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A Study on the Factors Influencing the Quality of Innovation and Entrepreneurship Education in Universities of Local Colleges and Universities--Taking Shiyan as an Example

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Abstract: Nowadays, innovation and entrepreneurship education plays a very important role in the development of China, and the factors influencing the quality of innovation and entrepreneurship education of college students in local colleges and universities in Shiyan City were analyzed, and the data were collected through a combination of online and offline questionnaires. Based on the results of the study, we proposed countermeasures in three aspects: students' own quality, teachers' strength and school environment.

1. Review of the Literature

In 1999, Tsinghua University held an entrepreneurship competition, which was the origin of innovation and entrepreneurship education. In 2002, the Ministry of Education (MOE) started to pilot the development strategy in nine universities, and entrepreneurship education started to enter the exploration stage and began to combine innovation and entrepreneurship together. 2009 saw the establishment of the Innovation and Entrepreneurship Education Branch, followed in 2010 by the founding of the journal of Zhongnan University and the Innovation and Entrepreneurship Society. 2014 saw Premier Li Keqiang put forward the slogan "Double Innovation " slogan, and the State Council explicitly proposed that innovation and entrepreneurship education urgently needed to be deepened and reformed in an interval of one year, and the Ministry of Education pioneered the first competition on innovation and entrepreneurship education relying on the Internet, a move that officially brought China into the era of dual innovation. Since then, major universities across the country have gradually paid more attention to innovation and entrepreneurship education and started to invest a lot of time, money and energy.

The key search term "Entrepreneurship Education" was searched on China Knowledge Network, and 179 papers were published from 2011 to 2021. Foreign researchers believe that one of the most

important external factors influencing the quality of innovation and entrepreneurship is the school environment, and the formation of this environment is influenced by teachers' innovation and entrepreneurship ability and teaching philosophy[1-4]. The study analyzed that students' own literacy, teachers' ability, and campus environment have an important influence on the quality of innovation and entrepreneurship education, and therefore focus on improving each aspect from the above aspects[5-8].

we can understand the current situation of the research on dual-innovation education at home and abroad, and these research results have laid a rich theoretical foundation for the study of the factors influencing the quality of innovation and entrepreneurship education of college students in Shiyan City.

Universities are gradually paying attention to innovation and entrepreneurship education, starting entrepreneurship programs, establishing entrepreneurship funds, and setting up incubation bases. The key method of this paper is factor analysis. In order to complete this paper, we collected data on the quality of dual-innovation education in four universities in Shiyan City, and proposed improvement methods to improve the quality of local dual-innovation education by focusing on specific problems[9-10].

2. Questionnaire Design and Analysis

2.1. Questionnaire Design and Pre-Distribution

2.1.1. Questionnaire Design

The scope of this paper is four general colleges and universities in Shiyan city including: Hubei Institute of Automotive Technology, Hubei Institute of Industrial Technology, Hubei Medical College and Hanjiang Normal College. The first part of the study investigates the basic information of students, such as school, gender, and so on. The second part is to investigate the students' own quality, teachers' strength, and school environment.

In this paper, Likert's 5-point scale was used to measure the variables involved for the metrics and then the items were rated by scoring. The options include not at all consistent, not very consistent, generally consistent, relatively consistent, and perfectly consistent, set on a scale of 1-5, respectively, and this method of analysis is often used in management is very significant.

2.1.2. Questionnaire Pre-Distribution

Before the official release of the questionnaire survey first use the questionnaire Star online small-scale distribution link, finally collected a total of 51 questionnaires, after screening there is 1 invalid questionnaire, so finally get 50 valid questionnaires, the total recovery rate of up to 98%. The data collected from the questionnaire was integrated into an excel sheet, and the reliability and validity of the questionnaire was tested with SPSS to facilitate a more convenient and effective distribution of the questionnaire in a large area.

2.1.3. Questionnaire Distribution and Collection

The target of the questionnaire is college students in four colleges and universities in Shiyan, I distributed the paper version of the questionnaire at the entrance of the four colleges and universities, and used Questionnaire Star to distribute the electronic version of the questionnaire on the Internet, these two ways to collect the questionnaire . The effective recovery rate was 100%,

which resulted in 262 valid questionnaires.

3. Extraction of Key Influencing Factors

3.1. Definition and Measurement of Correlation Factors

The index items are designed as simple and easy to understand questions to improve the quality of innovation and entrepreneurship education in local universities in Shiyan.

3.2. Reliability and Validity Tests

3.2.1. Reliability Test

The questionnaire in this paper was based on a Likert 5 scale, and the Cronbach value was used as the reference value for reliability testing for reliability analysis. The questionnaire scale includes a total of 3 level 1 indicators and 26 observed variables.

Table 1: Column deletion based on all variables in the process

Case Processing Summary Number of cases %			
Case	Effective	262	100.0
	Exclusion	0	0
	Total	262	100.0

Table 2: Cornbach' s a reliability analysis

Reliability statistics Kronbach Alpha	Number of items
971	26

The results calculated by spss26.0 are shown in Table 1 and Table 2, Cronbach's a is 0.971, which is greater than 0.9, and the reliability of the questionnaire is very good.

3.2.2. Validity Test Analysis

The following analytical results were obtained by running SPSS when performing the KMO and Bartlett's sphericity tests.

Table 3: KMO test and Bartlett's spherical test analysis

KMO and Bartlett's test		
KMO Sampling suitability quantity		965
Bartlett's sphericity test	Approximate cardinality	6412.519
	Degree of freedom	325
	Significance	000

From Table 3, we can see that the KMO test value is 0.965 and passes the Bartlett spherical test with a significance probability of 0.000, which indicates that the data from the questionnaire is suitable for factor analysis. The above analysis shows that the reliability and validity of the data collected in this study are very good, so we can proceed to the next step.

3.3. Factor Extraction Method

3.3.1. Solving for the Factor Loadings

In this paper, we use principal component analysis, which is commonly used in factor analysis.

Table 4: Subvariance table

Common factor variance Initial Extraction		
Wealthy family conditions, family support for entrepreneurship	1.000	. 308
Dare to challenge setbacks and difficulties	1.000	. 738
A hard-working and practical spirit	1.000	. 788
Decisive and good at seizing opportunities	1.000	. 663
Be persistent in what you do and never give up	1.000	. 758
Strong expertise in innovation and entrepreneurship	1.000	. 635
Good at observing things around you, good at thinking about things	1.000	. 771
Ability to adapt to the environment proactively and quickly	1.000	. 783
Self-directed learning using various tools and channels	1.000	. 672
Like to participate in practice, courageous to exercise the ability	1.000	. 707
Understanding and recognizing the significance of innovation and entrepreneurship education	1.000	. 685
Desire to improve the quality of their dual education	1.000	. 719
Have a passion for innovation and entrepreneurship	1.000	. 763
Strong experience in innovation and entrepreneurship	1.000	. 794
Very interested in innovation and entrepreneurship	1.000	. 799
Teachers add some elements of bi-cultural education to the teaching process	1.000	. 777
Teachers take the initiative to encourage students to participate in more entrepreneurial research projects on their own.	1.000	. 720
Faculty frequently conduct innovative experiments	1.000	. 694
Teachers with strong teaching skills	1.000	. 679
Teachers have high academic research level	1.000	. 714
Banners or slogans can be seen everywhere in the school	1.000	. 775
The school conducts seminars on dual innovation every semester	1.000	. 745
Every year, the school will announce the national innovation and entrepreneurship related policies or regulations	1.000	. 742
The university provides students with the opportunity to start up business internships in companies every semester	1.000	. 597
The school regularly conducts enrichment programs for students on dual creativity	1.000	. 775
The school employs specialized dual-innovation teachers to conduct classes	1.000	. 758
Extraction method: Principal component analysis		

SPSS software was used to analyze the collected data, and the principal component method was selected to extract the factors, and the final analysis results were obtained after 25 iterations of the five selected factors.

Table 5: Variance decomposition table

Total variance explained									
Ingredients	Initial Eigenvalue			Extraction of the sum of squares of loads			Sum of squared rotating loads		
	Total	Percentage of variance	Cumulative	Total	Percentage of variance	Cumulative	Total	Percentage of variance	Cumulative

1	15.222	58.547	58.547	15.222	58.547	58.547	7.736	29.755	29.755
2	2.111	8.118	66.665	2.111	8.118	66.665	6.343	24.396	54.150
3	1.225	4.712	71.377	1.225	4.712	71.77	4.479	17.227	71.377
4	0.981	3.772	75.149						
5	0.624	2.400	77.549						
6	0.537	2.066	79.615						
7	0.488	1.877	81.492						
8	0.425	1.634	83.126						
9	0.401	1.542	84.668						
10	0.375	1.443	86.111						
11	0.344	1.323	87.435						
12	0.315	1.211	88.646						
13	0.307	1.182	89.828						
14	0.305	1.172	90.999						
15	0.281	1.081	92.081						
16	0.260	1.002	93.082						
17	0.249	0.958	94.040						
18	0.233	0.896	94.936						
19	0.214	0.821	95.757						
20	0.191	0.734	96.491						
21	0.176	0.677	97.168						
22	0.160	0.614	97.782						
23	0.158	0.607	98.390						
24	0.151	0.581	98.970						
25	0.145	0.557	99.528						
26	0.123	0.472	100.000						
Extraction method: Principal component analysis									

The results of factor extraction and factor rotation are shown in Table 4 Table 5. After the principal component analysis in SPSS 26.0 software, it was learned that the number of factors extracted in the third column was 3, and the initial eigenvalue was 71.377% indicating that the 5 factors in the questionnaire retained a large amount of original information, indicating that the retention of information in the analysis results was relatively complete and the information of the variables was less lost.

3.3.2. Factor Rotation

The coordinates are rotated so that the original variables appear near one of the axes as much as possible, and the variables near this axis will only have high loadings on that factor, and the common factor will be more specific and more meaningful.

3.3.3. Extraction of Component Factors and Interpretation of Factor Naming

The first factor, with a high factor loading coefficient, is option 1-11, which corresponds to the school climate and faculty, etc. It is defined as "external environmental factors" and is denoted by F1.

The second factor, which has a high factor loading coefficient, is options 13-20, which mainly corresponds to the content of college students' own literacy, etc. It is defined as an "internal factor" and denoted by F2.

The third factor, with a high factor loading coefficient, is options 21-26, which mainly corresponds to having the quality of dual innovation, etc. It is defined as "internal and external environmental results" and is denoted by F3.

3.3.4. Factor scores

Factor rotation was performed and then the factor loadings were analyzed so that the scores of each factor could be calculated, and the results were obtained using SPSS 26.0 statistical analysis.

Table 6: Component score coefficient matrix

Component score coefficient matrix Ingredients			
1		2	3
Y1. family conditions are rich, family support to start a business	. 078	-.148	. 142
Y2. dare to challenge setbacks and difficulties	.051	. 212	.085
Y3. hard-working and practical spirit	.051	. 240	119
Y4. be decisive and good at seizing opportunities	.032	. 164	.054
Y5. be persistent in doing things and never give up	.052	. 255	.139
Y6. Strong expertise in innovation and entrepreneurship	.075	. 003	. 201
Y7. good at observing things around, good at thinking about problems	-.073	. 212	.053
Y8. able to adapt to the environment proactively and quickly	-.088	. 261	-.099
Y9. Use various tools and channels for self-directed learning	-.017	. 126	.023
Y10. likes to participate in practice and is brave to exercise ability	.051	. 120	. 032
Y11. understand and recognize the significance of innovation and entrepreneurship education	.104	. 022	. 216
Y12. desire to improve the quality of their own dual education	115	. 020	. 234
Y13. have a passion for innovation and entrepreneurship	.046	.104	. 300
Y14. have rich experience in innovation and entrepreneurship	014	185	. 355

Y15. very interested in innovation and entrepreneurship	.049	125	. 331
Y16. Teachers incorporate some elements of bi-cultural education in the teaching process	. 125	.041	.005
Y17. Teachers take the initiative to encourage students to participate more in entrepreneurial research projects on their own	. 138	.002	.079
Y18. teachers often conduct innovative experiments	. 149	-.086	. 007
Y19. teachers have strong teaching skills	. 127	. 008	-.078
Y20. teachers have high academic research level	. 103	. 074	-.123
Y21. Banners or slogans are seen everywhere in the school	. 177	.060	.061
Y22. The school conducts seminars on dual innovation every semester	. 175	.085	.029
Y23. The school will announce the national innovation and entrepreneurship related policies or regulations every year	. 172	.104	.003
Y24. The school provides students with the opportunity to start their own business internship in a company every semester	. 091	.043	. 003
Y25. The school regularly conducts enrichment programs for students	. 159	. 003	.114
Y26. The school employs specialized bi-innovation teachers to teach	. 158	.064	-.028
Extraction method: Principal component analysis Rotation method: Kaiser normalized maximum variance method			

The factor score function can be derived from Table 6.

F1=0.078*y1-0.051y2-0.051y3+0.032y4+0.052y5-0.075y6-0.073y7-0.088y8-0.017y9+0.051y10+0.104y11+0.115y12+0.046y13+0.014y14+0.049y15+0.125y16+0.138y17+0.149y18-0.127y19-0.103y20 + 0.177y21 - 0.175y22 + 0.172y23 - 0.091y24 - 0.159y25 + 0.158y26 (3.1)

F2=-0.148y1+0.212y2+0.240y3+0.164y4+0.225y5+0.003y6+0.212y7+0.261y8+0.126y9+0.120y10+0.022y11+0.020y12-0.104y13-0.185y14-0.125y15-0.041y16-0.002y17-0.086y18+0.008y19+0.074y20+0.060y21+0.085y22-0.104y23-0.043y24+0.003y25-0.064y26 (3.2)

F3=0.142y1-0.085y2-0.119y3-0.054y4-0.139y5+0.201y6-0.053y7-0.099y8-0.023y9+0.032y10+0.216y11+0.234y12+0.300y13+0.355y14+0.331y15-0.005y16-0.079y17+0.007y18-0.078y19-0.123y20-0.061y21-0.029y22-0.003y23+0.033y24-0.114y25-0.028y26 (3.3)

Table7: Factor value covariance variance matrix

Component score covariance matrix			
Ingredients	1	2	3
1	1.000	. 000	. 000
2	. 000	1.000	. 000
3	. 000	. 000	1.000
Extraction method: principal component analysis. Rotation method: Kaiser normalized maximum variance method. Component score.			

Table7 shows the covariance matrix of the three factors. From the perspective of the covariance matrix, the correlation coefficients between the rotated factors are all zero, indicating that the factors in the research paper are independent of each other and have no correlation.

4. Suggestions for the Quality of Innovation and Entrepreneurship Education in Local Colleges and Universities in Shiyan

4.1. Focus on the Comprehensive Improvement of College Students' Literacy in Local Universities

College students' literacy refers to the comprehensive embodiment of students in many aspects,

and college students' literacy is the basis for the quality improvement of innovation and entrepreneurship education, which is not innate or unchanging, but is influenced by students' own factors and external conditions such as education and environment. students' theoretical knowledge reserve and guide to strengthen students' innovation and entrepreneurship practice ability.

4.2. Strengthen the Faculty of Local Universities

The quality of innovation and entrepreneurship education cannot be separated from the influence of college teachers. In reality, although local college teachers are proficient in their own professional field of knowledge and scientific research activities, they need to strengthen the faculty strength in this area, and require college teachers to strengthen their understanding and learning of dual innovation and regularly provide specialized training on innovation and entrepreneurship knowledge and skills for instructors of dual innovation, and teachers should actively encourage students to participate in the project and play students Teachers should actively encourage students to participate in the projects and give full play to students' initiative and motivation.

4.3. Create a good Campus Environment

"Let every wall speak" A good campus atmosphere inculcates and infects students and transforms them into their inner spirit and power, which requires us to pay attention to the potential nurturing role of cultural environment. In the process of improving the innovation and entrepreneurship education of college students in Shiyan, we should create a good environment, and at the same time, the school should regularly announce the national innovation and entrepreneurship related policies or regulations, and provide students with certain opportunities to go to designated enterprises for entrepreneurship internship.

4.4. Integrate the Resources of Innovation and Entrepreneurship Practice in Universities

Innovative and entrepreneurial practice resources are an important influencing factor for college students in local universities to acquire knowledge of innovation and entrepreneurship and have a positive and positive influence on them. The enhancement of colleges and universities in this aspect of the path of innovation and entrepreneurship requires the enrichment of various relevant resources to provide material guarantee and theoretical guidance for college students to carry out practice.

Newly build and expand the practice platform of innovation and entrepreneurship for college students, create a guidance institution for students' innovation and entrepreneurship, and create conditions for deepening the theoretical application of innovation and entrepreneurship knowledge. In addition, various competitions are important methods to enhance the innovation and entrepreneurship and practical ability of college students, and they are also an effective supplement and extension of innovation and entrepreneurship.

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