Analysis of College Students' Career Maturity Based on Logarithmic Linear Model

Pu Hu, Ran Junli, Yang Chunsong, Tian Yanxi

School of Mathematical·Sciences, Minzu Normal University of Xingyi, Xingyi Guizhou, China 562400

Abstract: The career maturity of college students is an important indicator to measure the level of individual career development, this paper selects the occupational maturity survey data of undergraduate students in a university in Guizhou, and selects factor A (the most important factor in choosing a career is money), factor B (gender) and factor C (). The three index variables of whether they are in charge of the class) were analyzed and statistically inferred by using a log-linear model to analyze and statistically infer the vocational maturity of college students. The results show that the career maturity of college students is significantly different in influencing factor A (the most important factor for choosing a career is money) and factor BC (gender and whether to work in the class), and the fitting effect of the model is the best. The results of the study can be used as a reference for college educators on the employment of college students.

Keywords: College Students; Career Maturity; Logarithmic Linear Model

1. INTRODUCTION

Since Premier Jiang Zemin proposed the implementation of the strategy of rejuvenating the country through science and education at the National Science and Technology Conference in May 1995, China's educational undertakings have developed rapidly, and various colleges and universities have continuously expanded their enrollment. Since 2000, millions of universities have attended the society every year, and the number of college graduates in 2022 is expected to reach 10.76 million the employment of college students is facing great challenges. Under the dual influence of the severe employment situation and low self-occupation awareness, the employment of college graduates has become a hot topic of attention of universities and scholars. Occupational maturity is an important tool for individuals to master the degree of career development appropriate to their career development stage, as well as the professional knowledge and individual employment attitude measurement of career development, career maturity is an effective tool to measure the level of individual career development, which has a very good predictive effect on the future career success of individuals, and plays a key role in the employment and career choice of college graduates.

In view of the above problems, some scholars have conducted research on employment issues and achieved some fruitful results. First proposed abroad in 1953 by the American scholar Super [1], he believes that professional maturity is the completion of the individual and the stage of his career development. Later, through the continuous improvement and continuous sublimation of scholars such as Luzzo (1995) [2], a more systematic and mature occupational maturity theory was proposed, and the multi-dimensional and multi-level occupational maturity model was proposed, and the occupational maturity was made by the individual and the occupation that was compatible with the career development task Degree of readiness to make decisions and deal with adaptation to developmental tasks. In China, at the beginning of the 21st century, he began to study occupational maturity, and mostly used quantitative research, such as Liu Yangyang [3] and Li Qingxian [4], Qi Li[5], Zhang Zhiyong, etc. [6], Shi Yi, Ao Jie[7] and Li Tao [8] and other scholars Questionnaires from different angles were designed to analyze the factors of employment maturity, the reliability and validity of the questionnaire was designed, and a comprehensive model was established to explore the career maturity of college students.

Through the collation and analysis of the literature, it is found that there are several deficiencies in the literature on the occupational maturity of college students, one is that most of them use quantitative research and scale questionnaire analysis, which leads to a large number of existing literature on occupational maturity being relatively single; Second, most of the studies use one-to-one descriptiveness, few studies of multi-factor interaction, and lack of research on the common action between various influencing factors.

In view of the above deficiencies, on the basis of the previous research results, this paper proposes to use a log-linear model to study the career maturity of college students, and select factorS

A (the most important factor in choosing a career is money), factor B (gender), and factor C (whether to work as a class worker Three indicators, the use of logarithmic linear model to analyze the interaction between the three variables of college students' career maturity, in order to find out whether the above three indicators are important indicators affecting the career maturity of college students, so that college educators can better grasp the key points, carry out practical and effective career planning and guidance, and better find the entry point for individual students, and clarify the direction of career planning efforts.

2. LOGLINEAR MODEL

The logarithmic linear model is based on the analysis of variance model (general linear model), which can solve the problem of whether the categorical variables are related, analyze the main effect of each variable and the correlation and interaction effect between the variables, and include an independent model, a partial conditional independent model (joint independence), a conditional independent model, and a saturation model, mainly by analyzing the desired frequency of cells to test the relationship between categorical variables. The logarithmic linear model of Wang Jinglong et al. [9] describes in detail the relationship between the expected frequency λ number and the covariate, and $x_1, x_2, \cdots, x_k$ the value of the λ expected frequency number is 0 To ∞, so first transform the expectation of the Poisson distribution $P(m)$ λ to $f(\lambda) = \ln \lambda$ such that λ the value is between $-\infty$ and, and ∞ then establish a logarithmic linear model, see equation (1):

$$\ln m = \beta_0 + \beta_1 x_1 + ... + \beta_k x_k \qquad (1)$$

Logarithmic linear model refers to each categorical variable as a factor, the variation of the frequency number in the row table cells is the result of the joint influence of multiple factors, to study the effect of each variable on the frequency number, it is necessary to understand the various variations of the frequency number in each cell.

Suppose here that there are n individuals classified according to attributes A, B, and C, and attribute A has a class of r: $A_1, \cdots, A_r$, Genus B has class C: $B_1, \cdots, B_c$, while attribute C has class t: $c_1, \cdots, c_t$, n There is a three-dimensional columnar table A_i, B_j of individuals belonging to C_k n_{ijk} the sum class, which constitutes a $r \times c \times t$ three-dimensional column table, and its expected frequency is:

$$\lambda_{ijk} = E(n_{ijk})(i=1,2,\cdots,r, \; j=1,2,\cdots,c, \; k=1,2,\cdots,t)$$ When they are not independent of each other, the saturation model of the three-dimensional contiguous table is as in (2) form:

$$\ln \lambda_{ijk} = \mu + \mu_{a(i)} + \mu_{b(j)} + \mu_{c(k)}$$
$$+ \mu_{ab(ij)} + \mu_{bc(jk)} + \mu_{ac(ik)} + \mu_{abc(ijk)} \qquad (2)$$

Its unsaturated linear model is as follows:

$$\ln \lambda_{ijk} = \mu + \mu_{a(i)} + \mu_{b(j)} + \mu_{c(k)} \qquad (3)$$

$$\ln \lambda_{ijk} = \mu + \mu_{a(i)} + \mu_{b(j)} + \mu_{c(k)} + \mu_{bc(jk)} \qquad (4)$$

$$\ln \lambda_{ijk} = \mu + \mu_{a(i)} + \mu_{b(j)} + \mu_{c(k)} + \mu_{ac(ik)} \qquad (5)$$

$$\ln \lambda_{ijk} = \mu + \mu_{a(i)} + \mu_{b(j)} + \mu_{c(k)} + \mu_{ab(ij)} \qquad (6)$$

$$\ln \lambda_{ijk} = \mu + \mu_{a(i)} + \mu_{b(j)}$$
$$+ \mu_{c(k)} + \mu_{ab(ij)} + \mu_{ac(ik)} \qquad (7)$$

$$\ln \lambda_{ijk} = \mu + \mu_{a(i)} + \mu_{b(j)}$$
$$+ \mu_{c(k)} + \mu_{ab(ij)} + \mu_{bc(jk)} \qquad (8)$$

$$\ln m_{ijk} = \mu + \mu_{a(i)} + \mu_{b(j)} + \mu_{c(k)}$$
$$+ \mu_{bc(jk)} + \mu_{ac(ik)} \qquad (9)$$

(2) is the μ total mean effect, $\mu_{a(i)}$ and the difference $\mu_{b(j)}$ between $\mu_{c(k)}$ attribute A A_i, attribute B is at B_j time, and attribute C is The C_k main effect between the 3 variables at the time $\mu_{ab(ij)}$, and $\mu_{bc(jk)}$ $\mu_{bc(jk)}$ the property A at the A_i time and the property B at the B_j time, respectively, Attribute B is in B_j and attribute C is in C_k the same time as attribute A is in A_i and attribute C is in C_k 2 The effect of the secondary interaction between the variables, but 3 when attribute A A_i is in, genera B_j B is in, and attribute C C_k is in A three-way interaction effect between variables.

The likelihood ratio test statistic for the contingency table independence test problem is:

$$-2 \ln \Lambda = -2 \sum_{i=1}^{r} \sum_{j=1}^{c} \sum_{k=1}^{t} n_{ijk} \ln \left(\frac{\hat{m}_{ijk}}{n_{ijk}} \right) \qquad (10)$$

The Pearson test χ^2 statistic for the column table independence test problem is:

$$\chi^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \sum_{k=1}^{t} \frac{(n_{ijk} - \hat{m}_{ijk})^2}{\hat{m}_{ijk}} \qquad (11)$$

3. EMPIRICAL ANALYSIS

Career maturity is one of the important indicators of personal career maturity. This article mainly refers to Liu Yangyang[3], Li Qingxian[4], Qi Li[5], Zhang Zhiyong et al. [6], Shi Yi, Ao Jie [7] and Li Tao [8] and other scholars selected the indicators, according to the actual situation, on this basis The most important factor in choosing a career is the three indicators of money to discuss and analyze the vocational maturity of college students.

Table 1 is a three-dimensional interactive column table of the frequency distribution of money, and the selection of indicators is mainly referred to by Zhang Zhiyong et al. [6]. The revised college students' career maturity measurement table is a survey data on the career maturity of college students conducted by a questionnaire designed by career goals, career autonomy, career value, career confidence, career reference, and professional relatives and friends relying on six dimensions, and the questionnaire is aimed at 252 students in the first, second and third years of the School of Mathematical Sciences of Xingyi Normal University for Nationalities. A indicates that the most important factor in choosing a career is money, B indicates gender, and C indicates whether to work as a class worker.

TABLE 1 GENDER * WHETHER TO WORK AS A CADRE * THE MOST IMPORTANT FACTOR IN CHOOSING A CAREER IS THE THREE-DIMENSIONAL INTERACTIVE COLUMN TABLE OF MONEY

The most important factor in choosing a career is money and gender		Whether or not to work as a class	
		be	No
Very much in line with it	man	2	22
	woman	0	6
More compliant	man	3	34
	woman	1	34
Difficult to determine	man	5	11
	woman	2	24
Comparison does not conform	man	3	31
	woman	7	43
Very much not up to date	man	3	8
	woman	2	11

The variable type of the dependent variable is categorical, and the occupational maturity measurement scale is measured on a scale of 5 to 1, so it is stipulated that 4 to 5 is a high score and 3 to be 4 points are medium, 2 to 3 points are average, and 2 points or less is low.

TABLE 2 SCORES FOR EACH DIMENSION OF OCCUPATIONAL MATURITY

variable	N	score	Number of questions	The topics are divided equally
Career goals	252	21.46 ± 3.64	8	2.68 ± 0.46
Professional confidence	252	18.18 ± 3.08	6	3.03 ± 0.51
Professional value	252	17.24 ± 2.74	6	2.87 ± 0.46
Professional autonomy	252	13.33 ± 2.71	4	3.33 ± 0.68
Friends and family dependent	252	10.33 ± 2.27	4	2.58 ± 0.57
Career Reference	252	17.19 ± 3.39	6	2.86 ± 0.57

Career maturity	252	97.72 ± 11.82	34	2.87 ± 0.35

From Table 2, the professional maturity score of college students is, 2.87 ± 0.35 and its level is lower than moderate, of which the score of career goal is 2.68 ± 0.46, the score of professional confidence 3.03 ± 0.51 is, the score of career value 2.87 ± 0.46 is, the score of career autonomy 3.33 ± 0.68 is, the score of family and friends is 2.58 ± 0.57, and the score of career reference is 2.86 ± 0.57 The score level of the two dimensions of career confidence and career goals is relatively high, which shows that the professional maturity of college students is related to whether the students are confident personally, and more related to whether they choose their own careers, which reflects that in the professional quality cultivated by college students, it is important to establish good professional confidence and career autonomy.

Using the loglinear model and using R statistical software to program the collected data, the programming mainly refers to the literature [10], to obtain the likelihood ratio test of the three-dimensional column table and the value of the Pearson χ^2 test. The goodness of fit of the model is obtained by testing separately, and the results are shown in Table 3.

TABLE 3 GOODNESS-OF-FIT TEST TABLE FOR THE MODEL

model	independence	G^2 Likelihood ratio statistic	Pearson χ^2 statistic	df	G^2 The P value of	χ^2 The P value of
Stand-alone models	(A,B,C)	30.3211	28.63131	13	0.004232683	0.007380922
Federated stand-alone models	(A,BC)	29.35856	27.90489	12	0.003484362	0.005712013
	(B,AC)	23.8366	22.24522	9	0.004575639	0.008133457
	(C,AB)	13.31771	14.31975	9	0.1487493	0.1113971
Condition Independent Model	(AB,AM)	6.833208	6.466231	5	0.2333433	0.263457
	(BA,BC)	12.35517	12.72349	8	0.1360466	0.1217242
	(CA,CB)	22.87406	21.42269	8	0.003529758	0.006105438
	(AB,AC,BC)	4.89544	4.550568	4	0.2981952	0.2981952

As can be seen from Table 3, the P-value of the (A, B G^2, C) model = 0.004232683, Pearson's χ^2 P-value = 0.007380922, (A,BC) P of the model G^2 Value = 0.004232683, Pearson's χ^2 P-value = 0.007380922, (B , AC) model G^2 of the P-value = 0.004232683, Pearson's χ^2 P-value =0.007380922, P-value of the (G^2 CA,CB) model = 0.003529758, Pearson's χ^2 P-value = 0.006105438 indicates that the four models do not fit well. P-value of the (C,AB G^2) model = 0.1487493, Pearson χ^2 P-value = 0.1113971, (AB, AC G^2) P-value for the model =0.2333433, Pearson's χ^2 P-value =0.263457, (BA, BC) model's G^2 P-value = 0.1360466, Pearson's χ^2 P-value =0.1217242, (AB,AC,BC) model G^2 P-value = 0.2981952, Pearson's χ^2 P-value = 0.2981952 The P-value is greater than 0.05, indicating that the good fit of these four models is good.

To get the model with the best good fit effect, it is necessary to remove the interaction model that does not fit well and is not significant according to the independence relationship between the variables. Cause (C,AB), (AB,AC), (BA,BC), (AB, AC, BC) accepts the null hypothesis, but its (AB, AC), (BA, BC The model is two interaction effects and (AB, AC, BC) three interaction effects, relative to the model with only one

interaction effect is more complex, not suitable as the best model, so the (C, AB) model is selected as the best model.

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSION

(1) From the score level of the vocational maturity dimension of college students, it can be seen that the career target score is 2.68 ± 0.46 relatively low;

(2) Judging from the goodness-of-fit test results of the model of factors influencing the occupational maturity of college students, the occupational maturity of college students in this survey is significantly different in factor A (the most important factor in choosing a career is money) and factor AB (gender and whether to work in the class), and the goodness of fit of the model is the best.

4.2 RECOMMENDATIONS

(1) From the perspective of the score level of the six dimensions, it is recommended that college educators strengthen the employment guidance of students, regularly conduct vocational training for students and improve students' career awareness, and formulate exclusive career plans for individual students, so that students can find career goals;

(2) From the perspective of the influencing factors of college students' career maturity, it is recommended that individual students should take the initiative to actively strive to accumulate experience as cadres, establish a correct concept of employment, and attach importance to the development of the entire career.

FUNDS

REFERENCES

[1]Super DE,Thompson AS,Lindeman RH et al. Manual for the Adult Career Concerns Inventory.Palo Alto,CA:Con2 sulting Psychologists Press,1988.

[2]Luzzo,D.A.Gender difference incollege students'career maturity and perceived barriers in career development[J]. Joumey of Counseling Development,199573(3):319-325.

[3]LIU Yangyang A study on the influencing factors of college students' vocational maturity[D]. Southwestern University of Finance and Economics, 2010

[4]Li Qingxian The influencing factors of the professional maturity of college students in China are based on the comprehensive consideration of individuals, families and society[J]. Journal of Shandong Institute of Technology and Business,2013,27(04):82-88+119.]

[5]Qi Li The influence of school factors on the vocational maturity of college students[J]. Financial Theory and Teaching, 2014(03): 111-113

[6]Zhang Zhiyong, Rong Yu, Guan Yanjun Reliability and validity of the Chinese College Students' Vocational Maturity Metric[J]. Journal of Southwest University (Humanities and Social Sciences Edition),20 06(05): 1-6

[7]Shi Yi, Ao Jie Current situation, influencing factors and countermeasures of vocational maturity of higher vocational graduates[J]. Journal of Changsha University of Science and Technology (Social Science Edition),2017,32(03):130-135.]

[8]LI Tao, SUN Yan, WU Zhihui. What are the changes in the employment situation of fresh graduates of Chinese universities under the background of the epidemic in 2021?——An empirical study based on national survey data in 2021 and 2020[J]. Journal of East China Normal University (Educational Science Edition), 2022, 40(02): 100-113 Shi Yi, Ao Jie Current situation, influencing factors and countermeasures of vocational maturity of higher vocational graduates[J]. Journal of Changsha University of Science and Technology (Social Science Edition),2017,32(03):130-135.]

[9]WANG Jinglong, LIANG Xiaojun, WANG Liming Attribute data analysis[M]. Higher Education Press, 2013

[10]WEI Jie,MENG Jie. Logarithmic linear model analysis of three-dimensional columnar tables based on R[J].Science and Technology Information, 2009(20):718+72