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Survey on Employment Trends and Responses of Guangdong University Students in the Era of Artificial Intelligence

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Abstract: With the in-depth development and wide application of artificial intelligence, college students' employment is facing the status quo of both opportunities and challenges. The article uses the theory of planned behavior and the theory of innovation and economic cycle to explore the employment trend of college students in Guangdong Province and provide countermeasures for college students' employment in the era of artificial intelligence. The results of the study show that: the development of artificial intelligence increases the employment pressure of college students; college students pursue positions with high stability; and the power of instrumental beliefs, normative beliefs, and control beliefs plays a positive role in the employment intention of college students.

Keywords: Artificial Intelligence; College Students in Guangdong Province; Theory of Planned Behavior; Employment Trend; Coping Measures.

1. Introduction

As a key factor leading the development of the times, artificial intelligence has a significant impact on employment trends. It is of great interest to explore the employment trends of college students in the era of artificial intelligence and promote the common development of artificial intelligence and high-quality employment.

1.1. Research Background and Significance

The 14th BRICS Summit in 2022 pointed out that "whoever can grasp the opportunities of new economic development such as big data and artificial intelligence will have the pulse of the times". The vigorous development of artificial intelligence technology has an increasing impact on the employment trend of college students.

Research background. Artificial intelligence will become a key driving force for industrial transformation, reshape all aspects of economic activities, give birth to new things, trigger economic structural adjustments, and promote the overall improvement of productivity. Artificial intelligence has a significant impact on the employment trends of college students. On the one hand, it replaces some traditional jobs, resulting in a reduction in jobs. On the other hand, it brings new business models and employment scenarios, creating new jobs.

Research significance. First, practical significance. To understand the impact of current artificial intelligence on the employment trend of college students and provide reference for the employment development direction of college students. Second, academic value. To enrich the literature on the impact of artificial intelligence on employment and the literature reference on college students' choice of employment positions.

1.2. Literature Review

The research on employment trends and countermeasures for college students in the era of artificial intelligence can be divided into three categories: research on the development status of artificial intelligence, research on the impact of artificial intelligence on the employment trends of college students, and research on employment countermeasures for college students in the era of artificial intelligence.

(1) Research on the current status of artificial intelligence development

Artificial intelligence is an important strategic field in the new round of global scientific and technological revolution and industrial transformation, and is also a key technological component for enhancing the country's strategic scientific and technological capabilities [1]. According to the analysis of existing literature, its development mainly involves three aspects.

First, in terms of academic research, more and more countries are paying attention to the development of artificial intelligence. According to MAG statistics, the number of papers on artificial intelligence published through various channels has increased fourfold from 2000 to 2020.

Second, in terms of technological innovation, high-intensity AI research and development has produced a large number of scientific research results. Guo CX and Fang A pointed out that artificial intelligence technology has been widely used in finance, digital modeling, music and painting, and has also been widely used in scientific research activities such as drug discovery and screening, material identification and simulation [2].

Third, in terms of market and employment, AI is gradually moving towards commercialization, and related investment has increased significantly. The employment creation effect brought about by the development of artificial intelligence technology continues to increase, bringing new business models and new employment channels, which overall promotes the development of the employment market and thus has a positive impact on labor employment [3].

(2) Research on the impact of artificial intelligence on college students' employment trends

First, positive impact. Artificial intelligence brings more employment opportunities for college students. Since

artificial intelligence reduces costs and expands output while also increasing the demand for labor for non-automated tasks and the production of other labor-intensive products, the creation effect will increase the total employment in the long run [4]. Therefore, the development of related industries and the rise of emerging industries will provide more employment opportunities for college students.

Second, negative impact. Artificial intelligence brings a replacement crisis to college students' employment. Its popularity brings challenges to some traditional jobs. Highly repetitive mechanical work may be replaced by automation and intelligence, affecting the employment prospects of some college students.

(3) Research on employment strategies for college students in the era of artificial intelligence

In order to adapt to social development, it is necessary to pay attention to the development of artificial intelligence, improve the quality of college graduates, and enhance employment competitiveness. Scholars believe that it should be addressed from the individual, college and national levels. Through analysis and research, Zhang Q believes that colleges and universities should actively popularize and attach importance to knowledge education related to artificial intelligence, so that students can systematically learn relevant knowledge about artificial intelligence [5]. Wang J believes that students should actively participate in skill tests related to artificial intelligence to improve their personal education level and obtain certificates representing their skill level, which can effectively alleviate the pressure of artificial intelligence replacing jobs. It is also proposed that the country should vigorously promote education system reform, attach importance to higher education investment, carry out courses related to artificial intelligence, cultivate high-quality talents that are compatible with the industry in the era of artificial intelligence, and support social training institutions outside colleges and universities to carry out corresponding professional training [6].

1.3. Innovation and Shortcomings

Most of the relevant research data is for the whole country, but this article breaks the convention and precisely selects college students in Guangdong Province as the survey subjects. The article chooses Guangdong Province, which has a developed economy and rapid progress in artificial intelligence, breaking the conventional scope of the survey subjects. Although it is conducive to studying the current situation and trends in economically developed regions, it is not very meaningful for reference in economically underdeveloped regions.

2. Survey Design and Implementation Process

In order to comprehensively study the employment trends of college students in Guangdong Province in the era of artificial intelligence and propose countermeasures, the team designed a detailed survey plan and reasonably processed the collected data.

2.1. Survey Subjects

In order to fully understand the employment trends and factors affecting employment of college students in Guangdong Province, the team selected college students in higher education in various cities in Guangdong Province as the survey subjects.

2.2. Survey Content

As a frontier field in current scientific and technological development, artificial intelligence is changing all walks of life. Traditional jobs are being replaced and demand in emerging fields is surging. Therefore, this article aims to deeply analyze the employment trends of college students in Guangdong Province in the era of artificial intelligence, and provide a basis for subsequent countermeasures.

As a major economic province in China, Guangdong Province's unique industrial structure, policy environment and educational resources may have a significant impact on college students' employment intentions. Therefore, this article takes the influencing factors of employment intention of college students in Guangdong Province as the investigation target, studies the influencing factors affecting the employment intention of college students in Guangdong Province, and provides a basis for the subsequent proposal of countermeasures.

2.3. Survey Methods

The team used a questionnaire survey and, based on the theory of planned behavior, classified and summarized 25 scale questions from a large amount of literature, divided them into seven factors: emotional beliefs, instrumental beliefs, normative beliefs, application motivation, control beliefs, the power of control beliefs, and employment intention, and constructed a theoretical model of college students' employment intention. The theoretical model is shown in Figure 1:

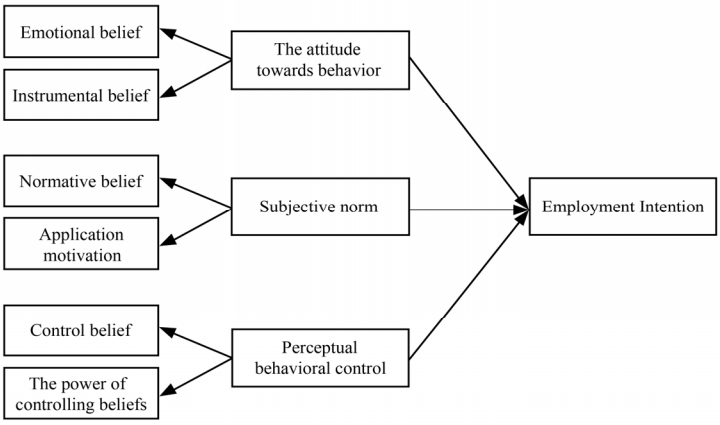

Figure 1. Theoretical model of college students' employment intention

Combined with the overall survey and the team's human, material, and financial resources, the team divided the prefecture-level cities in Guangdong Province and collected the number of college students in each city. Then, the proportional stratified sampling method and RDS sampling method were used for sampling. According to the preliminary survey, the proportion of college students in each city in Guangdong Province was used as the estimation object, and the sample variance of the proportion of college students in each city in Guangdong Province was obtained. The calculation formula (1) is:

$$n = \frac{Z^2 p(1-p)}{e^2} \quad (1)$$

Among them, n is the initial sample size, Z is the survey confidence, p is the sample dispersion, and e is the sampling error range. Since the variance of the general population is difficult to obtain, p(1-p) is used to estimate the variance. When p=0.5, p(1-p) takes the maximum value, and n is the maximum sample size at this time. The Z value is usually 95% (1.960), and the e value is 4.6%. The conservative maximum sample size is calculated to be 454. The team needs to calculate the survey population and check whether the initial sample size needs to be adjusted. The adjusted sample size formula (2) is:

$$n_{adjust} = \frac{nN}{n+N-1} \quad (2)$$

Among them, N is the total capacity of the survey subjects, n_{adjust} and is the adjusted sample capacity. As shown in Table 1, the total number of college students in Guangdong Province is about 2,068,600. Substituting the data, the adjusted sample capacity can be calculated to be 454.

In order to avoid major mistakes during the formal investigation, the team selected a portion of the sample for a preliminary investigation and analyzed the preliminary investigation data. The team collected 196 valid questionnaires and tested their reliability and validity, and finally obtained Cronbach 's The α coefficients were all greater than 0.8, the overall scale reliability was 0.997, the KMO value was 0.95, and the significance of Bartlett's sphericity test was less than 0.05. The questionnaire structure was well designed, and the structure and item design were scientific and reasonable, so a formal survey could be conducted.

During the formal survey, the team collected a total of 540 questionnaires, 27 of which were invalid, leaving 513 valid questionnaires, with a valid questionnaire recovery rate of 95 %. The number of valid questionnaires reached the optimal sample size calculated based on the number of survey subjects. The team conducted reliability and validity tests on the returned questionnaires and ultimately concluded that the Cronbach 's α coefficients for all scales ranged from 0.797 to 0.942, the Cronbach 's α coefficient for the total scale was 0.936, the KMO value was 0.860, and the significance of Bartlett's sphericity test was less than 0.05. After the principal components of the 22 items in the scale were extracted, there were 6 factors with larger contribution rates after rotation, the cumulative explained variance was 65.74% and the factor loading coefficients of each item were basically higher than 0.6. The reliability and validity of the questionnaire were good.

3. Data Analysis

This section conducts a detailed analysis of the questionnaire data from three aspects: sample composition, employment trends of college students in Guangdong Province, and factors affecting employment trends.

3.1. Sample Composition

Among the college students surveyed, women accounted for 52.32%, men accounted for 47.68%, and undergraduates accounted for 78.37%; junior college students accounted for 13.69%, masters accounted for 5.96%, and doctoral students and above accounted for 1.99%; in terms of professional distribution, management accounted for 34.66%, engineering accounted for 13.25%, science accounted for 11.92%, economics accounted for 9.71%, education accounted for 8.83%, medicine accounted for 7.28%, history accounted for 6.62%, law accounted for 4.86%, literature accounted for 4.64%, others accounted for 4.42%, philosophy accounted for 2.21%, art accounted for 1.99%, and agriculture accounted for 1.55%.

3.2. Employment Trends

Among the college students surveyed, 69.54% expect to obtain a master's degree as their highest degree, 73.29% will choose to continue their studies after graduation, and 86.36% are willing to choose to work in emerging AI positions. The most desired workplaces are state-owned enterprises and public institutions, accounting for 77.27% and 63.64% respectively. The preferred employment locations are first-tier and second-tier cities, accounting for 45.45% and 59.09% respectively. College students in Guangdong Province show a strong desire to continue their studies, a strong desire to work in emerging AI-related positions, a high willingness to work within the system, second-tier cities as the preferred employment location, and a trend of increasing employment pressure.

The team collected data from the statistical yearbooks published by Guangdong Province in each year, and compared the data on the number of students and graduates in Guangdong Province's higher education from 2012 to 2022. The number of students and graduates in Guangdong Province's higher education continued to rise, and the employment pressure on college students in Guangdong Province continued to increase. As shown in Figure 13, the number of students in Guangdong Province's higher education grew slowly from 2014 to 2017, and the number of students in Guangdong Province's higher education reached 2.7888 million in 2017; compared with 2014 to 2017, after 2017, the number of students in Guangdong Province's higher education entered a new period of rapid growth, and the number of students grew rapidly until 2022, when the number of students in Guangdong Province's higher education reached 4.4266 million. From 2012 to 2017, the number of higher education graduates in Guangdong Province showed a slow growth trend, reaching 802,700 in 2017. After 2017, the rapid growth of the number of students in Guangdong Province's higher education led to a significant increase in the number of higher education graduates in Guangdong Province after 2020, reaching 1,145,800 in 2022. It is expected that the number of students and graduates in Guangdong Province will continue to rise in the future, and the employment pressure on college students will continue to

increase.

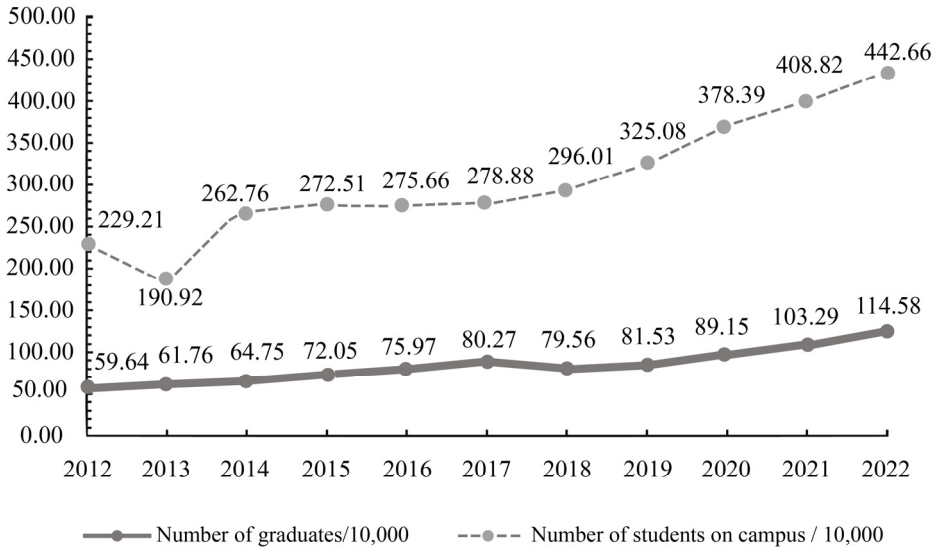

Figure 2. Number of graduates and students in Guangdong Province from 2012 to 2022

3.3. Mechanism Analysis

The team used the SEM structural equation model to analyze the factors affecting the employment intention of college students in Guangdong Province. The X2/df of the scale was 2.85, RMSEA was 0.073, CFI was 0.883, IFI was 0.884, TLI was 0.858, and NFI was 0.832, indicating a good model fit.

As shown in Table 1, instrumental beliefs ($\beta = 0.359$, $p < 0.001$), normative beliefs ($\beta = 0.435$, $p < 0.001$), and the power of control beliefs ($\beta = 0.339$, $p < 0.001$) have significant positive predictive effects on employment intention. The opinions of relatives and friends, their own strong core competitiveness, and the support of schools and governments will all enhance college students' employment intentions.

Table 1. Results of SEM path relationship test on factors affecting college students' employment intention

Path relationship			Estimate	SE	CR	P
Employment intention	<---	Emotional beliefs	0.064	0.056	1.146	0.252
Employment intention	<---	Instrumental Beliefs	0.359	0.101	3.569	***
Employment intention	<---	Normative beliefs	0.435	0.066	6.628	***
Employment intention	<---	Motivation for application	-0.167	0.088	-1.896	0.058
Employment intention	<---	Control Beliefs	-0.049	0.076	-0.636	0.525
Employment intention	<---	The power of controlling beliefs	0.339	0.07	4.844	***

4. Coping Methods

4.1. For Students

Students should actively adapt to the development trend of artificial intelligence, understand the current status and prospects of the industry, actively break the traditional job cognition, actively understand related jobs, stimulate interest and clarify career goals and development paths. In addition, students should actively learn artificial intelligence knowledge, improve technical capabilities, and enhance employment competitiveness.

4.2. For Colleges and Universities

Schools should build online platforms to provide AI information and help students understand application trends; keep up with the development of AI technology, dynamically adjust professional settings, and respond to market and industry changes. Schools should encourage participation in scientific research projects to improve practical ability and innovative spirit.

4.3. For Enterprises

Enterprises should deepen cooperation between schools and enterprises, provide human-machine collaboration skills training and practice opportunities, formulate human resource development plans, connect with colleges and universities, and improve the fit between the education chain and the industrial chain. This will not only meet the talent needs of enterprises, but also alleviate the employment pressure of college students.

4.4. To the Government

The government should improve the policy support system for the AI industry, provide funding, tax and other incentives, optimize the employment environment and promote

employment for college students. The government should strengthen the popularization of AI education, reform teaching content and cultivate professional talents. The government should set up an employment guidance platform to help students understand the market. In addition, the government should provide transformation support for industries with high replacement rates, promote economic diversification and ensure employment for college students.

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