

ORIGINAL

## Employment cognition and occupational contradictions among college graduates under the new employment form - based on data analysis

## Cognición laboral y contradicciones ocupacionales entre los graduados universitarios bajo el nuevo formulario de empleo - basado en el análisis de datos

Hong Xiang<sup>1</sup> , Anrong Wang<sup>2</sup> , Wenxi Tan<sup>3</sup> , Xiaoju Dai<sup>4</sup> , Le Zhang<sup>1</sup> 

<sup>1</sup>College of Fine Arts, Chongqing Three Gorges University. Chongqing Wanzhou 404020, China.

<sup>2</sup>School of Electronic information Engineering, Chongqing Three Gorges University. Chongqing Wanzhou 404020, China.

<sup>3</sup>School of Education, Chongqing Three Gorges University. Chongqing Wanzhou 404020, China.

<sup>4</sup>Student affairs department, Chongqing Three Gorges University. Chongqing Wanzhou 404020, China.

Cite as: Xiang H, Wang A, Tan W, Dai X, Zhang L. Employment cognition and occupational contradictions among college graduates under the new employment form - based on data analysis. Data and Metadata. 2024; 3:389. <https://doi.org/10.56294/dm2024389>

Submitted: 09-02-2024

Revised: 10-04-2024

Accepted: 29-06-2024

Published: 30-06-2024

Editor: Adrian Alejandro Vitón Castillo 

### ABSTRACT

Total employment among college grads is now under significant pressure, and structural conflicts are quite visible. People are starting to take notice of the serious job crisis that college students face. According to the research study, college students' employment cognition is a key factor in this problem. The importance of enhancing students' employment cognition cannot be overstated. According to the article, knowing the important aspects that could affect one's job cognition is the first step in improving students' employment cognition. SEM analysis shows these characteristics were positively and substantially associated with employment cognition. This article aims to use big data technologies to conduct extensive studies and analyses on AI employment cognition and occupational contradictions. The first step is implementing a scientific approach to building a multi-level linked big data management platform for Employment Cognition. The platform will be used during the development of Employment career advancement. The subsequent objective is to build an employment team by including information resources. Finally, the results show a huge variation in self-ability cognition and a remarkable difference in how college students think about their job capacity due to new work. Their physiological features and societal expectations are related to this. However, the most critical factor in enhancing the quality of college graduates' jobs is for the relevant department to improve the nurturing of their prior abilities in this area.

**Keywords:** Employment Cognition; Occupational Contradictions; Big Data; Artificial Intelligence.

### RESUMEN

El empleo total entre los graduados universitarios está ahora bajo una presión significativa y los conflictos estructurales son bastante visibles. La gente está empezando a darse cuenta de la grave crisis laboral que enfrentan los estudiantes universitarios. Según el estudio de investigación, la cognición laboral de los estudiantes universitarios es un factor clave en este problema. No se puede subestimar la importancia de mejorar la cognición laboral de los estudiantes. Según el artículo, conocer los aspectos importantes que podrían afectar la cognición laboral es el primer paso para mejorar la cognición laboral de los estudiantes. El análisis SEM muestra que estas características se asociaron positiva y sustancialmente con la cognición laboral. Este artículo tiene como objetivo utilizar tecnologías de big data para realizar estudios y análisis extensos sobre la cognición laboral de la IA y las contradicciones ocupacionales. El primer paso es implementar un enfoque científico para construir una plataforma de gestión de big data vinculada de múltiples niveles para la cognición del empleo. La plataforma se utilizará durante el desarrollo de la promoción profesional en Empleo. El objetivo posterior es formar un equipo de empleo mediante la inclusión de recursos de

información. Finalmente, los resultados muestran una enorme variación en la cognición de la capacidad personal y una diferencia notable en cómo los estudiantes universitarios piensan sobre su capacidad laboral debido al nuevo trabajo. Sus características fisiológicas y expectativas sociales están relacionadas con esto. Sin embargo, el factor más crítico para mejorar la calidad de los empleos de los graduados universitarios es que el departamento correspondiente mejore el fomento de sus habilidades previas en esta área.

**Palabras clave:** Cognición Laboral; Contradicciones Laborales; Big Data; Inteligencia Artificial.

## INTRODUCTION

A thriving social economy and excellent educational institutions go hand in hand with student employment. As the economy has changed, college students' attitudes and actions towards finding work have evolved. Universities, colleges, and society have all actively facilitated graduates' access to the workforce.<sup>(1)</sup> Increasing partnerships between tertiary institutions and the construction sector is one strategy for making built environment majors more marketable to potential employers. Multiple studies have shown that UICs help advance a society's economy by increasing the spread of information, enhancing R&D, and opening up new avenues for patenting innovations.<sup>(2)</sup> Because of this, the labour market has an "employment gap"; that is, neither businesses nor recent college grads can locate enough work opportunities. Improving college students' employability is critical to resolving the employment challenges faced by college graduates. Being able to find work after graduation should be a basic skill for anyone looking to enter the workforce. Being employable is also an important measure of how well a university trains its students to be leaders.<sup>(3,4)</sup> Instead of focusing only on employment rates or the information, abilities, and characteristics that students acquire or improve upon while in school, the provided framework considers all the variables and situations that affect students' and graduates' employability.<sup>(5)</sup>

Employing recent college grads in AI has long been a top priority for the nation's leadership since it directly impacts people's capacity to make a living, contributes to overall social and economic health, and has been the subject of much discussion and analysis. Statistics show that recent graduates are under much more pressure to find jobs than they were in the past due to factors including low demand in the labour market, a shortage of internship programmes, and fewer interview chances. Many recent grads are counting on the government to expand its job support programs.<sup>(6,7)</sup> Corporate graduates, who are expected to fulfil market expectations, must improve their skills due to the rapid changes in the corporate environment. The function of business education in fostering employability is the primary area of emphasis here. Complex and multi-faceted issues in trade and finance need cutting-edge problem-solving abilities for success in the corporate world.<sup>(8)</sup>

This empirical research builds an SEM data analysis incorporating the ideas of employability for AI and the competencies of business graduates from the current literature. Additionally, the study model includes formal hypotheses derived from previous investigations. Using survey data as an empirical basis, we evaluate the elements that make business graduates employable and the interactions between them.<sup>(9)</sup> This study contended that a recent grad's employability reflects its capacity to compete for and get a position in the official workforce or the self-employed sector, depending on the individual's skills and competencies. One must work on those mental abilities to get a university-level banking and finance degree.<sup>(10)</sup>

To make more informed management choices, "Big Data" refers to massive data collections that may be analyzed. Collecting, identifying, analyzing, and evaluating data from target audiences is a modern competitive advantage businesses may use to benefit. Companies may stay ahead of the competition by collecting and analyzing data to forecast trends and meet client expectations.<sup>(11,12)</sup> This study is important for academics and educational policy, curriculum creation, and personal career planning. It might lead to a better education system that is both informed and responsive. This work aims to fill the gaps left by standard techniques of graduate employment prediction.<sup>(13,14)</sup> The Intelligence market is constantly changing, and there is an urgent need for more accurate predictions and data privacy. Colleges and institutions are now considering ways to make their graduates more marketable to potential AI employers. Colleges and universities are actively investigating effective strategies to enhance the employability of graduates in light of the current circumstances<sup>(15,16)</sup> since this has long been a shared concern and area of study for the government, colleges, and society. This would promote a fair distribution of talent between the county and the cities, keep college grads in the county, and help build the economy from the ground up. Assessing the desire of university students to stay in the county for entrepreneurship or employment reasons and related significant variables is the first step in attracting talent and promoting industrial development and restructuring in different counties. Future employment development projects may benefit greatly from the data, which can then be used to suggest improvement strategies.<sup>(17,18)</sup>

The main objectives are:

- i) This research explores the influence of big data analytics courses on college students' employability in AI by proposing that hard and soft skills obtained in the courses have a favourable impact.

ii) The perspectives on “college graduate employability” and “job compatibility” are supported by this study, which argues that enhancing student employment cognition is an effective solution to these challenges.

iii) To facilitate quantitative analysis and the development of a multidimensional talent profile based on cognitive and non-cognitive talents, it is necessary to build a data-driven information service platform for connecting field talent supply and demand.

iv) Theoretically, the study adds to the expanding collection of work on employability and sheds light on the tensions and inconsistencies faced by recent college grads in the job market.

Here is the structure of the remaining portion of the paper: section 2 discusses the relevant literature. In section 3, the suggested strategy for employment in college students is then shown. Section 4 displays the experimental findings after presenting the recommended approach. Section 5 wraps up the paper by drawing conclusions and outlining the work.

### Literature Survey

Hui Du et al.<sup>(19)</sup> use educational and psychological evaluation, multivariate statistics, and internet technology to create a multi-faceted knowledge database and all-around talent portraiture with data mining and model construction, laying the groundwork for predictive modelling for reciprocal accurate talent availability and demand matching. Full integration of campus education administration, learning assessment system data, and improved campus data governance is crucial for personalized job and future planning options.

To identify the traits that enhance college students’ employability during talent nurturing, Yi-Cheng Zhang et al.<sup>(20)</sup> utilize regression analysis on 263 valid samples from universities. College students’ employability is strongly connected with prograde establishing, programme instructing and club interests; the most significant components are course instruction and social events. Future employers also consider a student’s internship experience and cumulative grade point average.

The results of the ANCOVA analysis, as shown by Tingting Gao et al.<sup>(21)</sup>, demonstrated that the experimental group outperformed the control group regarding the test completion rate (74,71 % vs. 65,90 %). In conclusion, when contrasted with more conventional methods of instruction, state-of-the-art interactive learning technologies can greatly enhance students’ capacity for critical thinking. Students might benefit from the suggestions offered to improve their critical thinking abilities. Students’ professional skills may be effectively enhanced by relying on the results to design an action plan to expedite the learning process.

To study the correlation between structural model-based employability pedagogy, learning based on problems, reception capability, and student employability, Michael Yao-Ping Peng et al.<sup>(22)</sup> surveyed 442 participants. According to the SEM findings, problem-based learning and employability pedagogy favourably correlate with absorptive capacity. Pedagogy for employability also has a positive correlation with student employability. The intervention technique was successful, as the results showed that the test group outperformed the control group in every performance category.

Using survey data from 392 Chinese university students, Tiansheng Xia et al.<sup>(23)</sup> investigated the correlation between corporate relationships and employability. The findings demonstrated that professional social support positively impacted college students’ employability and career adaptation, with career adaptation acting as a mediator between the two. Higher levels of initiative amplify the positive impact of employment flexibility on college students’ employability.

In their investigation of the mediating role of human capital, Thuy Thi Hai Ho et al.<sup>(24)</sup> look at the relationship between career development learning (CDL) and students’ perceived employability (SPE). The partial least square structural equation model indicated that CDL positively impacted SPE in the long run. Additionally, the role of human capital as a modifier in the relationship between CDL and SPE was examined. This study’s findings have practical consequences for how educational institutions may better prepare their students to succeed in the job market.

Michael Healy et al.<sup>(25)</sup> examined the institutional environments shown by visualizations of direct reference networks among 4068 journal articles concentrating on student employability and career advancement. Despite their obvious interdependence, the fields of education and research have seldom engaged in formal or informal dialogue. An intentional partnership between the two fields may influence a based-on-proof and integrated pedagogy of careers and employability teaching in higher education; this would benefit both professions when implemented.

To address several concerns about the graduates’ readiness to join the profession, namely regarding their lack of employability skills, Muhd Khaizer Omar et al.<sup>(26)</sup> conducted quantitative descriptive and cross-sectional research among students from vocational college diploma programmes across various fields of study. The results regarding the capacity to find work were modest. A modest level of self-efficacy was reported with career advancement. There was no statistically significant relationship between the demographic factors of gender and academic achievement and students’ self-efficacy towards job growth.

## METHOD

An increasingly popular topic in AI employment-related research is the correlation between college students' employment values, their desire to work after graduation, and their graduation destination. College students' priorities for finding work have evolved over the years, reflecting the unique traits of each era. College students are more risk-averse in their hiring practices due to the unpredictability of the environment due to the pandemic and other problems. Since the system tends towards unit selection and places a premium on job security, it is clear that their employment values are embedded in it. Quality of employment, worry about employment, first outcomes of employment, work happiness, career growth, self-efficacy in making career decisions, and many other factors are significantly influenced by college students' employment values. College students nowadays have high career expectations, leading to low job satisfaction, and their ideals regarding work are often realistic and subjective. Thus, we must enhance ideal career and job guidance education to direct the formation of scientific ideals. Various synergies must be fostered to integrate work ethics into the educational system. The authors of this study classified all abilities acquired during schooling as either "hard skills," explicitly taught in the classroom, or "soft skills," which are more amorphous and acquired elsewhere. Figure 1 shows the fundamental structure of the big data analysis for employability in college students.

Students get an advantage in the labour market via education, the fundamental method of enhancing personal talents. Unfortunately, finding a job isn't easy for all graduates. The National Centre for Education Statistics (NCES) found that full-time undergraduates had an employment rate of 43 % and part-time undergraduates of 81 %; both percentages had declined from 53 % and 85 % in 2000, respectively. Employers saw 87,4 % of 20-34-year-olds with a bachelor's degree or above and 71,8 % with an associate's degree or above in 2023. As shown in figure 1, the skill requirement for student employment is low, and the present epidemic is adding to the already bad labour market condition. This is having a multiplicative effect on the job situation among young people. Depression is one of the severe negative psychosocial effects that may result from not getting a job. This is especially true for students, who may lack the emotional and cognitive maturity to cope well with such adversity. Therefore, it is critical to identify students experiencing problems obtaining appropriate employment quickly and provide them with tailored support and guidance. It might be difficult to predict which students will have the greatest difficulty obtaining employment because of the many factors that could influence the recruitment process.

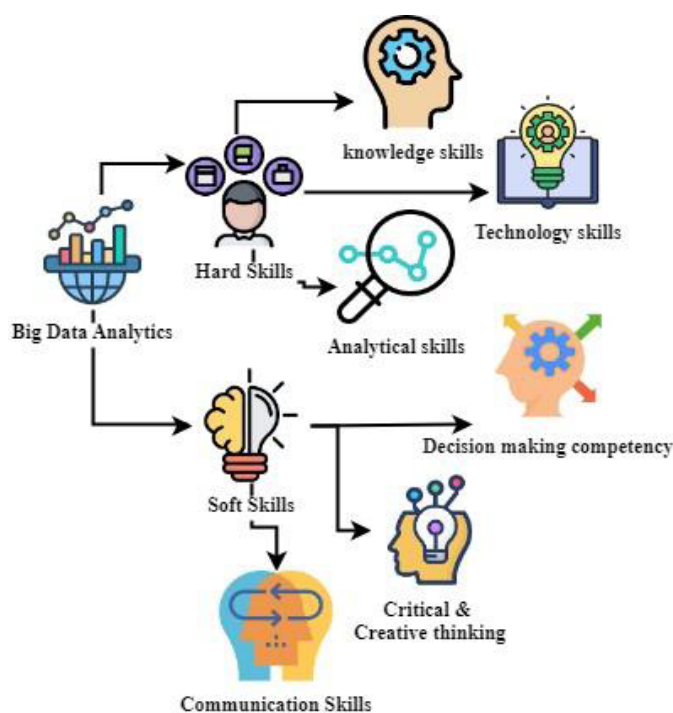


Figure 1. Big Data for enhancing college student's employment skills

The purpose of every recruiter is to find suitable individuals to fill available jobs; however, subjective and objective factors could affect the hiring process. In addition to academic competency, unconscious prejudices such as gender, and the school's reputation may influence recruiting decisions. Particularly for young graduates without work experience, these biases make the hiring process unfair and contribute to uneven employment chances, which value diversity over conformity. Therefore, it is critical to understand recruitment biases and how to use them to predict graduates' employment. Researchers have tried to figure out these biases in the past. However, they have relied heavily on surveys and questionnaires, which are labour- and resource-intensive



to distribute and probably don't capture the views of all students due to their limited breadth. Campus life is data-heavy, but thanks to smart education management systems that use big data, we can sift through mountains of student information extracted from electronic records. This opens up new avenues for research on the characteristics of graduate employment and the obstacles they face, and it also facilitates data-driven growth. We still face many significant obstacles. For starters, sophisticated analytical methods are required since this data is far more nuanced than that derived from surveys. Secondly, there is a substantial imbalance in employment analysis and prediction since there are fewer graduates who are unable to get work than those who can do so. Third, current algorithms seldom account for all potential biases, and there may be biases in employment that differ by academic field and major.

By analyzing demographic and academic performance data, we want to draw two conclusions about the employment biases across various majors in this paper: jobs status: early identification of students having difficulty getting jobs requires careful monitoring. Predict early on whether a student will choose a job with the government or an entrepreneurial firm based on their career preferences. This research's experimental approach is shown in figure 2. We examine gender, ethnicity, hometown, and enrollment status biases regarding each major. We then suggest the four-part big data analysis based on potential employment biases. First, we use an autoencoder to embed students' academic performance into a space with a single dimension, thereby resolving the issue of course heterogeneity. Even more so, a temporal convolutional network (TCN) is used to consider the sequential information across semesters. Lastly, we develop a regularisation to mitigate the impact of major-induced employment biases.

## **Hard skills**

### *Knowledge skills*

Students may learn more effectively and retain more information when they take big data as analysis. Digital devices and platforms have expanded pupils' ability to understand materials by making it easier for them to browse libraries and web pages for particular information. Within this framework, engineering students' expertise is enhanced by taking big data analysis.

### *Technology skills*

The technologies and tools covered in big data analytics include Hadoop, HBase, MongoDB, and NoSQL. Students may deepen their understanding of technical topics and hone their abilities by studying big data platforms and technologies. Knowledgeable implementation of big data analytics techniques also allows for the derivation of insights, the provision of integrated solutions, and the extraction of meaning from data across many different fields of application.

### *Analytical skills*

Students' data analysis abilities are the primary focus of big data analysis. In this article, learn how to mine large datasets for insights using data mining methods and how to mine raw data for insights using big data analytics tools and methodologies. Students will get a strong foundation in the theory and practice of big data analytics by taking this course, which covers primary data mining, advanced statistical data mining, and shared filtering. This is due to their proficiency in understanding devices and software, as well as pertinent engineering concepts and modelling techniques.

## **Soft skills**

### *Decision-making competency*

Gaining access to big data may help students improve their systematic thinking, cooperation, and problem-solving skills. Prior studies have focused chiefly on decision-making abilities, and the development of these skills relies on appropriate data. One new approach to decision-making is big data analytics, which mines massive datasets for useful information using big data technology. As a result, consumers can better digest the facts and make informed choices. Engineering students may enhance their decision-making skills by integrating digital technologies with information produced from big data.

### *Critical and creative thinking*

Big data opens the students' minds to possibilities that have never been considered before, or at least to issues we have not yet found a solution. Additionally, methods for gathering and analyzing large amounts of data may encourage original thought and new ideas.

### *Communication skills*

A person with strong communication skills can explain themselves clearly and convey complex thoughts and information via various formal and informal channels. The ability to recognize, solve problems, visualize, and communicate may all be enhanced via digital training techniques.

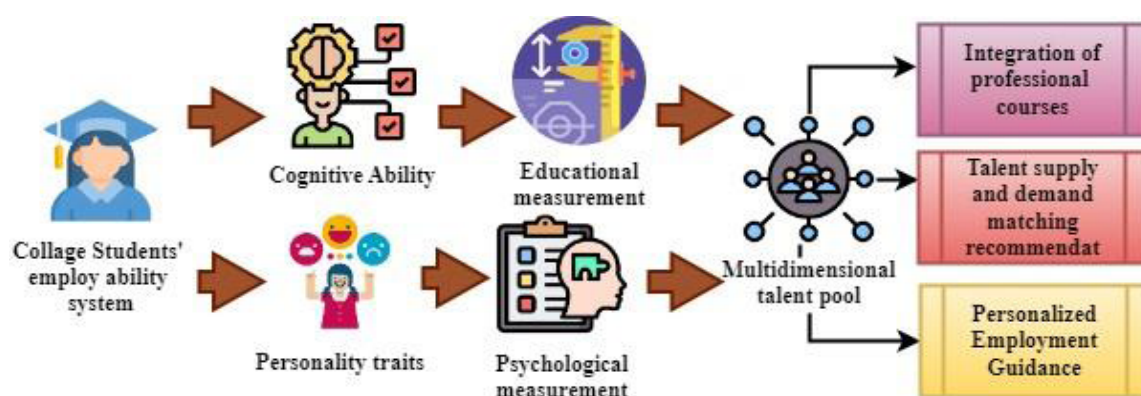


Figure 2. Personalized Employability for college students

The construction of a multidimensional talent pool by collecting and studying data on college students' non-cognitive abilities (such as personality traits, professional values, and aspirations) and cognitive skills (such as logical thinking and data analysis) to address the issue of a two-way talent supply and demand in the industrial sector. This pool will be based on the theory and method of psychological and educational measurement. Businesses also build their post-quality models and industry categorization systems by collecting huge amounts of data from networks and doing thorough investigations. This article draws on theories in international psychology to suggest a model for people-job matching based on factors like value alignment, interest types, and personality traits. The model can help with both the supply and demand for talent, ensuring accurate matches and smooth docking. It can also provide relevant management departments with data on talent demand, regional compensation, and professional distribution. Finally, it can provide relevant employment management departments with the research findings. The system's foundation is B/S architecture, enabling multi-terminal access via a public WeChat account, a desktop browser, or a mobile terminal.

An all-encompassing talent portrait is created by analyzing college students' results from a battery of tests measuring their cognitive abilities, personalities, career goals, interests, and intentions, as well as their professional interests, regional orientation, and positional orientation. Building on earlier efforts, a multi-faceted talent pool was established. Many areas may benefit from the talent pool data, including employment distribution legislation, study on students' psychological features, career planning advice, review of industry education integration, and other areas.

It will present an accurate statistical basis for vocational advice and technical ability growing in educational institutions. Its focus is improving the college's employability and expanding the optimum use of human resources. The goal is to achieve the optimal matching of talent supply and demand using the large data accumulated from the multidimensional talent pool. Acknowledging the significance of individual trait variation in shaping behaviour is the foundational principle of psychometric assessment. This study will construct a talent pool based on pupils' college cognitive capacity and non-cognitive ability (personality qualities). College students' cognitive ability will mostly be measured via educational assessments, while their non-cognitive ability will primarily be measured through psychological assessments. Figure 1 displays the research framework.

Due to the intricacy of the theory and the vast number of hypotheses it supports, it was essential to summarise the research's hypotheses and the studies that have given empirical and conceptual support for them in table 1. This follows a strategy similar to that of prior research. Their first step was to test hypotheses 1-4 on the relationships between cognitive variables and career planning. Beginning with cognitive characteristics and career planning, we examined the direct relationships between coaches' assistance and career obstacles (H5, H6). Afterwards, we discussed the conceptual factors and career planning concerning the indirect links between coaches' support and career obstacles (H7-H9). This was followed by an analysis of contextual variables through H5-H9. Using H10-H17, they examined the direct and indirect connections between personality traits, cognitive abilities, and career planning. The association between professional goals and career planning was then reviewed to determine whether conscientiousness was a moderator (H18). So far as we are aware, this moderating effect has only been proposed in the newly constructed CSM model and has not been evaluated experimentally.

Big data and intelligence assessments may be categorized as single-level or multiple based on how the factors are split. This study uses two-level partitioning, big data, and intelligence to demonstrate the challenge while considering operations' operability and complexity. An assessment model is developed under Big Data/Intelligence, and the evaluation above index system is used to evaluate the quality of jobs for college graduates.

Table 1. Hypotheses

## Hypotheses

## Cognitive variables

H1: aspirations for professional advancement are positively correlated with levels of self-efficacy.

H2: there is a favourable correlation between career preparation and professional objectives.

H3: career planning is favourably correlated with self-efficacy.

H4: as a mediator, career objectives help explain how self-efficacy relates to career planning.

## Contextual variables

H5: self-efficacy, professional objectives, and career planning favourably correlate with coaches' assistance.

H6: problems have a detrimental effect on self-efficacy, professional aspirations, and career strategy.

H7: self-efficacy mediates the connection between professional objectives and the support and barriers coaches provide.

H8: a person's sense of self-efficacy mediates the connection between career planning and the support and obstacles coaches provide.

H9: the association between career planning, career obstacles, and coaching assistance is somewhat mediated by career aspirations.

## Personality variables

H10: there is a positive correlation between conscientiousness, extraversion, and self-efficacy.

H11: having low self-efficacy is associated with high neuroticism.

H12: there is a positive correlation between openness, extraversion, conscientiousness and career aspirations.

H13: planning one's professional future positively correlates with openness, extraversion, and conscientiousness.

H14: neuroticism, as well as agreeableness, are detrimental to career planning.

H15: conscientiousness and job aspirations are mediated to some extent by self-efficacy.

H16: the association between openness, self-efficacy, and career planning is partly mediated by conscientiousness and openness.

H17: openness, career planning, and conscientiousness are mediated to some extent by professional aspirations.

H18: conscientiousness modifies the association between professional objectives and career planning. Higher degrees of conscientiousness show a larger relationship.

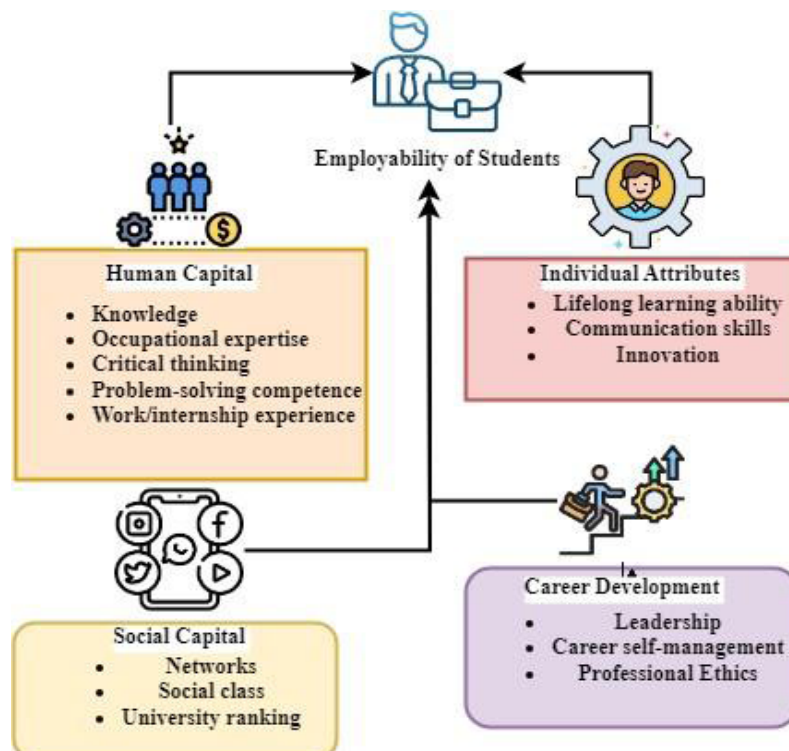


Figure 3. Core attributes of the employability of students

The following four dimensions reflect students' employability:

#### *Human capital*

Human capital encompasses an individual's meta-cognitive understanding, abilities, attitudes, and information, both general and specialized to a certain profession, contributing to their success in the workforce. Graduates' employability heavily depends on their human capital, which includes professional skills and recognized abilities like problem-solving, critical thinking, and collaboration. It is essential that aspiring engineers consistently study the fundamentals of the field and hone their practical skills. Expertise in solving complex engineering problems requires a solid foundation in mathematics, the natural sciences, and engineering. In contrast, design and development, modern tools, project management, financial analysis, research, and engineering analysis are all part of the engineering profession's unique set of skills. Computer and technological literacy are becoming more important in many fields, including the construction business, where companies are looking for graduates who can efficiently use technology to carry out industrial duties. Also required are abilities in analysis, critical thinking, and engineering thought processes, all of which are part of the skill level. On the other hand, employers in the engineering field highly value students' ability to solve problems, which they can develop through internships and industry-sponsored projects.

#### *Social capital*

The ability to build and maintain meaningful professional connections and one's level of immersion in relevant social networks are all components of social capital. Among the many social-level employment factors are one's social class and the rating of one's university. Graduates from more privileged backgrounds and highly regarded educational institutions, such as those with engineering degrees, tend to have a better chance of finding a gainful job after graduation. Thus, engineering students' employability is affected by their social network contacts, which are significant regarding social class, social capital, and university ranking.

#### *Individual attributes*

An essential component of most frameworks for assessing employability is flexibility, which entails proactive and reactive measures to increase one's openness to and capacity to respond to novel demands. Learning new things and adapting to new situations is an important skill for engineers, and one of the most stressed competencies is the capacity for lifelong learning. This includes the knowledge of the importance of learning on one's own and the ability to learn new things in response to new developments. The ability to innovate, defined as the capacity to develop novel challenges and strategies for addressing them via creative problem-solving, is the pivotal competency that ensures students can adapt to new situations and grow as individuals. The current research on the employability of college graduates shows that the capacity to work well with others and maintain positive relationships is crucial to advancing one's career.

#### *Career development*

Being able to control and plan one's career is known as career self-management, while career growth is all about having a sense of one's professional identity. It encompasses aspirations, character quirks, principles, convictions, and standards. Occupational self-management is taking stock of one's strengths and weaknesses in one's values, attitudes, competencies, interests, and work-life balance; these factors may influence one's professional advancement. Being self-aware in the workplace entails knowing one's place, values, interests, expectations, motivations, strengths, and shortcomings and reflecting on one's role in the business. Organizational leadership and self-management abilities are highly sought after by employers. Graduates exhibiting leadership qualities exhibit self-assurance, proficiency in working in a team, and initiative. To summarize, figure 3 shows the essential qualities of employable students, which are the most important factors in achieving professional success.

The evaluation index set should be determined. Following equations 1, 2 and 3 is the college graduate job market breakdown according to the assessment above index system to establish the Distribution of Self-Ability Cognition. Some of the main signs are:

$$K=(k_1, k_2, k_3) \quad (1)$$

Extraneous signs comprise:

$$k_1=(k_{11}, k_{12}, k_{13}, k_{14}, k_{15}, k_{16}, k_{17}, k_{18}, k_{19}) \quad (2)$$

This also allows us to get:

$$k_2=(k_{21}, k_{22}, k_{23}, k_{24}, k_{25}, k_{26}, k_{27}, k_{28}, k_{29})$$



$$k_3=(k_{31},k_{32},k_{33},k_{34},k_{35},k_{36},k_{37},k_{38},k_{39}) \quad (3)$$

Find the mass of every layer of indicators: the preceding makes the significance of each indication clear to establish the Comparison of Job Capacity Perception by utilizing equations 4(a), 4(b), 4(c) and 4(d).

$$m=(m_1,m_2,m_3)=(0,02,0,05,0,03) \quad (4a)$$

$$m_1=(m_{11},m_{12},m_{13},m_{14},m_{15},m_{16},m_{17},m_{18},m_{19})=(0,11,0,11,0,050,0,10,0,20,0,050,0,02,0,050,0,02,0,050,0,015) \quad (4b)$$

$$m_2=(m_{21},m_{22},m_{23},m_{24},m_{25},m_{26},m_{27},m_{28},m_{29})=(0,21,0,11,0,11,0,015,0,015,0,11,0,115,0,015,0,12) \quad (4c)$$

$$m_3=(m_{31},m_{32},m_{33},m_{34},m_{35},m_{36},m_{37},m_{38},m_{39})=(0,12,0,11,0,11,0,12,0,015,0,01,0,015,0,02) \quad (4d)$$

Sort out the options: one way to represent the prior indications' decision set is equations 5, 6, 7 and 8. Additionally, it is possible to establish Trends in Employment Cognition by utilizing equations 5, 6, 7 and Equation 8.

$$W=(w_1,w_2,w_3,w_4,w_5)=(\text{very good},\text{good},\text{generally},\text{poor}) \quad (5)$$

A questionnaire survey is conducted to clarify the distribution of index values and determine 001 using a four-level rating system.

$$S_1=[s_{11} \ s_{12} \ s_{13} \ s_{14} \ s_{21} \ s_{22} \ s_{23} \ s_{24} \dots\dots\dots s_{91} \ s_{92} \ s_{93} \ s_{94}] \quad (6)$$

The employer's evaluation membership matrix is represented by the formula above for the school evaluation.

$$S_2=[s_{11} \ s_{12} \ s_{13} \ s_{14} \ s_{21} \ s_{22} \ s_{23} \ s_{24} \dots\dots\dots s_{91} \ s_{92} \ s_{93} \ s_{94}] \quad (7)$$

Employers use the formula above as their evaluation membership matrix to assess college grads.

$$S_3=[s_{11} \ s_{12} \ s_{13} \ s_{14} \ s_{21} \ s_{22} \ s_{23} \ s_{24} \dots\dots\dots s_{91} \ s_{92} \ s_{93} \ s_{94}] \quad (8)$$

The membership matrix in the formula above represents graduating students' feedback on the school's job placement efforts.

Implement big data and intelligence: the assessment strategy begins with big data and secondary indicator intelligence.

$$C_j=b_j*S_j \quad (9)$$

$C_j$  is the main indication, whereas  $j=1,2,3$  is secondary. Three main signs are present. Here is the composition matrix  $C$ :

$$C=[c_{11} \ c_{12} \ c_{13} \ c_{14} \ c_{15} \ c_{21} \ c_{22} \ c_{23} \ c_{24} \ c_{25} \ c_{31} \ c_{32} \ c_{33} \ c_{34} \ c_{35}] \quad (10)$$

After doing the index's first-level assessment, they get matrix  $F$ . This approach is:

$$F=b*C \quad (11)$$

Perform a thorough assessment: using the  $C$  results as a guide, add the first two elements together to get the outstanding value. The maximization of membership principle states that a higher value leads to higher-quality employment in educational institutions and a more prominent profile in all spheres.

## RESULTS AND DISCUSSION

Our research shows that college graduates face occupational contradictions and mismatches between their skills and job demands. They also found that they need interventions to help them adapt and be resilient in a changing job market. They recommend more research and proactive measures to help graduates transition into the workforce and promote sustainable career development strategies. Lastly, they recommend collaboration between academic institutions and professional organizations to address this issue.

Dataset: significant research shows cognitive problems in high-adversity children. Based on these findings, chronic stress may impair cognition. Recent research shows these individuals may increase their cognitive skills for high-adversity problem-solving. College students' ability to learn danger vs. non-danger information is evaluated. In unpublished, preregistered, well-powered, confirmatory research ( $N = 126$ ), college students with

greater engagement in but not more exposure to violence learn better about risk but not location information than peers with less violence.

### Distribution of Self-Ability Cognition

Figure 5 shows that the Employment Cognition, its self-ability, is measured using equations 1, 2, and 3. Individuals' multi-domain self-perceptions may be better understood by looking at the distribution of self-ability cognition. This distribution shows various self-assessments, from very confident people to those who severely underrate their talents. Within this range, self-perceptions are greatly impacted by personal motives, educational background, cultural influences, and past experiences. To promote a more equitable and inclusive environment conducive to personal and professional development, fostering self-efficacy and providing targeted support, educators, employers, and legislators must fully grasp how self-ability cognition is distributed.

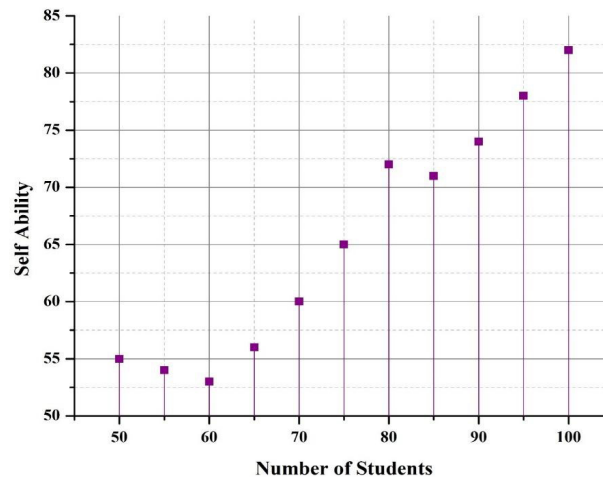


Figure 4. Distribution of Self-Ability in Cognition

### Comparison of Job Capacity Perception

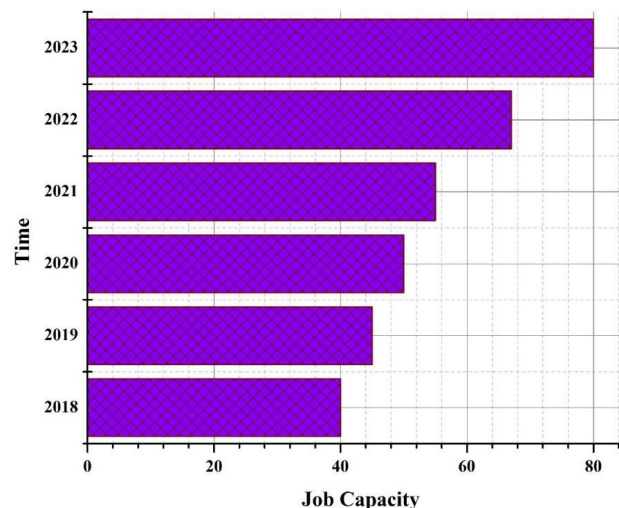


Figure 5. Comparison of Job Capacity Perception

Figure 6 shows that Employment Cognition, Job Capacity, is measured using equations 4(a), 4(b), 4(c) and 4(d). Changes in how individuals show figure 7 their preparedness and appropriateness for different occupations are demonstrated by comparing their job capability perception. Comparisons of views before and after the advent of new work trends shed light on how factors like technical improvements, economic volatility, and changes in industry needs impact changing viewpoints. It records changes in self-confidence, evaluations of skills, and career goals, drawing attention to the influence of environmental factors on these constructs. By understanding that people have different views about their abilities on the job, we can better tailor our

interventions to help people feel more confident, close skill gaps, and adapt our training programs to the changing demands of the labour market. In addition, the contrast highlights how employment cognition is always changing and the necessity of adjusting to new job environments.

### Trends in Employment Cognition

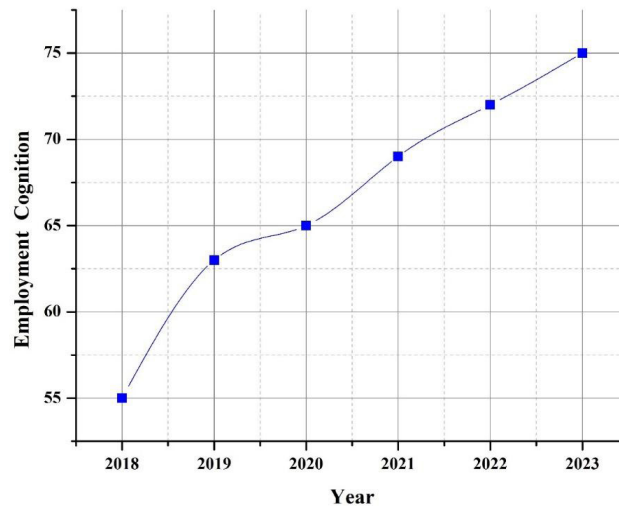


Figure 6. Trends in Employment Cognition

Figure 7 illustrates the Trends in Employment Cognition with year curves of the Modified Data Analysis composites, measured using equations 5, 6, 7 and 8. Especially in light of modern data analysis, new forms of work are coming under more and more scrutiny. At the intersection of conventional employment arrangements and new types of labour, our investigation sheds light on how recent college graduates see and negotiate the job market. Recent graduates face possibilities and difficulties in an environment where technology reshapes sectors and work positions. Along with changing social expectations for professional paths, they face gaps between their educational background and the skill sets needed by contemporary employers. Suppose lawmakers, educators, and businesses are serious about closing the achievement gap and increasing job preparedness. In that case, they must have a firm grasp of these patterns to create successful career development programs and improve employment outcomes.

### Total Efforts

Table 2. Total Efforts						
Model Pathways	Efforts	Points Estimation	Bootstrapping			
			Bias-corrected 95 %		Percentile 95 %	
			Lower	Upper	Lower	Upper
Big data	Total Effects	0,515	0,347	0,697	0,353	0,705
	Direct Effects	0,166	0,021	0,323	0,022	0,324
	Indirect Effects	0,350	0,202	0,537	0,202	0,537

They conclude that academic satisfaction considerably affects employment cognition ( $s=0,598, q<0,000$ ) and that professional training has a small but significant effect on employment cognition (EC) ( $s=0,187, q<0,05$ ). Academic satisfaction and professional training (PT) have a strong and significant association ( $s=0,658, q<0,00$ ). Table 2 displays the findings of the bootstrap approach, which further identifies this with 5000 sample times. Given the minimal direct impact of PT on the right employment cognition establishment but substantial overall effects, it seems that college students' contentment acts as a mediator between PT and EC. Hierarchical moderated regression was used to determine whether word of mouth contributes to the formation of accurate employment cognition. The findings provide credence to the idea that SEM significantly improves job-related thinking.

## CONCLUSIONS

The investigation of employment cognition and occupational conflicts among college graduates under the new job form reveals a multidimensional environment defined by both possibilities and difficulties. This examination was based on the analysis of data using SEM. Our research elucidates the complexities of today's labour market, which is defined by the meeting point of traditional employment models with more modern approaches to getting work done. Our findings demonstrate that recent college graduates can adapt quickly to shifting job markets. The presence of intrinsic inconsistencies and uncertainty does not change the fact that this is the case. To go forward, a comprehensive strategy for resolving occupational paradoxes is required. An inclusive and equitable job environment, better workforce preparation, and the promotion of lifelong learning should all be the goals of this plan, including data-driven insights with proactive policy.

The use of self-reported data is a limitation of our study. As a result, respondents' prejudices or inaccurate impressions may be impacted by their job cognition and occupational inconsistencies. Further, our data analysis could miss regional or demographic differences in employment trends and occupational difficulties. Occupational paradoxes, employment cognition, and the whole complexity of human experiences are all areas that data analysis has the potential to shed light on. Yet, it may also overlook important qualitative details. A more robust methodology, such as a mixed-methods approach or a longitudinal study, may help researchers overcome these limitations and better understand the factors influencing the changing employment market for college graduates. Stakeholders may use these insights to better equip recent college graduates with the resources, networks, and skills they need to thrive in the ever-changing and unpredictable workplace.

## BIBLIOGRAPHIC REFERENCES

1. Hossain, M. M., Alam, M., Alamgir, M., & Salat, A. Factors affecting business graduates' employability-empirical evidence using partial least squares (PLS). *Education+ Training*, 62(3), pp. 292-310. <https://doi.org/10.1108/ET-07-2018-0154>.
2. Qian, T., Bian, J., & Chen, J. The status quo, causes, and countermeasures of employment difficulties faced by college graduates in China. *Labor History*, 1-16. <https://doi.org/10.1080/0023656X.2023.2162376>.
3. Dong, J. A Preliminary Exploration of Guidance Strategies for College Students Job-seeking Positioning from the Perspective of Employment Education. *Adult and Higher Education*, 5(16), pp. 28-33. <https://doi.org/10.20448/journal.522.2023.516.28.33>.
4. Wang, T., & Li, S. Relationship between employment values and college students' choice intention of slow employment: A moderated mediation model. *Frontiers in Psychology*, 13, 940556, pp. 1-16. <https://doi.org/10.3389/fpsyg.2022.940556>.
5. Kirdani-Ryan, M., Ko, A. J., & Borisova, E. A. "Taught to be automata": Examining the departmental role in shaping initial career choices of computing students. *Computer Science Education*, 34(1), pp. 87-113. <https://doi.org/10.1080/08993408.2024.1934350>.
6. Aliu, J., & Aigbavboa, C. O. Structural determinants of graduate employability: impact of university and industry collaborations. *Journal of Engineering, Design and Technology*, 19(5), pp. 1080-1100. <https://doi.org/10.1108/JEDT-02-2021-0096>.
7. Zhang, Y. C., Zhang, Y., Xiong, X. L., Liu, J. B., & Zhai, R. B. An empirical study on the improvement of college students' employability based on university factors. *Frontiers in Psychology*, 13, 793492, pp. 1-12. <https://doi.org/10.3389/fpsyg.2022.793492>.
8. Behle, H. Students' and graduates' employability. A framework to classify and measure employability gain. *Policy Reviews in Higher Education*, 4(1), pp. 105-130. <https://doi.org/10.1080/23322969.2020.1712665>.
9. Kanar, A., & Bouckenoghe, D. The role of extracurricular activities in shaping university students' employment self-efficacy perceptions. *Career Development International*, 26(2), pp. 158-173. <https://doi.org/10.1108/CDI-06-2020-0142>.
10. Ali, S., & Nadeem, A. The Impact of Socio-emotional competencies, Socio-economic factors, and the Employability process on Employment Status. *Journal of Management Practice*, 22(2), pp. 138-156. <https://doi.org/10.1108/JMP-02-2021-0108>.



11. Alavi, H. How Big Data can influence tertiary education curriculum to increase employability rates (Doctoral dissertation, Macquarie University), pp. 1-165. <https://doi.org/10.25949/19433252.v1>.
12. Wang, K., Yuan, R., & Lee, I. Exploring Contradiction-Driven Language Teacher Identity Transformation During Curriculum Reforms: A Chinese Tale. *TESOL Quarterly*, 58(1), pp. 142-160. <https://doi.org/10.1002/tesq.3145>.
13. Ahmed, A. M., Mohamed-Arshad, S. B., & Omran, A. Cognitive Skills Construct and Effecting on Employability Competence for Undergraduate Students: A Conceptual Framework. *International Journal of Advanced Research in Economics and Finance*, 4(3), pp. 27-38. <https://doi.org/10.2139/ssrn.4007852>.
14. Faizan, M., Huang, Q., Riaz, N., & Saif, U. From academia to industry: A framework to securely implement big data and AI to predict college graduates' employment trajectories. *International Journal of Science and Research Archive*, 11(2), pp. 708-723. <https://doi.org/10.30574/ijrsra.2024.11.2.0735>.
15. Huang, X., Cao, J., Zhao, G., Long, Z., Han, G., & Cai, X. The employability and career development of finance and trade college graduates. *Frontiers in Psychology*, 12, 719336, pp. 1-13. <https://doi.org/10.3389/fpsyg.2021.719336>.
16. Li, R. Research on the Precise Employment and Education Training Mode of Engineering Colleges under the Internet Big Data. *Advances in Vocational and Technical Education*, 5(7), pp. 6-12. <https://doi.org/10.18052/www.scipress.com/AVTE.5.6>.
17. Chen, S., Zhang, Q., Zhao, Q., Deng, H., & Su, Y. S. Influencing factors of university relocation on college students' intention to engage in local entrepreneurship and employment. *Frontiers in Psychology*, 12, 750972, pp. 1-14. <https://doi.org/10.3389/fpsyg.2021.750972>.
18. Du, H. Research on the data driven intelligent employment information service system for college students. In *International Conference on Computer Application and Information Security (ICCAIS 2021)*, SPIE, 12260, pp. 638-643. <https://doi.org/10.1117/12.2621681>.
19. Zhang, Y. C., Zhang, Y., Xiong, X. L., Liu, J. B., & Zhai, R. B. An empirical study on the improvement of college students' employability based on university factors. *Frontiers in Psychology*, 13, 793492, pp. 1-12. <https://doi.org/10.3389/fpsyg.2022.793492>.
20. Gao, T. Employability of college students in the new digital era: which thinking skills are optimal?. *Interactive Learning Environments*, 31(10), pp. 7029-7039. <https://doi.org/10.1080/10494820.2022.2145556>.
21. Peng, M. Y. P., Wang, L., Yue, X., Xu, Y., & Feng, Y. A study on the influence of multi-teaching strategy intervention program on college students' absorptive capacity and employability. *Frontiers in Psychology*, 12, 631958, pp. 1-15. <https://doi.org/10.3389/fpsyg.2021.631958>.
22. Xia, T., Gu, H., Huang, Y., Zhu, Q., & Cheng, Y. The relationship between career social support and employability of college students: A moderated mediation model. *Frontiers in Psychology*, 11, 28, pp. 1-15. <https://doi.org/10.3389/fpsyg.2020.00028>.
23. Ho, T. T. H., Le, V. H., Nguyen, D. T., Nguyen, C. T. P., & Nguyen, H. T. T. Effects of career development learning on students' perceived employability: a longitudinal study. *Higher Education*, 86(2), pp. 297-315. <https://doi.org/10.1007/s10734-021-00765-4>.
24. Healy, M., Hammer, S., & McIlveen, P. Mapping graduate employability and career development in higher education research: A citation network analysis. *Studies in Higher Education*, 47(4), pp. 799-811. <https://doi.org/10.1080/03075079.2020.1804851>.
25. Omar, M. K., Muhamad, W. M. W., Ismail, N., Zakaria, A., & Kadir, K. M. Employability Skills and Career Development Self-Efficacy as Indicators for Workforce Success. *Journal of Technical Education and Training*, 15(3), pp. 118-130. <https://doi.org/10.30880/jtet.2023.15.03.011>.
26. Ali, S., & Nadeem, A. The Impact of Socio-emotional competencies, Socio-economic factors, and the Employability process on Employment Status. <https://doi.org/10.1108/JMP-02-2021-0108>.

## **FINANCING**

The authors did not receive financing for the development of this research.

## **CONFLICT OF INTEREST**

The authors declare that there is no conflict of interest.

## **AUTHOR CONTRIBUTION**

*Conceptualization:* Hong Xiang, Wenxi Tan.

*Data curation:* Anrong Wang, Xiaoju Dai.

*Formal analysis:* Anrong Wang, Xiaoju Dai.

*Research:* Hong Xiang, Le Zhang.

*Methodology:* Hong Xiang, Wenxi Tan.

*Drafting - original draft:* Wenxi Tan, Le Zhang.

*Writing - proofreading and editing:* Hong Xiang, Anrong Wang.