Research on Influencing Factors of College Students' Employment Based on Grey Relational Analysis – Take Jiangsu University as an Example

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Abstract: At present, the employment situation of college students is mixed, which has aroused wide attention from all walks of life. The employment problem of college students not only needs the help of the government and society, but also needs college students to improve their comprehensive quality and prepare for the future employment. Based on the survey data of the graduates of jiangsu university for five consecutive years, this paper adopts the method of grey relational analysis to conduct an empirical study on factors affecting the employment of college students. Aimed at helping college students with their job prospects. The results show that there are 15 main factors affecting the employment prospects of college students. Among them, the importance of the ability of active learning is the most important, followed by ability required by work. On the whole, the importance of the ability of active learning and ability required by work remain unchanged. The importance of the ability of lifelong learning required by work and ability of professional competence required by work is increasing.

1   Introduction

With the development of social economy, people's demand for education is growing. China's higher education began to expand enrollment in 1999, and the number of university graduates has increased year by year [1]. In 2017, the number of college graduates in China reached 7.358 million [2]. In addition, the number of students who have not been employed in the past years, the graduates in China are facing a severe employment situation. The employment of university graduates is not only related to their own development, but also directly affects the development of China's higher education. It is also related to China's social human resources and economic development [3]. The employment of college students is affected by various factors. The determination of the main factors affecting employment and their relative importance is significant for solving the current employment problem of college students in China, as well as guiding the employment of college students themselves.

   Many scholars have studied the influencing factors of college students' employment and analyzed the importance of the influencing factors. Bai (2008) used comparative analysis to analyze the influence of social capital and human capital on the employment of college graduates. It was concluded that the importance of human capital is higher than that of social capital [4]. Lu (2009) conducted a questionnaire survey on the employment status and influencing factors of 158 fresh nursing undergraduates. The results showed that professional knowledge and operational skills, appearance and communication skills were the top three factors affecting employment [5]. Chen (2012) utilized association rules to study the internal and external factors that affected college students' employment. The results indicated that the comprehensive quality of college graduates is the key factor of employment [6]. Through questionnaires, Fu (2012) used the method of collective survey to analyze the employment situation of normal university students. He explored the main factors affecting the employment of normal university graduates from personal, family, school, and policy aspects, and put forward relevant suggestions [7]. Based on the survey of college graduates' intention and destination in dalian region, Ban (2013) analyzed the current situation of college graduates' difficult employment and the existing influencing factors. It provided practical countermeasures to solve the problem of graduate employment [8]. Liu (2017) conducted research and analysis on the

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employment situation of undergraduates, and summarized the factors influencing the employment of undergraduates. The influencing factors included urban living standard, family status, and industrial development prospect [9]. In addition to theoretical analysis, some scholars also studied the factors affecting the employment of college graduates by establishing models. Liu (2008) established the two-class Logistic model to quantitatively analyze the employment situation of college students. The results showed that the gender, age and political status of college graduates had a significant impact on their employment, while the education background and graduate colleges have no significant impact on the employment status of college students [10]. Qi (2009) established Logit model to estimate and test the factors that affect the employment of university graduates. It was found that college students' English proficiency, whether to minor in other majors, time arrangement after school and the intensity of job hunting had significant effects on employment [11]. Qian (2008) adopted the grey correlation analysis method to find out the main factors affecting college students' employment by establishing the grey relational analysis model. The study found that social factors and personal factors were the main factors affecting college students' employment [1]. Based on grey correlation and AHP model, Zheng (2012) studied the influencing factors of college students' employment in Hubei Province. The results showed that there were significant correlations between college Students' employment and their own quality, unemployment insurance, foreign direct investment, and other factors [12].

Many studies have analyzed the factors affecting college students' employment, but few quantitative studies have been conducted. Based on the employment survey data of college students for five consecutive years, this paper establishes grey relational analysis model to study the main factors influencing college students' employment and their relative importance. It aims to provide guidance for college students' employment prospects. The rest of the article is as follows: Section 2 is grey relational analysis model. Results followed by section 3. At last, Section 4 draws conclusions.

2 Grey relational analysis model

In this paper, the original data are derived from the employment survey of 1753 graduates of Jiangsu university from 2013 to 2017. We utilize grey correlation analysis to find out the main factors affecting the employment prospects of college students, and provide guidance for their future employment.

The grey system theory was first proposed by Chinese scholar professor Deng Julong in 1982. The study of grey theory includes grey relational analysis, grey prediction, grey decision making, and grey prediction control. Gray correlation analysis is distinguished by the geometric similarity of time series. The correlation order is determined by correlation degree and correlation matrix. It is a quantitative analysis method of dynamic process development trend among various factors. This method has the advantages of less sample demand, less workload, quantitative analysis results are consistent with qualitative analysis results, high accuracy, and wide application range [13, 14]. This paper uses grey relational analysis to study the influencing factors of College Students'employment prospects, and provides suggestions for future employment of College students. The basic principles are as follows:

1. Determine the reference sequence reflecting the system characteristics and the comparison sequence that affects the behavior of the system. The reference is set to

$$X_0 = (x_0(1), x_0(2), ..., x_0(n))^T, \tag{1}$$

and the comparison sequence is set to

$$X_i = (x_i(1), x_i(2), ..., x_i(n))^T, i = 1, 2, ..., m. \tag{2}$$

2. Dimensionless processing of data

$$X_i' = \frac{X_i}{x_i(1)} = (x_i'(1), x_i'(2), ..., x_i'(n))^T, i = 0, 1, 2, ..., m. \tag{3}$$

3. Compute difference sequence

$$\Delta_i = (\Delta_i(1), \Delta_i(2), ..., \Delta_i(n))^T, i = 1, 2, ..., m. \Delta_i(k) = |x_0'(k) - x_i'(k)|, k = 1, 2, ..., n. \tag{4}$$

4. Calculate two differential

$$M = \max_i \max_k \Delta_i(k), m = \min_i \min_k \Delta_i(k). \tag{5}$$

5. Calculate the correlation coefficient

$$\gamma_{(}x_0(k), x_i(k)) = \frac{m + \xi M}{|x_0(k) - x_i(k)| + \xi M}. \tag{6}$$

6. Calculate the correlation degree. Correlation coefficient is the correlation degree between reference sequence and comparison sequence in each index. In order to facilitate the overall comparison, the values can be averaged as a quantitative expression of the degree of correlation between the reference sequence and the comparison sequence.

$$\gamma_0(i) = \frac{1}{n}\sum_{k=1}^{n}, \gamma(x_0(k), x_i(k)), i = 1, 2, ..., m, \tag{7}$$

where i is the number of comparison sequences, k indicates the number of research objects, ξ represents the resolution coefficient.

In this paper, the value of ξ is 0.5. The greater the degree of association, the greater the effect of the comparison series on the reference series.

3   Results

For simplicity, the factors and their abbreviations are shown in Table 1. According to the steps of grey relational analysis, the grey relational degree and its comprehensive ranking of influencing factors of college student's employment prospects from 2013 to 2017 are obtained (Table 2). We only list the factors with correlation degree greater than 0.6.

Table 1: Major factors and abbreviations of employment prospects for university graduates

Influence factors	Abbreviation
Ability of active learning	Y_1
Ability required by work	Y_2
Ability of effective oral communication	Y_3
Ability of active learning required by work	Y_4
Knowledge level required by work	Y_5
Ability to master at graduation	Y_6
Ability of effective oral communication required by work	Y_7
Ability of active learning acquired at graduation	Y_8
Knowledge level acquired at graduation	Y_9
Ability of learn methods	Y_{10}
Ability of lifelong learning required by work	Y_{11}
Ability of professional competence required by work	Y_{12}
Ability of communication required by work	Y_{13}
Ability of personal and team required by work	Y_{14}
Ability of project management required by work	Y_{15}

The vacancy data in Table 2 indicate that the correlation degree of this factor is lower than 0.6. From Table 2, we find that a total of 15 factors have a great impact on the graduation prospects of college students. Among them, the ability of active learning has the greatest impact, followed by ability required by work, ability of active learning required by work, knowledge level required by work, ability of lifelong learning required by work and so on. In general, the importance of the ability of active learning and ability required by work remain unchanged. The ability of lifelong learning, ability of professional competence, ability of communication, ability of personal and team, and ability of project management required by work are increasingly important. However, the importance of the ability of effective oral communication required by work, knowledge level acquired at graduation, and ability of learn methods is declining.

Table 2: Correlation and comprehensive ranking of university students' employment factors for five consecutive years

Years / Factors	2013	2014	2015	2016	2017	Ranking
Y_1	0.9126	0.8998	0.9512	0.9064	0.9354	1
Y_2	0.8257	0.8186	0.7925	0.7954	0.7733	2
Y_3	0.7936	0.6484	0.6233	0.6574	0.6927	6
Y_4	0.7502	0.7000	0.7212	0.6808	0.7378	3
Y_5	0.7437	0.7324	0.6896	0.6748	0.7101	4
Y_6	0.6610	0.6293	0.6596	0.6508	0.6328	7
Y_7	0.6461					8
Y_8	0.6309		0.6187	0.6204	0.6062	12
Y_9	0.6098					13
Y_{10}	0.6024					15
Y_{11}				0.6711	0.7378	5
Y_{12}				0.6409	0.6174	11
Y_{13}				0.6367	0.6430	9
Y_{14}				0.6339	0.6248	10
Y_{15}				0.6096	0.6047	14

4   Conclusions

Based on the survey data of the graduates of jiangsu university for five consecutive years, this paper adopts the method of grey relational analysis to conduct an empirical study on factors affecting the employment of college students. The results show that there are 15 main factors affecting the employment prospects of college students. Among them, the ability of active learning has the greatest impact, followed by ability required by work, ability of active learning required by work, knowledge level required by work, ability of lifelong learning required by work and so on. Besides, the main influencing factors are different each year. Overall, the importance of the ability of active learning and ability required by work remain unchanged. The ability of lifelong learning, ability of professional competence, ability of communication, ability of personal and team and ability of project management required by work are increasingly important. The importance of the ability of effective oral communication required by work, knowledge level acquired at graduation, and ability of learn methods is declining.

Through the research on the factors affecting the employment of college graduates, we hope to provide guidance and help for the future employment of college students. College students should focus on cultivating the ability of active learning and ability required by work, and at the same time should not neglect ability of lifelong learning required by work and ability of professional competence required by work. College students should keep pace with the times and improve their comprehensive ability to stand out in the future employment wave.

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