Research on the Path of Constructing Informationization Cooperation Platform Between Universities and Enterprises Under the Background of Education Informationization

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Keywords: Education, Informatization, University-Enterprise Cooperation, Informatization Platform.

Abstract: Based on the survey of enterprises, schools and students, this study collects the demands of the three parties, and makes use of existing information technology to explore and build a sharing and integrated school-enterprise cooperation information platform. The empirical results show that the support, effectiveness and closeness of the information cooperation platform affect the willingness of enterprises to participate in the school-enterprise information cooperation platform. Among them, corporate interest correlation plays a mediating effect. Therefore, the development of horizontal and vertical collaborative innovation cooperation mode can promote the deep cooperation between the university and enterprise.

1 INTRODUCTION

With the continuous reform of China's education information technology, information technology has gone deep into every link of education. Educational informationization is an effective way to accelerate the realization of educational modernization, and it is the basic connotation and remarkable characteristic of educational modernization. "Education Informatization 2.0 Action Plan" was issued by the Ministry of Education of China takes education informatization as the endogenous variable of education systematic reform. Under the background of "Internet Plus", big data and the new generation of artificial intelligence, school-enterprise cooperation and industry-education integration are important means for the reform of talent training mode in colleges and universities. Only by accurately grasping the relationship between information technology and university-enterprise cooperation, and giving full play to the supporting role of information technology, can colleges and universities promote the connotation quality of university-enterprise cooperation. At present, undergraduate colleges and universities across China have generally strengthened the cooperation with enterprises in information education, and developed a large number of school-enterprise cooperation projects with their own characteristics, so as to support the cultivation of high-quality talents. However, there are still some problems, such as insufficient ideological attention and insufficient practice transformation, in using information technology to promote university-enterprise cooperation. Therefore, this study focuses on the important breakthrough point of education informatization to comprehensively support university-enterprise cooperation, and explores a new mode of university-enterprise cooperation, so as to promote high-quality and sustainable development of university-enterprise cooperation.

2 LITERATURE REVIEW

The school-enterprise cooperation information platform is a part of the construction of school-enterprise cooperation information. The informationization of school-enterprise cooperation includes the informationization teaching of school-enterprise cooperation, the post practice of informationization technology, and the construction

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of informationization platform. The school-enterprise cooperation information platform refers to the realization of the platform operation of school-enterprise cooperation information teaching, on-the-job practice and public services. In recent years, the research on university-enterprise cooperation has become a hot topic in the academic field. According to the research of Li (2012), the lack of smooth communication channels between the university and enterprise, weak cooperation ability between the university and enterprise, large cultural differences between the university and enterprise, and insufficient support of policies and regulations will directly affect the willingness of enterprises to participate in the cooperation. Han (2015) believes that modern information technology can effectively integrate the resources of universities and enterprises, effectively realize the information connection between universities and enterprises through information technology, strengthen the closeness of cooperation and the support of information technology, so as to better cultivate high-level talents to meet the needs of society. For example, communication costs, sharing of resources and information technology. At the same time, some scholars have discussed the mode and mechanism of school-enterprise cooperation by analyzing the influencing factors of school-enterprise cooperation and the functions of both sides. Liu (2018) conducted a feasibility investigation on the refom of school-enterprise cooperation talent training mode in vocational education under the background of "Internet +", and believed that school-enterprise informatization cooperation could promote the in-depth cooperation between them. Therefore, the current cooperation mode between universities and enterprises is still based on the shallow cooperation model. Only by constructing a horizontal and vertical collaborative innovation cooperation mode can we promote the deep cooperation between universities and enterprises (Zhou and Chen, 2022). Therefore, this study first discusses the factors influencing information cooperation between colleges: informatization cooperation supporting (ICS), information cooperation effectiveness (ICE), information cooperation tightness (ICT), information cooperation benefit correlation (ICI) and information cooperation participation (ICP), and then build new mode information cooperation platform between colleges.

3 RESEARCH HYPOTHESIS

3.1 The Relationship between Informatization Cooperation Supporting, Informatization Cooperation Effectiveness, Informatization Cooperation Tightness, Informatization Cooperation Benefit Correlation and Informatization Cooperation Participation

The factors that determine the participation of school-enterprise cooperation are mainly reflected in cooperation support, such as the allocation of teachers (Zhang, 2010); Effectiveness of cooperation, such as whether the cultivated students meet the needs of enterprises (Tian, 2019); Tightness of cooperation, such as deep cooperation model (Ying, 2019). In the process of school-enterprise cooperation in vocational education, enterprises will incur transaction costs, such as execution costs, supervision costs and risk costs. For enterprises, it is always their goal to maximize economic benefits. Therefore, enterprises will inevitably consider the return on investment before participating in cooperation. If the school-enterprise cooperation project cannot bring good economic benefits to enterprises, enterprises will be more cautious and conservative in their participation in school-enterprise cooperation (Xiao, 2016). At the same time, enterprise managers' understanding of and willingness to participate in school-enterprise cooperation also determine enterprise participation, while cooperation mode significantly affects enterprise managers' willingness to participate in cooperation. The high cost invested by the enterprise, the talents cultivated by the enterprise may not be used by the enterprise, and the high turnover rate of on-the-job internship students all have the uncertain factors of expected benefits. Zhou and Ran (2021) conducted a qualitative study on behavior and revenue, which showed that the participation willingness of enterprise masters affects the enthusiasm of enterprise cooperation and the quality of student training. Therefore, the following hypotheses are proposed in this study.

H1: The informatization cooperation supporting is positively correlated with information cooperation benefit correlation;

H2: The information cooperation effectiveness is positively correlated with the information cooperation benefit correlation;

H3: The informatization cooperation tightness is positively correlated with the informatization cooperation benefit correlation;

H4: The informatization cooperation supporting is positively correlated with participation in information cooperation;

H5: The effectiveness of information cooperation is positively correlated with the participation in information cooperation;

H6: The informatization cooperation tightness is positively correlated with the participation in information cooperation;

H7: The informatization cooperation benefit correlation is positively correlated with informatization cooperation participation;

H8: The informatization cooperation benefit correlation plays a mediating role between information cooperation support and information cooperation participation;

H9: The informatization cooperation benefit correlation plays a mediating role between effectiveness of informatization cooperation and participation in informatization cooperation;

H10: The informatization cooperation benefit correlation plays a mediating role between informationization cooperation closeness and informationization cooperation participation.

4 RESEARCH DESIGN

4.1 Sample Source

In this study, 304 enterprises in Guangdong, Zhejiang, Sichuan and Guangxi were selected as the research objects. Questionnaires were collected by on-site and online distribution. A total of 400 questionnaires were distributed and 321 questionnaires were collected. Among them, the questionnaires with consistent answers and incomplete answers were all removed. After removing the unqualified questionnaires, 304 questionnaires were valid, and the effective questionnaire recovery rate was 94.70%.

4.2 Preparation of the Scale

Based on Factors Scale for Enterprises to Participate in School-Enterprise Cooperation compiled by Zhang (2010). This study compiled Factors Scale for Enterprises to Participate in School-Enterprise Cooperation in Vocational Undergraduate Education through joint discussion with five experts of cooperative education enterprises. The scale consists of three parts, including basic information of enterprises (6 items), factors of enterprises' participation in school-enterprise cooperation (12 items), and enterprise participation (4 items). After the pre-test, the reliability and validity of the scale were high.

4.3 Research Methods

SPSS21.0 software was used to analysis the reliability and validity. AMOS software was used to construct SEM model. Exploratory factor analysis and confirmatory factor analysis were used to test whether the hypothesis was valid.

5 EMPIRICAL RESULTS AND ANALYSIS

5.1 Descriptive Statistical Analysis

Skewness and kurtosis in Table 1 are tests of normal distribution of formal survey data. It is generally believed that when the absolute value of skewness is less than 3 and absolute value of kurtosis is less than 10, it indicates that the sample basically conforms to normal distribution. As can be seen from Table 1, the absolute value of skewness and kurtosis of all measurement questions are all less than 3 and less than 10, so it can be considered that the large sample survey data of each measurement question in this study basically meet the critical value requirements and can be further analyzed.

Table 1: Descriptive statistical analysis.

Item	N	Mean	Sta. d	Skew.	Kurt.
				statistic	statistic
CS1	304	3.64	1.02	0.40	0.50
CS2	304	3.69	1.02	0.40	0.46
CS3	304	3.74	1.01	0.56	0.18
CE1	304	3.77	1.08	0.74	0.04
CE2	304	3.67	1.05	0.60	0.16
CE3	304	3.8	1.08	0.92	0.28
CT1	304	3.94	0.96	0.92	0.63
CT2	304	3.91	0.94	0.73	0.20
CT3	304	3.88	1.00	0.80	0.30
CI1	304	3.75	0.97	0.45	0.65
CI2	304	3.67	0.97	0.47	0.16
CI3	304	3.69	0.97	0.31	0.49
CP1	304	3.79	1.16	0.79	0.16
CP2	304	3.69	1.19	0.53	0.67
CP3	304	3.63	1.08	0.39	0.47
CP4	304	3.69	1.14	0.57	0.40
CP5	304	3.67	1.10	0.56	0.37

5.2 Reliability and Validity Analysis

5.2.1 Reliability Analysis

Table 2: Reliability test.

Var.	Item	CITC	Item's deleted Cronbach'a	Cronbach'α
ICS	CS1	0.793	0.891	0.902
	CS2	0.668	0.908	
	CS3	0.705	0.904	
ICE	CE1	0.726	0.853	0.880
	CE2	0.657	0.865	
	CE3	0.612	0.872	
ICT	CT1	0.628	0.870	0.896
	CT2	0.710	0.856	
	CT3	0.800	0.841	
ICI	CI1	0.723	0.843	0.873
	CI2	0.642	0.857	
	CI3	0.641	0.857	
ICP	CP1	0.774	0.885	0.867
	CP2	0.779	0.884	
	CP3	0.757	0.889	
	CP4	0.759	0.888	
	CP5	0.766	0.887	

As shown in Table 2, CITC is above 0.5, and most of them are between 0.6 and 0.85, which indicates that the latent variables of each question are well set, indicating that the overall reliability of the questionnaire is very high. Cronbach's α coefficient was greater than 0.8, indicating that the reliability of the questionnaire was high, and the scale had high internal consistency and stability.

5.2.2 Validity Analysis

Table 3: Convergent validity analysis of each variable.

The path			Convergent validity		
			Sta. factor loading	CR	AVE
CS1	<---	ICS	0.836	0.875	0.682
CS2	<---	ICS	0.853		
CS3	<---	ICS	0.774		
CE1	<---	ICE	0.886	0.902	0.758
CE2	<---	ICE	0.865		
CE3	<---	ICE	0.868		
CT1	<---	ICT	0.858	0.898	0.745
CT2	<---	ICT	0.879		
CT3	<---	ICT	0.857		
CI1	<---	ICI	0.834	0.868	0.677
CI2	<---	ICI	0.853		
CI3	<---	ICI	0.777		
CP1	<---	ICP	0.835	0.909	0.668
CP2	<---	ICP	0.823		
CP3	<---	ICP	0.806		
CP4	<---	ICP	0.808		
CP5	<---	ICP	0.810		

Note: ** (P< 0.01), *(P<0.05)

Table 4: Discriminant validity analysis.

	ICS	ICE	ICT	ICI	ICP
ICS	**0.830**				
ICE	.307* *	**0.871**			
ICT	.550* *	.512* *	**0.858**		
ICI	.620* *	.403* *	.562 * *	**0.822**	
ICP	.510**	.556* *	.557 * *	.542 * *	**0.816**

Note: ** (P< 0.01) *(P<0.05)

According to the results in Table 3 and Table 4, the standardized factor loading of each item is greater than 0.5, indicating that each item can well explain its dimension. Combined reliability (CR) is one of the criteria for determining the intrinsic quality of a model, which reflects whether all the measured items in each latent variable can consistently explain the latent variable. As can be seen from the table, the combined reliability CR is greater than 0.7, indicating that all the measured items in each latent variable can consistently explain the latent variable. The AVE of each dimension was greater than 0.5, and the square root of AVE was greater than the correlation coefficient between each dimension, indicating that the scale had good convergent and discriminant validity.

5.2.3 Structural Model Analysis

As shown in Table 5, the fitting indexes of the model all meet the requirements, so the path of the model is analyzed.

Table 5: Model fit index.

Item	X^2/df	GFI	AGFI	NFI	IFI	TLI	CFI	RMSEA
Sta.	1.210	0.966	0.928	0.977	0.994	0.997	0.996	0.019
Norm	< 3	> 0.8	> 0.8	> 0.9	> 0.9	> 0.9	> 0.9	< 0.08
Fitting	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

According to Figure 1and Table 6, the results show:

ICS→ICI: β=0.35, t-value =4.817, P<0.05, so H1 was established;

ICE→ICI: β=0.17, t-value=2.655, P<0.05, so H2 was established.

ICT→ICI: β=0.35, t-value =4.837, P<0.05, so H3 was established.

ICS→ICP: β=0.18, t-value =2.558, P<0.05, so H4 was established.

ICE→ICP: β=0.37, t-value =2.463, P<0.05, so H5 was established.

ICT→ICP: β=0.21, t-value =4.416, P<0.05, so H6 was established.

ICI→ICP: β=0.19, t-value =2.513, P<0.05, so H7 was established.

ICS-ICI-ICP: Interval value is (0.007, 0.157), no contain 0, P<0.05, so H8 was established.

ICE-ICI-ICP: Interval value is (0.005, 0.059), no contain 0, P<0.05, so H8 was established.

ICT-ICI-ICP: Interval value is (0.006,0.153), no contain 0, P<0.05, so H8 was established.

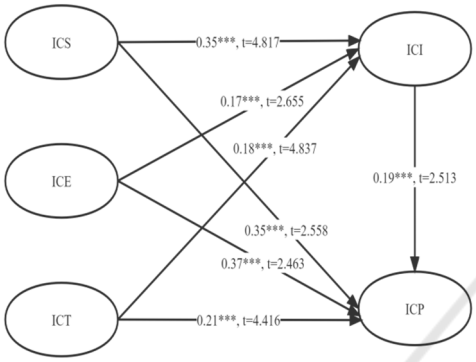

Figure 1: Path analysis diagram

Table 6: Mediating effect test.

Path	Est.	Lower	Upper	P	Result
ICS-ICI-ICP	0.078	0.007	0.157	0.022	Valid
ICE-ICI-ICP	0.042	0.005	0.059	0.024	Valid
ICT-ICI-ICP	0.069	0.006	0.153	0.025	Valid

6 CONCLUSIONS

According to the results of path relationship analysis, it can be seen that in the process of building the school-enterprise information cooperation platform, how to truly realize the deep cooperation between the university and the enterprise can motivate the enterprise to better participate in the project of the school-enterprise information cooperation platform. Therefore, this study proposes the school-enterprise informatization cooperation platform model (see Figure 2). The platform is divided into four modules: university information module, enterprise information module, university-enterprise co-construction resource module and student practice management module. The main functions are: three sharing and six common. Three sharing: teacher resources sharing, course resources sharing, teaching resources sharing. (1) Jointly develop professional personnel training programs and curriculum development; (2) Jointly implement the "3+1" cooperative education model; (3) Jointly guide the graduation work tasks of students; (4) Joint teaching; (5) Jointly supervise the teaching and student training process; (6) Jointly build a double-qualified team. Meanwhile, big data can be used to analyze the information platform, so as to facilitate the innovation of school-enterprise cooperation model.

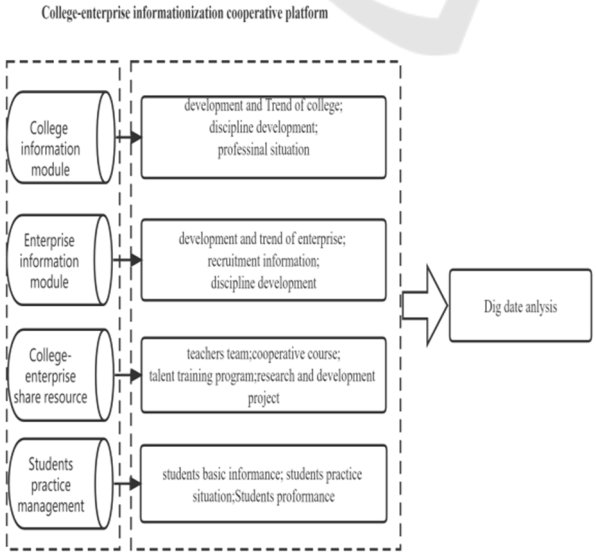

Figure 2: College-Enterprise informationization cooperative platform

Due to the constraints of time and resources, this research still has some shortcomings. Future research will further study the new mode of school-enterprise cooperation, and stimulate the in-depth cooperation between the two sides in teaching, scientific research and management.

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