simulation experiment teaching projects in western colleges

and universities, in order to make better use of virtual simulation experiment teaching resources, this paper takes the virtual simulation experiment project in Yunnan Province as an example, and conducts a systematic investigation and research on the development situation of virtual simulation experiment teaching projects in colleges and universities across the country by means of questionnaire survey. The conclusion is drawn and some reasonable suggestions are put forward in order to give some enlightenment to the construction of virtual simulation experiment teaching project and education reform in western universities in the future.

2. Development Status of Virtual Simulation Experiment Projects

2.1. Basic Information

Education digitalization has achieved a historic leap, opening up a new track and adding strong momentum for the construction of education power. [7] As an important part of the educational digitalization strategic action, virtual simulation experiment teaching has made important contributions to the experimental and practical teaching of colleges and universities in the past epidemic prevention period. With the reform of higher education teaching and the rapid development of information technology, in order to deeply integrate experimental teaching and informatization in colleges and universities, we should vigorously strengthen the construction of virtual simulation experimental teaching center, support and encourage the opening and sharing of experimental teaching resources inside and outside the university, in the region and in a wider range. In May 2022, the General Office of the Ministry of Education issued the National Smart Education Platform Digital Education Resource Content Audit Standards (Trial); In December 2022, the CPC Central Committee and The State Council issued the Opinions on Deepening the Construction and Reform of Modern Vocational Education System. These documents and measures reflect and improve the teaching and management ability of the virtual test team, and provide the atmosphere, teaching and data management, and teaching courses for the virtual test team.

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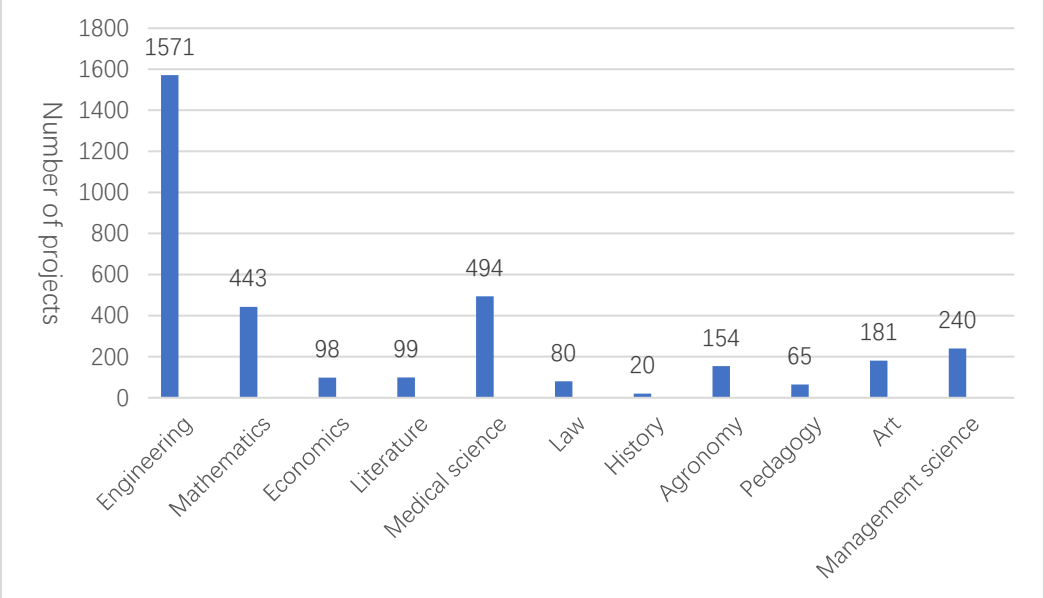


Fig 1. Number of online virtual simulation experiment projects in each discipline

2.2. Western Trip Plan

In September 2021, the "Western Travel Plan of Experimental Teaching Courses" was officially launched. The plan was guided by the Department of Higher Education of the Ministry of Education, led by the Laboratory Construction and Experimental Teaching Steering Committee of Higher Education Institutions of the Ministry of Education and Higher Education Press, and jointly held by universities in the eastern and western regions. The overall goal is to improve the experimental teaching level and talent training ability of western colleges and universities, further promote the cooperation between eastern and western colleges and universities, help western colleges and universities make good use of the first-class experimental teaching courses according to local conditions, school conditions and course conditions, and create local experimental teaching courses with western characteristics. [8] At present, a total of 712 virtual simulation courses have been built in western colleges and universities, and teachers and students in western colleges and universities have carried out 1.45 million online experiments.

The Western trip program currently has two activities. On September 25, 2021, the launching ceremony of "Experimental Teaching Course Trip to Western China" and the seminar on the construction and application of first-class experimental teaching courses were officially kicked off in

Xining city, Qinghai Province. The Steering Committee for Laboratory Construction and Experimental Teaching of Higher Education Institutions of the Ministry of Education and the Higher Education Press will continue to promote the "trip to the West" work, further promote the cooperation between universities in the east and the west, constantly explore the innovation of experimental teaching curriculum system, content, quality and application sharing, and further promote the establishment of local experimental teaching curriculum. On December 17, 2021, the second phase of "Experimental Teaching Course trip to Western China" and the online training on the construction and application of innovative experimental teaching courses were successfully held. The training focuses on the design of innovative experimental teaching courses, the integration of virtual reality technology and experimental teaching, the core elements of experimental teaching, the cultivation of students' lifelong development ability, and the sharing of experience in the construction of first-class experimental courses. To carry out the construction of the first-class courses of virtual simulation experimental teaching is one of the construction projects of the "Double Ten Thousand Plan" and "five golden courses" of the first-class undergraduate courses of the Ministry of Education, and also one of the important links to promote the innovation of experimental teaching and improve the quality of talent training in colleges and universities.

In addition to activities, the national virtual simulation experiment course teaching platform also offers a total of 13 courses jointly built between the east and the west, such as Kunming University of Science and Technology and Beijing University of Chemical Technology jointly set up virtual chemical process control simulation experiment course. A total of 25 universities are involved in the co-construction courses between the east and the west, among which two universities are in Yunnan, namely Yunnan Normal University and Kunming University of Science and Technology. At present, there are a total of 20 western universities carrying out experimental teaching (as shown in Figure 3), among which there are only 2 universities in Yunnan, namely Yunnan Agricultural University and Jinqiao College of Kunming University of Science and Technology. It can be seen that the implementation of the trip plan in western Yunnan Province needs to be strengthened, and the scope of virtual simulation teaching in colleges and universities needs to be further expanded.

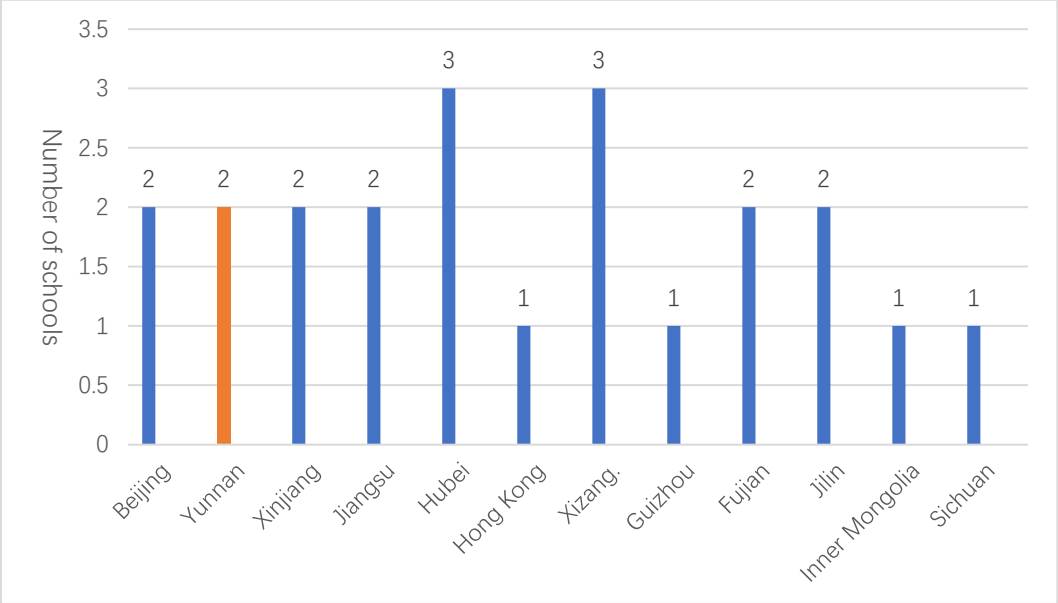


Fig 2. Distribution of schools with co-built curriculum in the eastern and western regions

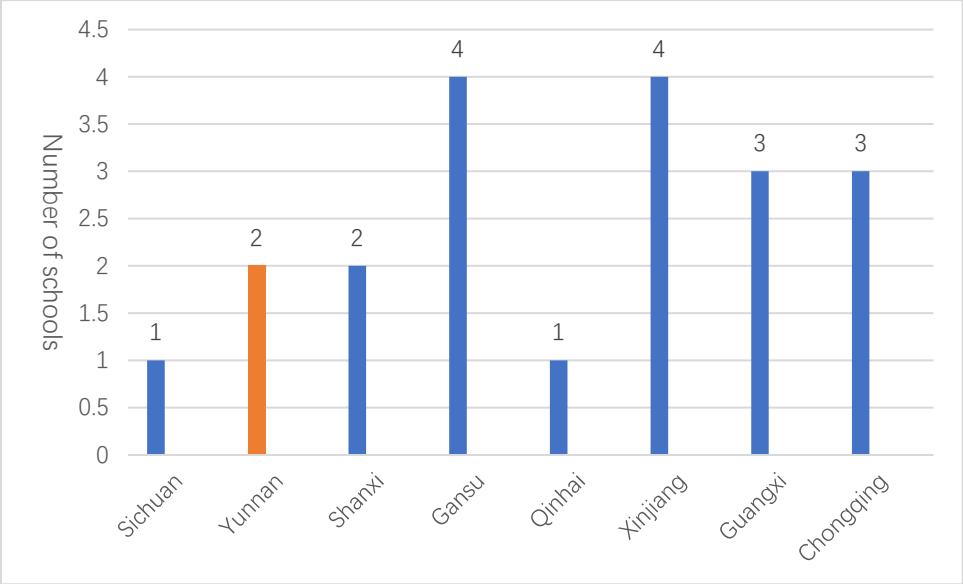


Fig 3. Western universities carrying out virtual simulation experiment teaching

2.3. Construction of Virtual Simulation Experiment Projects in Yunnan Universities

There are 82 colleges and universities in Yunnan Province, including 32 undergraduate colleges and 50 junior colleges. According to statistics, the number of universities that have opened virtual simulation experiment projects is 15, such as Yunnan University, Kunming University of Science and Technology, Yunnan Agricultural University, Yunnan University of Finance and Economics, etc. These universities are all undergraduate colleges, and junior colleges have not opened virtual simulation experiment projects. Statistics show that the total number of virtual simulation experiment projects in Yunnan Province is 88, among which Yunnan University, a "211" university in Yunnan Province, has 18 projects, ranking first in the province, followed by Kunming University of Science and Technology and Yunnan Normal University with 12 and 16 projects respectively. The construction of virtual simulation experiment projects in colleges and universities is related to whether the strength of colleges and universities is a key construction university.

The first batch of demonstration virtual simulation experiment teaching projects were identified in 2017, so this study counts the annual average number of virtual simulation experiment projects launched in colleges and universities in Yunnan Province from 2017 to 2022. As shown in Figure 4, the total number of online projects in 2017 was 6, the number of online virtual simulation experiment projects in 2018 increased rapidly to 22, and continued to rise to 29 in 2019. Due to the impact of the epidemic in 2020, Yunnan Province did not launch virtual simulation experiment projects, and the number increased rapidly to 28 in 2021. However, the number of newly launched projects in 2022 rapidly decreases to 3, which shows that the sustainability and stability of virtual simulation experiment project construction in Yunnan Province are not high.

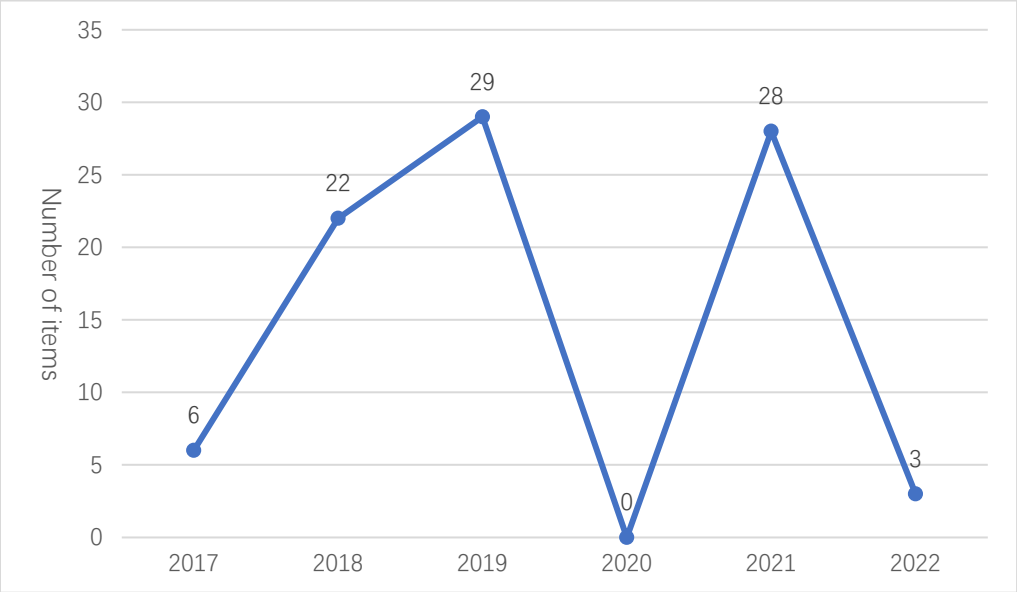
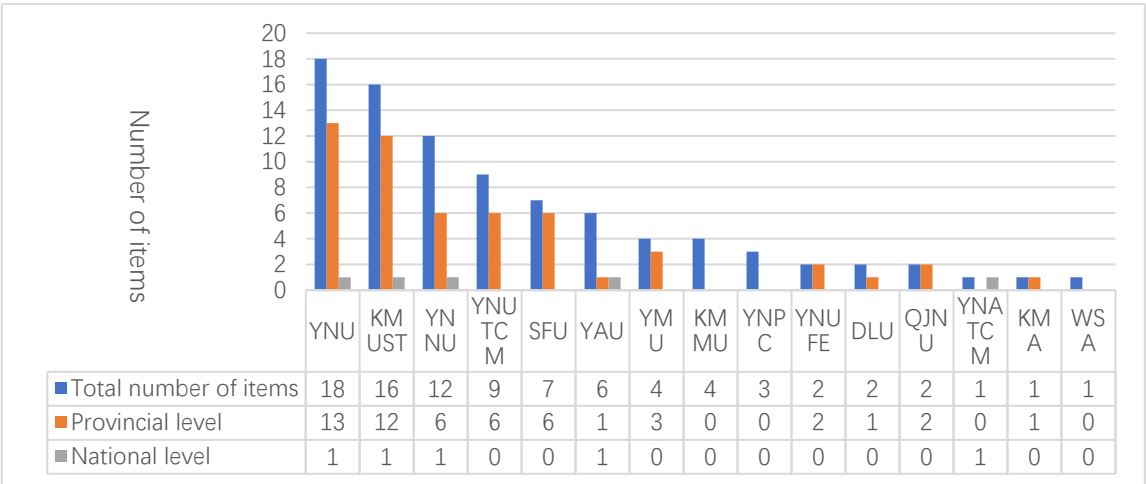


Fig 4. Annual average number of virtual simulation experiment projects launched in Yunnan universities

This study makes statistics on the accreditation levels of virtual simulation experiment projects of universities in Yunnan Province, and sorts them in descending order according to the total number of projects. It can be seen that the construction of virtual simulation experiment projects in universities in Yunnan Province is relatively backward, not only the number of online projects is small, but also the quality of projects still needs to be further improved on the current basis.



	YNU	KMUST	YNNU	YNUTCM	SFU	YAU	YMU	KMMU	YNPC	YNUFE	DLU	QJNU	YNATCM	KMA	WSA
Total number of items	18	16	12	9	7	6	4	4	3	2	2	2	1	1	1
Provincial level	13	12	6	6	6	1	3	0	0	2	1	2	0	1	0
National level	1	1	1	0	0	1	0	0	0	0	0	0	1	0	0

Fig 5. Identification levels of virtual simulation experiment projects in Yunnan universities

All experimental projects are open for free on ilab-x.com. Students can rate the projects after learning and using the experience, with a minimum score of 0 and a full score of 5. In this study, the scores of all the virtual simulation experiment items in Yunnan Province included in the website were counted, and the mean score was 4.1 points. 71.6% of them scored above the average score, including 17 experimental items with a full score of 5 and 8 experimental items with a score of 0. In addition, the score of a national recognized experimental project of Yunnan Agricultural University is only 3.3 points, and the number of experimental people is only 3, so it can be seen that the evaluation and recognition of the virtual simulation experimental project of Yunnan universities is not high.

The "experimental number" on the national virtual simulation experiment teaching course sharing platform refers to the total number of users who participate in the experiment, and the "experimental person-times" refers to the total number of users who participate in and complete the experiment. According to statistics, in the online virtual simulation experiments in Yunnan Province, the number of experimental people and experimental person-times are both 0, accounting for 34.1%; The other experiments were repeatedly learned by users after completion. It can be seen that the virtual simulation experiments of universities in Yunnan Province still need to focus on user demand and recognition, and strive to improve user experience and knowledge absorption, so as to stimulate users to use and learn repeatedly.

3. Research Design

3.1. Data Sources

With the support of the National virtual simulation experiment teaching course sharing platform and relevant units, the author distributed questionnaires to universities in Yunnan Province, and completed the collection in mid-February 2023. These colleges and universities include not only undergraduate colleges and junior colleges, but also colleges and universities of different majors such as engineering, agriculture, medicine, normal education and finance and economics. In addition, the objects of the questionnaire include undergraduates, master's students and doctoral students at three different stages, so the sample is representative to some extent. In this survey, a total of 750 questionnaires were collected, and 603 questionnaires were valid after screening, with an effective rate of 80.4%.

3.2. Selection of Theoretical Model

This paper takes the virtual simulation experiment project of Yunnan universities as an example, and selects Logit model to do empirical research on the use effect of digital teaching means in western universities. The student satisfaction with the virtual simulation experiment project was set as the dependent variable, that is, Y_i. Students' satisfaction with the virtual simulation experiment project is low, so Y_i=0; Students are highly satisfied with the virtual simulation experiment project, and Y_i=1 is set. Thus, the probability of students' high satisfaction with the virtual simulation experiment project is:

$$prob(Y_i) = p_i = \frac{e^{\beta_0+\beta_i X_i}}{1+e^{\beta_0+\beta_i X_i}} = \frac{1}{1+e^{-(\beta_0+\beta_i X_i)}} \quad (1)$$

Where X_i (i= 1,2,3... , n) represents the relevant factors that may affect students' satisfaction with the virtual simulation experiment project. β_i is the coefficient of each related factor. The final linear regression model is obtained by deducing Equation (1), namely:

$$\hat{Y} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n \quad (2)$$

3.3. Variable Description

According to relevant literature, factors that may affect students' satisfaction with virtual simulation experiment projects can be divided into the following five categories: (1) Basic characteristics. Through the investigation of the stage of the students in the sample, the questionnaire explores whether there are significant differences in the satisfaction of the students in different stages of the virtual simulation experiment project. (2) Popularity of virtual simulation experiment projects. In this classification, the popularity of virtual simulation experiments is reflected by two indicators: "students' understanding of virtual simulation experiments" and "several courses offer virtual simulation experiments". It is generally believed that the higher the popularity is, the deeper the students' understanding of the virtual simulation experiment project will be, and then they will pay more attention to the implementation effect of the virtual simulation experiment project. (3) Project characteristics of virtual simulation experiment project. "Fidelity", "interactivity" and "continuity" are selected as the representative characteristics of virtual simulation experiment projects. Among them, "fidelity" refers to the high degree of restoration of the experimental scene, and the good presentation of multi-sensory realism such as sight, hearing and touch. "Interactivity" means the provision of online Q&A, communication and interaction services; "Continuity" refers to a sound mechanism for continuous construction and renewal. It is generally believed that the more characteristic the virtual simulation experiment project is, that is, the higher the "fidelity", "interactivity" and "continuity" are, the higher the students' satisfaction with the virtual simulation experiment project is. (4) Experimental content of virtual simulation experiment. In the questionnaire, four variables of "accuracy", "innovativeness", "integration" and "operability" were used to measure the influence of the experimental content of the virtual simulation experiment on student satisfaction. Among them, "accuracy" refers to the ability to present real teaching requirements, experimental principles, knowledge points or knowledge systems; "Innovativeness" refers to the integration of cutting-edge scientific research achievements and ideological and political education into experimental teaching, and the teaching form is advanced and interactive; "Integration" means that online and offline teaching content can be well integrated, helping students to master relevant knowledge deeply; "Operability" means that the experiment design is clear and easy for students to get started. (5) Possible obstacles to the development of virtual simulation experiment projects. In addition to the above variables, this paper also sets the index in the questionnaire to explore the paths that affect the development of the virtual simulation experiment project and then affect the satisfaction of students. This indicator includes five variables, "equipment, site and other economic factors", "policy and institutional factors", "lack of technical support", "experience of teachers or teaching methods", "trainee needs".

The explained variable in this paper is students' satisfaction with the virtual simulation experiment project, and the

explanatory variables are 15 variables in the five categories of "basic characteristics," "popularity," "project characteristics," "experimental content" and "obstacles to project implementation."

Table 1. Variable Settings

	variable	Variable number	Variable declaration	Mean value
Basic characteristics	Student satisfaction	Y	low=0;high=1	0.3284
	Stage	X_1	Undergraduate=1;Postgraduate=2;Doctoral=3	1.3284
Popularity	Knowledge of virtual simulation experiments	X_2	low =1;lower =2;normal =3;higher =4;high=5	2.5821
	Several courses offer virtual simulation experiments	X_3	0 subjects =1;1~3 subjects=2;4~6 subjects=3;7 subjects and above =4	2.0597
Project characteristics	Whether it has fidelity	X_4	low =1;lower =2;normal =3;higher =4;high=5	2.6418
	Whether it is interactive or not	X_5	low =1;lower =2;normal =3;higher =4;high=5	2.4925
	Whether it is sustainable	X_6	low =1;lower =2;normal =3;higher =4;high=5	2.5970
Experimental content	Whether it has accuracy	X_7	low =1;lower =2;normal =3;higher =4;high=5	2.9403
	Whether it is innovative or not	X_8	low =1;lower =2;normal =3;higher =4;high=5	2.8955
	Whether it has integration	X_9	low =1;lower =2;normal =3;higher =4;high=5	3.0299
	Whether it is operable	X_{10}	low =1;lower =2;normal =3;higher =4;high=5	2.4030
Obstacles to project implementation	Equipment, site and other economic factors	X_{11}	low =1;lower =2;normal =3;higher =4;high=5	3.5970
	Policy, institutional factors	X_{12}	low =1;lower =2;normal =3;higher =4;high=5	3.5970
	Lack of technical support	X_{13}	low =1;lower =2;normal =3;higher =4;high=5	3.7463
	The instructor's experience or teaching style	X_{14}	low =1;lower =2;normal =3;higher =4;high=5	3.8657
	Trainee needs	X_{15}	low =1;lower =2;normal =3;higher =4;high=5	3.4030

3.4. Analysis of Regression Results

Based on the relevant explanatory variables involved in the questionnaire survey, this paper uses SPSS software to conduct Logit analysis on the survey data of 603 student samples by selecting variables in the two categories of "project category" and "experiment content". In terms of model goodness of fit, the value of -2 loglikelihood of the model is 114.471, and the values of Cox&SnellR2 and NagelkerR2 are 0.385 and 0.530, respectively. Perhaps because this paper uses the data obtained from the questionnaire, the fitting effect of the model is general, but such results can be used to explain the students' satisfaction with the implementation of the virtual simulation experiment project.

Table 2. Regression results

Model	-2 times the logarithmic likelihood	Chi-square value	df	p-value
Intercept only	129.489			
Final model	114.471	15.019	7	0.000

Firstly, the overall validity of the model is analyzed. It can be seen from Table 2 that the original hypothesis of the model test here is: the quality of the model is the same when independent variables (X4, X5, X6, X7, X8, X9, X10) are included; Here, the p-value is less than 0.05, indicating that the original hypothesis is rejected, that is, the independent variables put into the model are valid, and the model construction is meaningful.

The specific regression results are shown in the following table:

Table 3. Model validity test

Independent variable	Estimation coefficient	Standard error	z-statistic	p-value
c	-24.824	8.755	-2.835	0.005
X_4	2.438	1.106	2.205	0.027
X_5	2.624	0.514	5.106	0.000
X_6	1.923	0.368	5.228	0.000
X_7	0.879	0.271	3.246	0.001
X_8	2.878	0.605	4.757	0.000
X_9	0.999	0.257	3.881	0.000
X_{10}	4.852	1.787	2.714	0.007

(1) Project characteristics. It can be seen from the above table that the estimated coefficients of X4, X5 and X6 are 2.438, 2.624 and 1.923 respectively, and X4 shows the significance at the level of 0.05, and X5 and X6 show the significance at the level of 0.01, which means that X4, X5 and X6 will have a significant positive impact on Y. That is, the stronger the fidelity, interactivity and continuity of the virtual simulation experiment project, the higher the satisfaction of the students to the virtual simulation experiment project. Among them, the regression coefficients of "verifiability" and

"interactivity" are large, indicating that these two variables have a large impact on student satisfaction.

(2) Experimental content. It can be seen from Table 3 that the estimated coefficients of X7, X8, X9 and X10 are 0.879, 2.878, 0.999 and 4.852 respectively, and all are significant at the 0.01 level, which means that X7, X8, X9 and X10 will have a significant positive impact on Y. That is, the stronger the accuracy, innovation, integration and operability of the experimental content are, the higher the students' satisfaction with the virtual simulation experimental project is. However, the estimated coefficients of X7 and X9 are small, indicating that although the accuracy and integration of the experimental content have an impact on student satisfaction, the impact is not significant. The reasons may be as follows: firstly, from the design of the virtual simulation experiment project to the successful launch of the national virtual simulation experiment course teaching platform, the accuracy of the experiment content has reached a certain level, which basically meets the students' requirements for the accuracy of the experiment content, so the effect on students' satisfaction is not great; Secondly, some courses may only need online virtual simulation experiment teaching, without emphasizing the integration with offline content, so the integration of experimental content has little effect on student satisfaction.

4. Conclusion and Suggestions

4.1. Research Conclusion

(1) Students' overall satisfaction with the implementation of the virtual simulation experiment project is low. According to the questionnaire data, the statistical results in Table 4 can be obtained. It can be seen from Table 4 that 315 students are satisfied with the virtual simulation experiment project, accounting for 35%; There are 585 students think that the virtual simulation experiment project still has some problems, such as the project "realistic" is not strong, "operability" is not high.

Table 4. Students' satisfaction with virtual simulation experiment projects

Name	Options	Frequency	Percent (%)
Y	0.0	585	65.00
	1.0	315	35.00
Total		603	100.00

(2) The popularity of virtual simulation experiment projects is not high. In recent years, although digital teaching has attracted more and more attention, the popularity of virtual simulation experiment project as a representative means of digital teaching is not very high. According to the feedback from the "student side," the students' understanding of the virtual simulation experiment project is only 2.5821 points on average, that is, the understanding of the virtual simulation experiment project is only at the general level. According to the data of the questionnaire survey, the mean value of the variable "several courses offer virtual simulation experiment (X3)" is only 2.0597, that is, the number of courses offered by most colleges and universities in Yunnan Province is still relatively small.

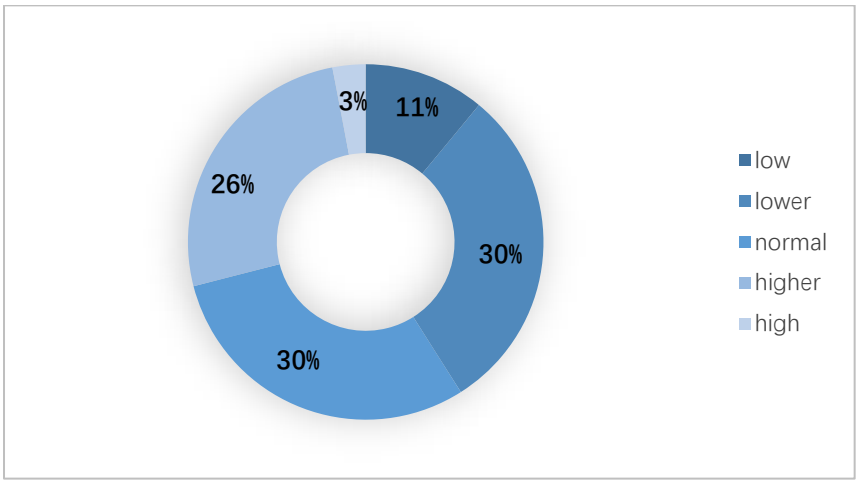


Fig 6. Students' understanding of the virtual simulation experiment

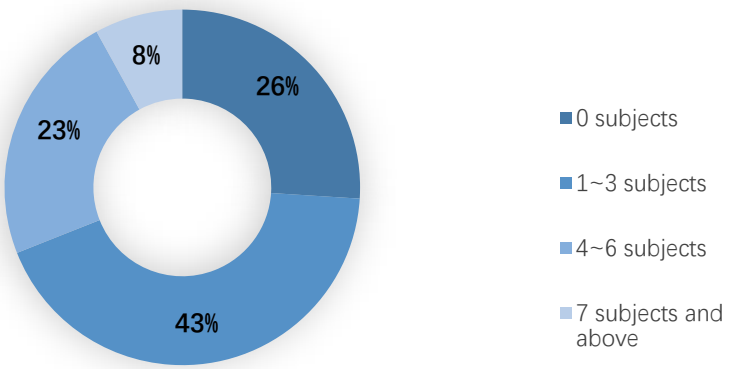


Fig 7. The proportion of the number of virtual simulation experiment courses

(3) The project characteristics and experimental content of virtual simulation experiment have a positive effect on student satisfaction. It can be seen from the regression results that the seven variables in the two indexes of the virtual simulation experiment project, project characteristics and experiment content, have a certain positive impact on student satisfaction. Among them, the operability of experimental items has the largest positive effect on student satisfaction, while the accuracy of experimental content has the smallest positive effect on student satisfaction. It can be seen that the construction of virtual simulation experiment projects still needs to base on and improve the project characteristics and experimental content, and enhance the teaching quality and user experience.

(4) The development of virtual simulation experiment projects is still hindered to some extent. According to the statistical data of the questionnaire survey, most students think that the development of virtual simulation experiment project is hindered by such aspects as economy and technology, among which the experience and technical factors of teachers account for the largest proportion, and the demand of trainees accounts for the smallest proportion, but it also has a certain impact on the development of virtual simulation experiment project. Therefore, when constructing virtual simulation experiment projects, universities in western China need to pay attention to these aspects, carry out targeted teaching practice activities, and continuously improve the teaching quality of digital teaching.

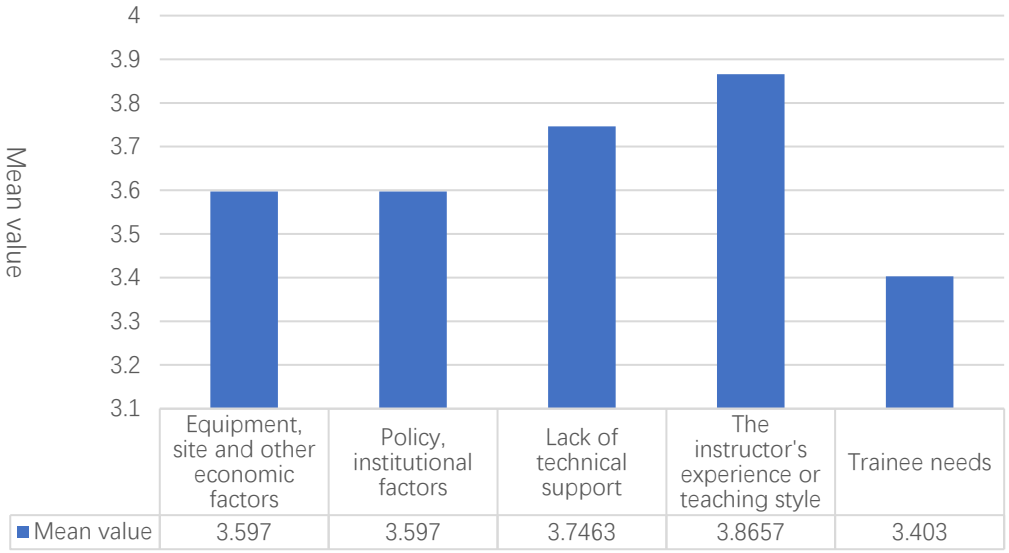


Fig 8. Obstacles to the development of virtual simulation experiment projects

4.2. Research Recommendations

(1) Establish a perfect online communication platform to enhance the interactivity and operability of virtual simulation experiment projects. The implementation mode of transforming scientific research results into virtual simulation experiment teaching content, especially the setting of interactive links, is an important factor to determine the quality of course resources construction. [9] Therefore, the virtual simulation experiment project should strengthen the interaction design, establish an appropriate online communication platform, grasp the problems encountered by students in the learning process in real time through the course interaction design, experimental communication and discussion, and timely answer questions. Of course, teachers can also evaluate students' learning through online communication platforms and make corresponding teaching adjustments according to students' feedback.

(2) Promote technological development to improve the fidelity and innovation of virtual simulation experiment projects. On the one hand, in-depth research on the technical problems involved in the basic disciplines, pay attention to the breakthrough of the key technology of the virtual simulation experiment platform, to improve the fidelity of the virtual simulation experiment project. On the other hand, combined with the characteristics of the subject, the use of information technology to innovate teaching methods. Teachers should have a deep understanding of cutting-edge scientific research achievements, ideological and political education, and integrate them into experimental teaching, to improve the innovation of virtual simulation experimental projects.

(3) Strengthen policy support and publicity to improve the popularity of virtual simulation experiment projects. To meet the requirements of future development, virtual simulation experiment teaching should further enrich the teaching content of virtual simulation experiment and expand the scope of application of the subject. [10] Colleges and universities should attach importance to the application of virtual simulation teaching, and encourage teachers to participate in the design and development of virtual simulation experiment projects by formulating corresponding evaluation mechanisms. The national virtual simulation experiment teaching course is the "golden course" of experiment, which should be actively promoted to open and share, and realize the maximum utilization of resources.

(4) Explore appropriate teacher training mechanism to improve the teaching quality of the project. In the experiment teaching, if the teacher can reasonably use the virtual simulation experiment, it will get twice the result with half the effort. [11,12] In order to promote the deep integration of virtual simulation experiment teaching in technology and teaching, relevant educational units should explore an appropriate training mechanism for teachers, enhance the ability of teachers to integrate subject content with information technology, so that they can develop new teaching methods and give students scientific guidance in the teaching process. To help students adapt to the virtual

simulation experiment scene and master the subject knowledge deeply, so as to improve the teaching quality of the project.

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