



# Analysis on the Influencing Factors of University Student Majoring in Information Engineering Technology “Involution” and Its Countermeasures Based on Analytic Hierarchy Process (AHP)

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**Abstract.** In recent years, college students have gradually formed the trend of “Involution” in order to compete for high-quality resources. The main manifestations include abnormal development and competition, inefficient time investment, complex interpersonal relationships and so on. Through the questionnaire survey of 700 college students majoring in information engineering technology, the results calculated by analytic hierarchy process (AHP) and Matlab software show that the main factors causing the involution are: learning, employment, achievement, student work, certificate and media influence. The influence of College Students’ involution at the school level accounts for the most, in which learning is the most important factor, followed by employment. Based on this, the study finally provides three educational innovation solutions for college students and schools.

**Keywords:** Involution · Mental Health of College Students · Information Technology Education

## 1 Introduction

In recent years, with the constant exaggerations of “we media” and the gradual increase of social pressure, employment and life pressure, university students’ “Involution” will become a behavior mode when social resources are not so abundant [4]. Whether actively involved in it, or passively involved, will cause university students to be involved in it. In the process of “involution”, there will be different manifestations: malformed overall development, inefficient time investment, complex interpersonal relationship, exam-oriented education model [5]. And the most direct cause of involution is the “white heat” competition, the competition target is single, the competitor increases [1].

### **1.1 Malformed Overall Development: Distortion of Resume Competition**

As the assessment method of the university of more and more, the development of all aspects of high-quality talent demand dynamics enlarges gradually, in order to show their university students is the development of all aspects of high-quality talent, as well as the later one's deceased father grind, jobs, your resume more rich than others, more brilliant resume, also in order to scholarship points, comprehensive evaluation is more advantage than the students, Nowadays, college students begin to participate in various associations, student unions, science and technology competitions and so on to make themselves well-rounded. This phenomenon also has a popular label, called "title youth".

### **1.2 Inefficient Time Investment: High Time Cost to Get Low Time Benefit**

Time competition is the most prominent one in the competition of university involution. When time competition exists within reasonable bounds, college students can be more efficient use of time, but with rising in phenomenon, college students will invest time in competition, make time gradually low, can't even get want to invest time and meaningful results, will be the final phenomenon, the time cost is too high and the time benefit is very low. That is to say when you do one thing, two hours can be very efficient to finish and get satisfactory results, but because compared with others in, a few good or not actually there is a gap is too big necessary things, will try to check and make up for, which spent four hours, and the result is the same as the input two hours, or worse than two hours, which creates an inefficient investment of time.

Because "involution" into the campus, campus interpersonal relationship is also becoming increasingly complicated, the competition between classmates also had a workplace, the trend of competition became not win, but a zero sum game, turned into an arenas, must have a party for the existing high quality resources, while others must be competitive, Instead of sharing the same quality resource.

### **1.3 Exam-Oriented Education Model: High School Mode into University**

With the Ministry of Education put forward strict requirements for college education, the learning atmosphere in the university has changed greatly, but also because of the influence of the factors of "involution" of college students, the current university education presents a trend of "exam-oriented education", only the theory of scores, the phenomenon of heroes only by GPA points between students competition is gradually increasing. As a result, many freshmen take the exam-oriented education model to the university campus. They don't care about whether they really learn knowledge, but whether they can pass the final exam and get a good score, and how to make the teacher give more marks on the usual score.

## **2 The Analysis Process**

After summarizing the phenomenon of involution in university student majoring in information engineering technology at present, we used analytic hierarchy process and a questionnaire survey to specific and digital the "involution" factors, so as to get an accurate and clear conclusion.

**2.1 A Study on Factors of “Involution” Based on Analytic Hierarchy Process**

**2.1.1 Objects and Methods**

**2.1.1.1 Survey Subjects**

By collecting the published articles on the “involution” of college student, the occurrence frequency statistics of the influencing factors of “involution” were made. Statistical articles are as follows (Table 1).

**2.1.1.2 Statistical Methods**

Through the analytic hierarchy process, using MATLAB software tools for normalization, weight distribution to get the specific data of the final influencing factors. Thus, the three-level analytical structure is established as follows:

Target layer: factors affecting involution

Criteria layer: literature statistical data Solution layer: “the media influence”, “public opinion”, “phenomenon of marriage” “wages”, “learning”, “certificate”, “grade”, “course contests” “student union work”, “employment”, “the problem of becoming a graduate”, “interpersonal” “parents’ expectations” “compare” “friends and family pressure”, “vanity”, a total of 16 factors.

Set target layer: A, criterion layer (with K criterion factors): C, scheme layer (with n schemes): P

**Table 1.** Table of statistical articles.

|  |
|--|
| The statistical articles   |
| “Entering the Game and Breaking the Game”: Behavioral logic and Physical and mental Self-help of College Students’ Participants in inner Examination |
| A study on the internalization effect of college students’ innovation and entrepreneurship under the background of “mass entrepreneurship”           |
| To help college students get rid of “introversion”, universities should also do something  |
| The dilemma and breakthrough of “internalization” in college students’ learning  |
| Breaking out of Exhaustion: The Performance, Harm and Countermeasures of College Students’ Internalization   |
| Study on internalization of Student Union organization in Private Colleges and Universities  |
| Do you suffer from “inside-out” job anxiety  |
| Cracking “involution Phenomenon”   |
| Say “inner coil”   |
| Explore the spread of anxiety among young groups from the perspective of inner scroll  |
| The impact of epidemic Risk on College Students’ employment values   |
| “New Scale” for The Reform of Selection Mode under the “Internalization” of Graduate involution  |
| Transcending the Age of Learning: The Educational dilemma and breakthrough of “involution Phenomenon”  |

According to the weight calculation of the data at the above three levels, the following judgment matrix can be obtained:

Judgment matrix (A–C judgment matrix) of criterion layer to target layer:

$$A = (a_{ij})_{K \times K} \tag{1}$$

Judgment matrix (C<sub>i</sub>–P judgment matrix) of each criterion of the scheme layer to the criterion layer:

$$B_i = (a_{ij})_{n \times n} \tag{2}$$

The weight vector between each layer can be obtained by substituting judgment matrix A and B<sub>i</sub> into the following formula:

$$(A - n)\omega = 0 \tag{3}$$

n is an eigenvalue of the matrix A, and ω is its corresponding eigenvector.

The calculated relative weight of criterion layer C (including K criteria) to target layer A is:

$$\omega^1 = (\omega_1^1, \omega_2^1, \dots, \omega_k^1)^T \tag{4}$$

For the scheme layer P of n schemes, the rules of rule layer C (i = 1,2... K) the relative weight is:

$$\omega_i^2 = (\omega_{1i}, \omega_{2i}, \dots, \omega_{ni})^T \quad (i = 1, 2, \dots, K) \tag{5}$$

Can be combined ω<sup>1</sup> and ω<sub>i</sub><sup>2</sup> into a matrix to obtain:

$$\begin{pmatrix} \omega_{1,1} & \omega_{1,2} & \dots & \omega_{1,k} \\ \omega_{2,1} & \omega_{2,2} & \dots & \omega_{2,k} \\ \dots & \dots & \dots & \dots \\ \omega_{n,1} & \omega_{n,2} & \dots & \omega_{n,k} \end{pmatrix} \begin{pmatrix} \omega_1^1 \\ \omega_2^1 \\ \dots \\ \omega_k^1 \end{pmatrix} \tag{6}$$

$$= (\omega_1^3 \ \omega_2^3 \ \dots \ \omega_k^3)$$

Vector ω<sub>i</sub><sup>3</sup> (i = 1, 2,...K) is the relative weight of all schemes of the P layer, and the order of advantages and disadvantages of all schemes can be obtained by sorting them.

### 2.1.2 The Results

We normalized each key word of the normalized scheme layer and The Times of occurrence in the criterion layer one by one, combined with the influence weight of the paper, conducted hierarchical analysis, and obtained the following results (Table 2).

According to the results obtained by using the analytic hierarchy process (AHP), the main factors causing involution (with more than 6 as the main factor) are six factors: study, employment, grades, student union work, certificates and media influence.

In addition, university students have the most involution influence at the school level, followed by the social level, and finally at the family level. Among them, study is the most important factor, followed by employment.

**Table 2.** This caption has more than one line so it has to be set to justify.

| FACTORS AFFECTING           | THE COEFFICIENT  |
|-----------------------------|------------------|
| THE MEDIA INFLUENCE         | 6.20140480474749 |
| PUBLIC OPINION              | 5.7876885171254  |
| THE PHENOMENON OF MARRIAGE  | 3.53578101006865 |
| WAGES                       | 4.75616188305429 |
| LEARNING                    | 12.2004733631313 |
| CERTIFICATE                 | 6.35322670816058 |
| RESULTS                     | 8.79927203658943 |
| COMPETITION                 | 5.59008263458753 |
| THE STUDENT WORK            | 7.73890818016959 |
| EMPLOYMENT                  | 9.91117688711603 |
| GRADUATE SCHOOL             | 5.23707893254819 |
| INTERPERSONAL RELATIONSHIPS | 5.01231222963251 |
| PARENTS EXPECT              | 5.22710220034747 |
| UP WITH THE JONESES”        | 5.82474219691243 |
| FRIENDS AND FAMILY PRESSURE | 3.69714380914118 |
| VANITY                      | 4.12744460666795 |

**2.2 A Study on Factors of “Involution” Based on Questionnaire Survey**

**2.2.1 Survey Subjects**

In this survey, freshman accounted for 5.67%, sophomore accounted for 19.86%, three accounted for 36.17%, senior accounted for 38.3%, boys accounted for 69.5%, girls accounted for 30.5%.

**2.2.2 Survey Data Results**

We divide the results of each question in the questionnaire to none, small, moderate, large, very large and extreme according to the degree.

Among the 700 respondents, 90.61% believed that they had involution around them, among which 2.1% believed that they did not participate in involution, 2.1% believed that they participated in involution to a small degree, 8.39% believed that they participated in involution to a moderate degree, and 29.37% believed that they participated in involution to a large degree. 28.67% thought that they were very involved in introversion, and 29.37% thought that they were very involved in introversion. By extending the obtained data, it can be found that “introversion” is a universal phenomenon among college students at present, and most college students have the phenomenon of introversion around them in their cognition.

In actual study and life, 4.2% of the surveyed college students do not have the mentality of “paper word comparison”, 95.8% have the mentality of “paper word comparison”, 1.4% of the research objects have a small number of word comparison thoughts, 11.89% of the research objects have a moderate number of word comparison thoughts. 32.87% of respondents had a large number of words in their comparative papers, 29.37% had a large number of words in their comparative papers and 20.28% had a large number of words in their comparative papers. This is the current situation of college students in the more typical characteristics of the following part of the “paper word comparison” mentality more obvious college students in-depth interview, found that most of them fell into the more words, the higher the error, blindly increase the number of words while ignoring the overall content structure.

Similarly, 6.99% of the respondents were never influenced by their classmates, and 93.01% of them were influenced by their classmates in the competition. They had the idea that “if they all signed up, I should also sign up”. 5.59% of the respondents were slightly influenced by their classmates in the competition, 23.08% were moderately influenced by their classmates in the competition, and 25.87% were greatly influenced by their classmates in the competition. 19.58% of the respondents were greatly influenced by their classmates, and 18.88% were greatly influenced by their classmates in the competition. However, according to the results of in-depth interviews, most in-depth interviews ignore the significance of the competition itself, ignore the basic situation of their own, blindly pursue the “amount” of participation in the competition, the result is that each competition is limited to participation, but failed to obtain the harvest matching the efforts.

At the same time, 14.69% of respondents were not affected by the gpa theory, 8.39% were slightly affected by it, 17.48% were moderately affected by it, 20.28% were greatly affected by it, 22.38% were greatly affected by it, and 16.78% were greatly affected by it. The “merit point theory” makes some college students take study as the only center of their life, while neglecting or reducing the development of other aspects such as interpersonal communication and sports activities.

We took the impact of involution on interpersonal relationship as a representative of the impact of involution on their own, and analyzed the research results. 90.27% of college students who participated in the survey thought that involution had a certain impact on their interpersonal relationship, 13.29% of respondents thought that the impact was small, 22.38% of respondents thought that the impact was moderate. 31.47% of respondents think it will have a great impact, 12.59% think it will have a great impact, and 10.49% think it will have a great impact.

### 2.2.3 The Findings

Through further information collection in the form of questionnaire, the conclusion we get is consistent with the results obtained by our analytic hierarchy process.

## 3 Implementation of the “Involution” Solution

After carrying out field research in universities and referring to a number of literature and carrying out analytic hierarchy process, we propose the following reform implementation

plan for the problem of in-roll of university student majoring in information engineering technology:

### 3.1 Competition-Oriented Innovation

Actively adjust the evaluation mechanism of competition categories, from the root to reduce the possibility of malformed all-round development, so that students can give full play to their own advantages in the discipline, and do not need to spend too much learning time for competition outside the discipline [2].

### 3.2 Social Environment Detection and Early Warning Mechanism

After investigation, another major concomitant factor of introversion is poor interpersonal relationship, mainly manifested as small circle of interpersonal communication, exclusive part of the small circle or easy to produce internal contradictions [3]. For this feature, we believe that the detection and early warning mechanism of university student' social environment should be established.

### 3.3 Carry Out Psychological Counseling

Psychological work should provide solutions to the three most prominent internalized psychological problems. With the detection and early warning mechanism of university students' social environment, psychological work can also be carried out in detail. And ideological and political education in colleges and universities should pay attention to awakening the self-consciousness of college students guides students to know the society consciously will, know yourself. Therefore, in view of the contemporary college students are generally faced with the "involution" ideological and political education must play its due role.

## 4 Conclusions

Through the analytic hierarchy process and our questionnaire survey, the results of data calculation are consistent, it is concluded that the main factors affecting college students' involution are academic performance, competition, postgraduate examination at the school level and employment at the social level. Through the investigation and research of college students and data collection. We provide three solutions for college students and schools to carry out. And college students' employment values have the obvious characteristics of involution into the system, specific the key factors of employment are turning inward towards stability. Units choose to involve into the system. Finally, college students' involution is a hot social phenomenon, which still needs further exploration and research in academic circles.

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## References

1. Lin, Y.Q. 2021. An exhausted breakout: The manifestation, harm and countermeasures of the phenomenon of university students involution. *Contemporary Young Research* 3: 88–93.
2. Liu, C.B., and Y.J. Zhang. 2021. Rolling into the system: The impact of epidemic risk on college students' employment values. *JiangHan Academic* 4 (40): 5–13.
3. Lu, X.W. 2021. Involution from a multidimensional perspective: Research status and concept combing. *Journal of Huazhong University of Science and Technology (Social Science Edition)* 6(35): 130–136.
4. Yang, Q.X., and M.S. Xu. 2021. Mingsheng, Mental representation and Guidance strategies of “enrolling” in Contemporary College students. *Youth & Juvenile Research*. 5: 16–20.
5. Yuan, J.S., and T.Q. Xing. 2021. “Entering the game and breaking the game”: The behavioral logic and physical and mental self-help of college students' participants. *Higher Education Exploration* 10: 123–128.

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