

Retraction

Retracted: Relationship between Business Administration Ability and Innovation Ability Formation of University Students Based on Data Mining and Empirical Research

Mobile Information Systems

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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- [1] L. Gao, "Relationship between Business Administration Ability and Innovation Ability Formation of University Students Based on Data Mining and Empirical Research," *Mobile Information Systems*, vol. 2021, Article ID 2388579, 8 pages, 2021.

Research Article

Relationship between Business Administration Ability and Innovation Ability Formation of University Students Based on Data Mining and Empirical Research

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With the continuous development of science and technology, the scale of education is slowly expanding, but at the same time, what is more important is the quality of higher education. This issue has also become a hot topic of concern for the society nowadays. Higher education, which is at the top of the education chain, has the important task of training talents for society. The cultivation of talents includes not only the ability to innovate but also the ability to manage business. The purpose of this paper is to study and empirically analyze the relationship between business administration competency and innovation competency formation among university students based on data mining (DM). This paper mainly uses the K-means algorithm in DM to extract relevant data and then conducts a questionnaire survey to analyze the innovation ability and business administration ability of university students; the results showed that 24 respondents considered their innovation ability is relatively poor, accounting for 20.98%; 137 respondents considered their innovation ability is average, accounting for 47.9% of the total, nearly half; and 65 respondents thought that their innovation ability is relatively strong. In the end, 60 respondents thought that their innovation ability is very strong and half of the respondents thought that their innovation ability is generally poor. Generally speaking, the tests have a strong ability to innovate. The evaluation is generally average.

1. Introduction

Today's international competition is actually a competition for talents, and it is also a competition for national innovation capabilities. Higher education is at the top of the education chain and bears the important task of cultivating talents [1, 2]. In the new era, innovation has become the soul of a nation's progress and an inexhaustible driving force for the prosperity of a country [3, 4]. Innovation refers to the activity that people use known information and conditions to break through the convention and discover or produce some novel, unique, and valuable new things and ideas in order to meet the needs of development. The essence of innovation is breakthrough, that is, breaking through the old thinking set and the old conventional commandments. The core of innovation activities is "new," which is either the change of product structure, performance, and external

characteristics or the creation of modeling design, expression forms, and means of content or the enrichment and perfection of content.

Regarding the relationship and empirical research on the formation of business administration capability and innovation capability of university students, many domestic and foreign scholars have conducted research on it, and the ranking of innovation capability of scientific research institutions in foreign countries started earlier, in 1983. In the 1980s, the Provisional Education Review Council of Japan proposed that "the creativity of students is closely related to their personalities, and in order to cultivate talents with innovative abilities, universities must make them to cultivate creative people in universities, and they must become people of action, free people, and independent people" [5]. In 1959, Duhaylongsod, an American educational psychologist and educator, one of

the representatives of the contemporary cognitive psychology school and structuralist educational thought, proposed “a theory of the basic structure of the subject, emphasising the importance of the student’s mastery of the basic concepts and principles of knowledge; the development of the student’s intelligence; the importance of logical thinking; and the ability to acquire knowledge independently; the emphasis is on reforming teaching methods so that students themselves become the discoverers of conclusions and laws” [6]. Although there are many studies on the relationship and empirical research on the formation of college students’ business administration ability and innovation ability, there are relatively few studies on the relationship and empirical research on the formation of college students’ business administration ability and innovation ability based on DM; therefore, it is necessary to strengthen the research on it. Scientific and technological innovation is the source of the development of social productive forces. Scientific and technological innovation refers to the innovation in the field of science and technology, covering two aspects: the new discovery of natural scientific knowledge and the innovation of technology and technology. In modern society, universities, scientific, and engineering research institutions are the basic subjects of basic science and technology innovation, while enterprises are the basic subjects of applied engineering technology and process technology innovation.

This paper firstly introduces DM, mainly from three aspects: statistical method, classification method, and cluster analysis, then analyses the relationship between university students’ business administration ability and innovation ability formation, explores the influencing factors of innovation ability by using DM, and puts forward the basic principles of contemporary university students’ innovation ability cultivation and the cultivation strategies of university students’ business administration ability and innovation ability, and finally a questionnaire survey study was conducted to analyze the collected data. The current examination-oriented education model has serious defects and imperfect social mechanism, which leads to the lack of innovative consciousness and desire of teenagers.

2. Relationship between Business Administration Ability and Innovation Ability Formation of College Students Based on DM

2.1. DM. The general process of DM is as follows: data acquisition, data preprocessing, DM, and the expression and interpretation of mining results, as shown in Figure 1 [1]. The establishment of data mining database includes the following steps: data collection, data description, selection, data quality evaluation and data cleaning, merging and integration, building metadata, loading data mining database, and maintaining data mining database.

The first step of DM is to obtain data. There are generally three ways to source data: databases, data warehouses, and

other data sources and then the preprocessing of data, which generally includes four steps: data cleaning, data integration, data protocol, and data exchange; the next step is to mine the preprocessed data, from the knowledge base to the DM engine, and the last step is to interpret and represent the mined data [7]. Modeling is an iterative process. Different models need to be carefully examined to determine which model is most useful for the business problems faced. First, a part of the data is used to establish the model, and then the remaining data are used to test and verify the obtained model. Sometimes there is a third data set, called validation set, because the test set may be affected by the characteristics of the model. At this time, an independent data set is needed to verify the accuracy of the model. Training and testing data mining models need to divide the data into at least two parts, one for model training and the other for model testing.

2.1.1. Statistical Methods. Statistics is a discipline in which scientific conclusions are drawn from existing data sets, which can be used to summarize or describe data sets [8]. The regression analysis method in statistical methods can describe the relationship between the change trend of a variable and the value of other variables by finding a regression equation. This inference may be presented by the answer to the right/wrong question (hypothesis test), the estimation of digital feature quantity (estimation), the prediction of future observation, the prediction of relevance (correlation), or the modeling of relationship (regression). Other modeling techniques include analysis of variance (ANOVA), time series, and data mining.

The steps of the stepwise regression analysis method are generally as follows:

Step 1: establish a univariate regression model for n independent variables x_1, x_2, \dots, x_n and dependent variable y :

$$y = a_0 + a_i x_i + \beta, \quad i = 1, 2, \dots, p. \quad (2)$$

Step 2: establish a binary regression model.

Step 3: introduce ternary regression variables, repeat step 2 until the F values of all independent variables that are not selected into the equation are less than the critical value, and the equation at this time is the optimal equation.

2.1.2. Classification Analysis. Classification methods have been extensively studied. When using DM techniques to deal with various practical problems, the demand for classification methods is not less than that of regression methods. Common classification algorithms can be divided into two types: single classification algorithm and integrated classification algorithm. Single classification algorithms usually include ANN classification and support vector machine classification; integrated algorithms usually include Bagging series algorithms and Boosting series algorithms [9, 10].

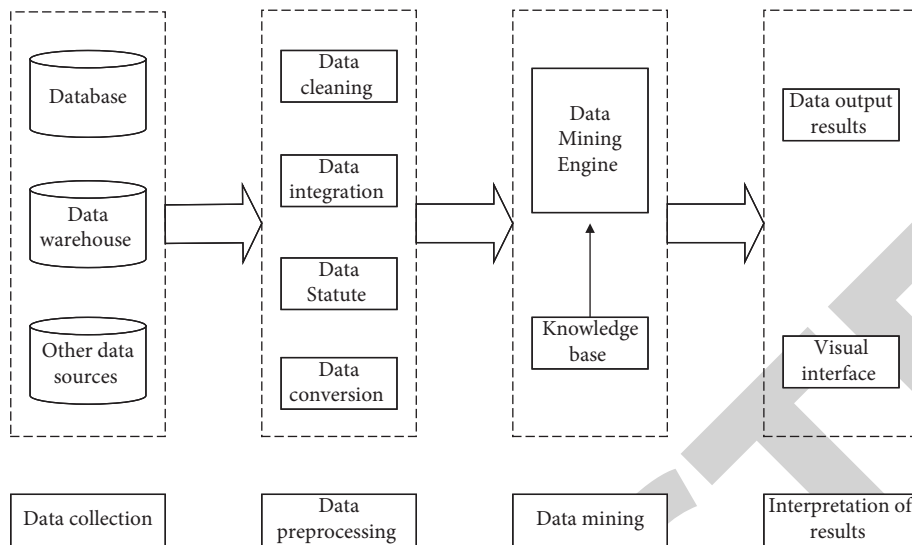


FIGURE 1: The general process of DM.

2.1.3. Cluster Analysis. The steps of cluster analysis mainly include feature selection, clustering algorithm selection or design, clustering effect evaluation, and physical analysis of clustering results. This paper uses the K-means algorithm when clustering learner groups.

The general steps of the K-means algorithm are as follows: first randomly select k initial cluster centers C_i ($1 \leq i \leq k$) from the obtained data set and calculate the distances from the remaining data objects to the cluster centers C_i , generally Euclidean distance; then assign the data object to the cluster corresponding to the cluster center C_i ; then recalculate the new cluster center for the next iteration; finally, stop the calculation until the cluster center is the same as the previous cluster center; that is, cluster stops when the Sum of Squared Error (SSE) does not change. In addition, the K-means is sensitive to outliers and noise points. For example, manually adding a noise point far from the center will pull the center far away. The choice of K value is difficult to determine. Only spherical clusters can be found. In K-means, we use a single point to model clusters, which actually assumes that the data of each cluster are distributed in a high-dimensional sphere, but the probability of this situation in life is not high. For example, each cluster is a long strip, and K-means cannot recognize this category at all (GMM can be used in this case). In fact, K-means is doing convex optimization, so it cannot deal with nonconvex distribution. If the two categories are close, the effect of K-means will not be very good. The initial value has a great impact on the results, and the clustering results may be different every time. The result may be local optimization rather than global optimization.

2.2. Relationship between College Students' Business Management Ability and Innovation Ability

2.2.1. Business Management Is the Way to Cultivate Innovation Ability. The formation of innovative ability must pass through a platform such as business management; through this platform, students can exert their intelligence as much as

possible, tap their talents, and enhance their innovative ability. The holding of various management project competitions is not just for awards. Of course, it is a good thing if they can be awarded. In fact, the more important thing is the improvement of management ability and problem-solving ability in the process of project management.

2.2.2. Business Management Helps to Explore and Cultivate Students' Innovative Thinking Ability. The main body of business administration is students. Students are first of all innovative thinkers in business administration. The process of innovative thinking is not only the process of students seeking differences in their ideas but also the process of forming their own personality. Many students are very active in innovative thinking. For students who are very active in this kind of thinking and innovative thinking, teachers should actively guide and support them, so that they can blossom and bear fruit in the process of business management, taste the joy of hard work, and gain confidence in success. For every "golden idea" or "ghost idea" that reveals innovative consciousness and artistic talent, teachers should redouble their encouragement to encourage more students to form their own personalities and innovative thinking.

2.2.3. Business Administration Improves Students' Practical Ability. The goal of business management training is to produce talents who can produce both design schemes and finished products. Students complete the practical operation process of the finished product through conceptual sketches-computer production-repeated revisions to turn the original creative ideas into real finished products, realize the simultaneous development of abstract thinking and image thinking, and construct the theoretical knowledge that they have learned. In this process, students' hand-drawn sketches and computer software operation ability have been improved, and their aesthetic quality has been improved.

2.2.4. Business Administration Promotes the Connection of Students with Classmates, Teachers, and Enterprises and Cultivates Students' Team Spirit and Communication and Coordination Skills. Many management activities cannot be completed by individual strength alone, but require teamwork to complete. The work efficiency of the team attack is obviously higher than that of fighting alone, and the working mood of the students is also obviously high. The work efficiency of the team attack is obviously higher than that of fighting alone, and the working mood of the students is also obviously high.

Under the guidance of economics and humanistic thought, human resource management is to make effective use of relevant human resources inside and outside the organization through management forms such as recruitment, selection, training, and compensation, so as to meet the needs of the current and future development of the organization and ensure the realization of organizational objectives and the maximization of member development. It is the whole process of predicting the human resource demand of the organization and making the human demand plan, recruiting and selecting personnel and organizing effectively, assessing performance, paying compensation and encouraging effectively, and developing effectively in combination with the needs of the organization and individuals in order to achieve the best organizational performance.

2.3. Use DM to Explore the Influencing Factors of Innovation Ability

2.3.1. Personal Characteristics

(1) *The Driving Force of Innovation.* The driving force of innovation is mainly manifested in two aspects. On the one hand, it is the yearning for innovative lifestyles and results. This aspect is the fundamental aspect of innovation. If you do not yearn for your own way of life, there is no way to continue innovation. College students hope that their innovative achievements can bring some impact to the society and hope that through their own efforts, they can make a public line for social progress, and their innovative products can make people's lives more convenient and comfortable. On the other hand, it is manifested in the pursuit of ability, which is mainly a pursuit of innovation.

(2) *Innovation perseverance.* Innovation perseverance refers to the characteristics of perseverance and non-giving up in the face of difficulties and setbacks in the process of innovation. Therefore, college students need to have perseverance when innovating, and when they encounter setbacks and difficulties, they can encourage themselves. Even if they encounter no matter how difficult they are, they will never give up and do their best to complete everything; at the same time, you must also learn to ask others for advice. When you encounter a bottleneck, you can ask experienced seniors for advice and then adjust the plan according to your actual situation.

2.3.2. Practical Operation Ability. Practical operation ability mainly refers to the ability of engineering college students to independently complete corresponding operations and to be familiar with relevant materials and standards and to complete technical operations or realize innovative ideas. In the category of the theory of practice, knowledge needs to be tested by practice, and only in the process of practice can the lack of knowledge be discovered. In the process of college students' innovation, only the ideas in their minds can be expressed with the tools and skills in their hands before they can finally achieve innovation. In the process of college students' practice, they rely on the ability to operate in engineering practice and play an important role in the process of completing innovation.

2.3.3. Management Ability

Technology Commercialization Capability. Technology commercialization needs to combine technology with the market, be market-oriented, and form economic benefits in market transactions. The collision of ideas in a team is often the source of sparks of inspiration; the greater the difference in the ability and personality characteristics of the people in the team, the more conducive to igniting the spark of new thinking. Communication skills are also particularly important in modern business activities. In the process of communicating with customers and in the process of elaborating engineering issues, the ability to clearly understand others and clearly express their wishes is particularly significant for the final innovation. The role of team members in the division of tasks, so that people can do their best, and innovation is just around the corner.

Management has five elements, mainly as follows: management subject: it is the organization or individual exercising management, including government departments and business departments; management object: it is all objects within the jurisdiction of the management subject, including people, materials, funds, science and technology, and information, with people as the basic; management objectives: they are the new realm that the management subject is expected to achieve, which is the starting point and destination of management activities, and should reflect the will of superior leading organs and subordinate personnel; management methods: they are the ways and means by which the management subject acts on the management object, including administrative methods, economic methods, legal methods, and ideological education methods; management theory: it is the norms and theories of management. In addition, management has five functions: planning, organization, command, supervision, and regulation. Planning is the most basic function.

2.4. Basic Principles of Cultivating the Innovative Ability of Contemporary College Students. To strengthen the cultivation of contemporary college students' innovative ability, it is necessary to grasp the many basic principles of contemporary college students' innovative ability cultivation. Starting from these basic principles and in accordance with

local conditions, can the cultivation of contemporary college students' innovative ability be further strengthened. The basic principles are shown in Table 1.

2.5. Cultivation Strategies for College Students' Business and Innovation Capabilities

2.5.1. Cultivate Students' Learning Goal Orientation. The college should pay attention to the learning behavior of students and pay attention to the role of learning goal orientation in the practice of educational management. Students should be cultivated as students with strong learning ability as much as possible. Such students are more likely to exert their innovative ability through their own efforts and learning to improve their innovation performance. Colleges should create different learning and competitive opportunities for students, cultivate students' learning goal orientation, and improve innovation performance. The student's learning goal orientation is often inappropriate or conforms to the teacher's teaching goal, so the formulation of teaching goals can effectively guide students to correct and moderate goal orientation.

Goal-oriented theory studies the relationship between behavior and goal. In order to achieve goals, two behaviors exist in this process, one is goal-oriented behavior and the other is goal behavior. Goal-oriented behavior is that behavior does not directly achieve the goal but guides the behavior to achieve the goal. Therefore, the shorter the goal oriented behavior, the better because the closer to the goal, the greater the intensity required; if it is long, it will weaken the intensity of the desire to achieve the goal, which is easy to have negative effects.

2.5.2. Enhance Students' Sense of Innovation Self-Efficacy. Students should learn to attribute correctly, have a correct understanding of past failures, believe that past academic performance cannot represent future academic performance, and do not attribute their failures to poor teacher teaching, poor luck, family, and so on. The reason is not to focus on other aspects of university life, blind innovation, employment, and challenges just because the level of knowledge is not as high as that of students in key institutions. Students' sense of innovative self-efficacy is not established blindly but on the basis of basic academic work and successful experience. Therefore, the difficulty of the goal set by the student is too high, which can easily lead to failure and frustration. If the goal is too low, it is not a goal that suits oneself. It will produce a sense of blind innovation and self-efficacy, which is also not conducive to academic development.

(1) Cultivate Students' Self-Confidence. There are two aspects to improve students' self-confidence. First of all, in terms of teaching, the teacher assessment and evaluation mechanism can be improved. The original teacher evaluation system only used student test scores, pass rates, and class satisfaction as the reference standards. It is possible to integrate student innovation behavior and subject innovation results into the teacher evaluation mechanism. Teachers should

respect, tolerate, and understand students in class. Teacher should enrich classroom teaching methods and allow students to teach by themselves. As teachers, they must fully inspire students in the classroom and create opportunities for students to show themselves and participate in the teacher's lectures, rather than as a listener. It can enrich the form of homework after class and arrange more practical homework. At the same time, the innovation ability and results are integrated into the reference range of students' evaluation and evaluation to develop students' abilities and enhance students' self-confidence.

(2) Inspire Students' Creative Inspiration. Improving students' sense of innovative self-efficacy should also start with inspiring students' creative inspiration. The college should pave the material and spiritual foundation for students' innovative activities so as to give students space and inspiration. For college students to carry out various innovative activities, such as: scientific research innovation and entrepreneurial innovation, all require certain funds and technical support, and financial support is the most basic prerequisite. These project funds can include support funds for new projects and incentive funds for innovative achievements. Schools can clarify the allocation and distribution measures of innovation project funds through standardized systems and regulations and at the same time strengthen the management and review of innovation project funds.

3. Investigation and Research on College Students' Innovative Ability

This article chooses the questionnaire survey method and chooses three universities in the province to conduct one-to-one questionnaire surveys. This paper constructs a theoretical model based on the literature review, as shown in Figure 2.

First, through questionnaire surveys, students have an understanding of innovative self-efficacy, business management capabilities, engineering operation applications, personal characteristics, and so on using empirical research to study the relationship between various factors.

3.1. Basic Content of Questionnaire Design. The questionnaire design of this research is mainly based on the framework of college students and personal innovation characteristics, management ability, and practical operation ability [11]. The research content of each part mainly includes the following three aspects: first, the survey on the innovation ability of engineering college students after graduation; second, the survey on the descriptive statistics of the undergraduates under investigation; and third, the survey on the status quo of business management capabilities and access channels.

3.2. Sample Selection and Data Collection Procedures. A total of 300 questionnaires were issued, 100 for each school [12]. In the end, a total of 300 questionnaires were returned.

TABLE 1: Basic principles.

Principles	Contents
Principle of openness	The principle of openness means that teachers should, in all cases, allow students to think about problems independently in the first place, ask them to express any different ideas and opinions they may have about the same problem, and respect and encourage all valid and invalid efforts to solve the same problem.
Principle of subjectivity	The principle of subjectivity means the innovative ability of students.
Principle of diversity	The principle of diversity means that in the process of cultivating students' creative abilities, we do not set absolute goals but rather look at the actual situation of each student and find a development goal that fits the actual situation of each student.
Principles of networking	The principle of networking means that the advantages of the Internet should be given full play in the process of cultivating students' creative abilities.
Systematic principles	The principle of systematisation means that in the process of developing students' creative abilities, all the factors involved in the development of students' creative abilities are categorised and processed in an effective way so that they can be brought together to present an effective structural arrangement for the achievement of a certain goal.
Ecological principles	Ecology principle refers to the harmonious interaction between the elements of the education system and the development of education and society in the process of cultivating the creative abilities of students.

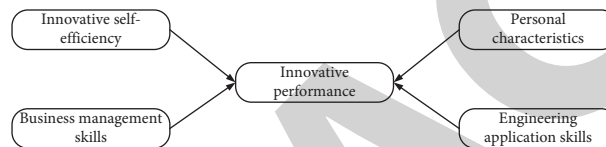


FIGURE 2: Theoretical model diagram.

Invalid questionnaires were excluded. There were 286 valid questionnaires, and the effective response rate was 95.3%.

3.3. Reliability Test. In the measurement (S) module of the analysis menu of the SPSS software, click reliability analysis (R) to calculate Cronbach's alpha reliability coefficient and Guttman split-half reliability coefficient. In this experiment, a total of 12 items were measured. Among them, Cronbach's alpha reliability coefficient value is 0.912. Generally, the reliability coefficient is higher than 0.7. Therefore, the reliability of the questionnaire designed in this article is relatively high. SPSS is the earliest statistical software in the world that uses graphical menu-driven interface. Its most prominent feature is that the operation interface is very friendly and the output results are beautiful. It shows almost all functions in a unified and standardized interface use the windows window to show the functions of various data management and analysis methods, and the dialog box shows various function options.

4. Empirical Analysis

4.1. Self-Evaluation of Innovation Ability. In this study, the subjects were asked to self-evaluate their innovation ability in the statistical variables of the questionnaire, and the evaluation results are shown in Table 2.

It can be seen from Table 2 and Figure 3 that among all 286 respondents, 24 respondents think their innovation ability is relatively poor, accounting for 20.98%; 137 respondents think their innovation ability is average,

accounting for 47.9% of the total, nearly half of the total; 65 respondents believe that their innovation ability is relatively strong; and finally 60 respondents believe that their innovation ability is very strong, and half of the interviewees think that their innovation ability was average, and overall the testees' evaluation of their innovation ability was generally average.

4.2. Business Management Capabilities. The tests also carried out self-evaluation on the influence of their business management skills in innovation activities. The results are shown in Table 3.

It can be seen from Table 3 and Figure 4 that 35 people think they have strong business management skills, 42 people think they are relatively strong, and 64.69% think they are generally, and there are 185 people, more than half of them think they are in business management. There are 24 people with poor management ability, accounting for 8.39%. The exception was also a survey on the importance of business management ability. The results of the survey showed that only a small number of people felt that this ability was not important in innovation activities. 45.6% of people felt that business management ability played a big role in innovation activities. 38.4% of people think that it is more important, and 14.8% think that the average person. Generally speaking, college students have a high consensus evaluation of business management ability, which shows that business management ability plays an important role in innovation activities, especially when technicians turn to management positions.

TABLE 2: Distribution of sample innovation capacity.

	Number of people	Proportion
Very good	60	20.98%
Comparatively good	65	22.73%
General	137	47.90%
Comparatively poor	24	8.39%

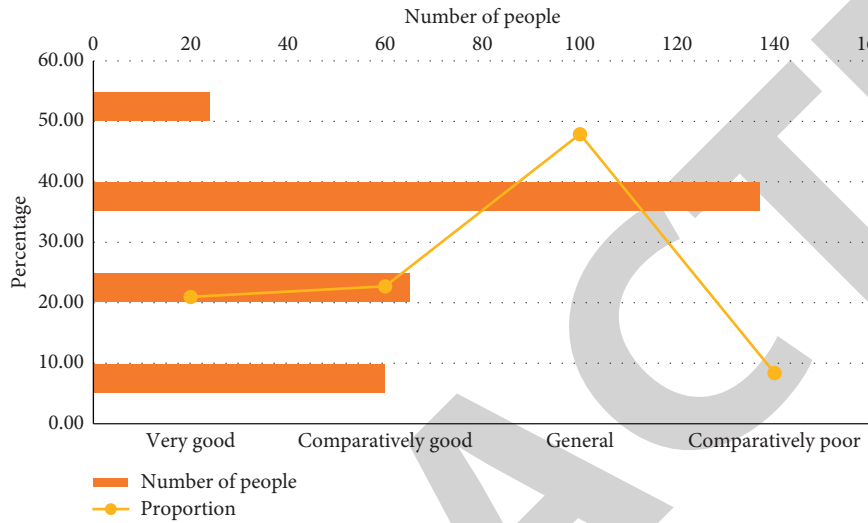


FIGURE 3: Distribution of sample innovation capacity.

TABLE 3: Sample business capability distribution diagram.

	Number of people	Proportion
Very good	35	12.24%
Comparatively good	42	14.69%
General	185	64.69%
Comparatively poor	24	8.39%

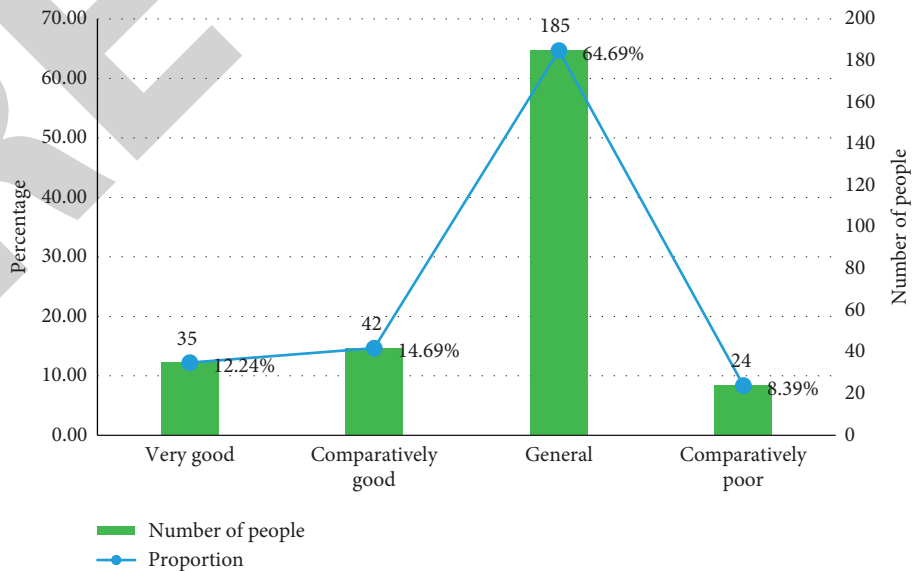


FIGURE 4: Sample business capability distribution diagram.

5. Conclusions

Today's society is an era of comprehensive innovation. The comprehensive improvement of college students' innovation ability and business management ability is of great significance for the future development of college students, the prosperity of the country, and the prosperity of the nation. To solve the innovation ability and business management ability of college students, it involves a wide range of fields and faces great challenges. It requires the joint efforts of college students themselves, schools, society, and the country. Relevant management ability training courses should be added appropriately at the university education stage so that engineering college students have the corresponding laws and regulations, information systems, team management, and other related management capabilities and add the corresponding innovation management content. This course module is set up in cooperation with the business school.

Data Availability

The data underlying the results presented in the study are available within the manuscript.

Disclosure

The author confirms that the content of the manuscript has not been published or submitted for publication elsewhere.

Conflicts of Interest

The author declares that there are no conflicts of interest.

Authors' Contributions

The author has read the manuscript and approved.

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