

Research on the Evaluation of Study Style of Navigation Majors based on AHP

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Abstract

The construction of style of study is the key content of students'education. Having a good style of study is conducive to the cultivation of high-quality talents. In recent years, the declining study style of navigation students has become increasingly prominent. Based on the analytic hierarchy process, this paper uses the data collected by X.E.Chen[1], evaluates through calculation and analysis, obtains the final score and ranks it. It is helpful to the construction of the style of study of navigation specialty.

Keywords

navigation students, analytic hierarchy process, style of study construction.

1. Introduction

As an important part of the transportation system, the shipping industry is responsible for more than 80% of China's international trade transportation and more than 50% of domestic trade transportation. It is extremely important in foreign trade, promoting the sustainable development of the national economy, and strengthening national defense. And irreplaceable role[2]. China must form a strong competitive force in the international shipping talent market. To obtain the market share of the shipping talents, the key is that the quality of shipping talents must meet the demand standards of the international shipping talent market[3]. However, in recent years, the study style of Chinese nautical students has declined. The diversified and personalized personality characteristics of the students have reduced the effectiveness of the management methods of maritime colleges and universities[4].

Taking Guangzhou Institute of Navigation as an example, this paper conducts a sample questionnaire survey on nautical students in the school. Using the relevant theories of analytic hierarchy process, this paper analyzes the current situation of students' ethics, the weights and rankings of influencing factors, and tries to explore the decline of academic style from the mathematical level. The reason is to provide a theoretical basis for the talent training of college students in navigation.

2. Analytic Hierarchy Process

2.1. Establish an Evaluation Index Model

According to Chen Xinen's survey, 259 students from different majors and grades of the Navigation Department were randomly selected for investigation. The principle of anonymous is used to recover 259 valid questionnaires. For the reasons for the decline in the style of study for maritime students, there are 6 items listed in the questionnaire, which can be selected. According to the survey, the teaching style accounted for 26.25%, the school management accounted for 52.12%, the employment was not good at 24.32%, the students themselves accounted for 47.88%, the campus atmosphere accounted for 42.08%, and the professional interest accounted for 18.15%[1]. The evaluation model is established, and the evaluation index system is divided into three levels: target layer A, constraint factor layer B, and constraint factor sub-layer C. Target level A is the construction of maritime students'

learning style; the constraint factor layer B is divided into: B1 people (student and teacher) 66.03%, B2 environment (school and society) 92.65%, B3 management 94.2%; constraint factor sub-layer C is divided into: C1 students themselves, C2 professional interests, C3 campus atmosphere, C4 teaching style, C5 employment is not good, C6 school management. The evaluation model is divided into three first-level indicators and six second-level indicators. see Fig 1.

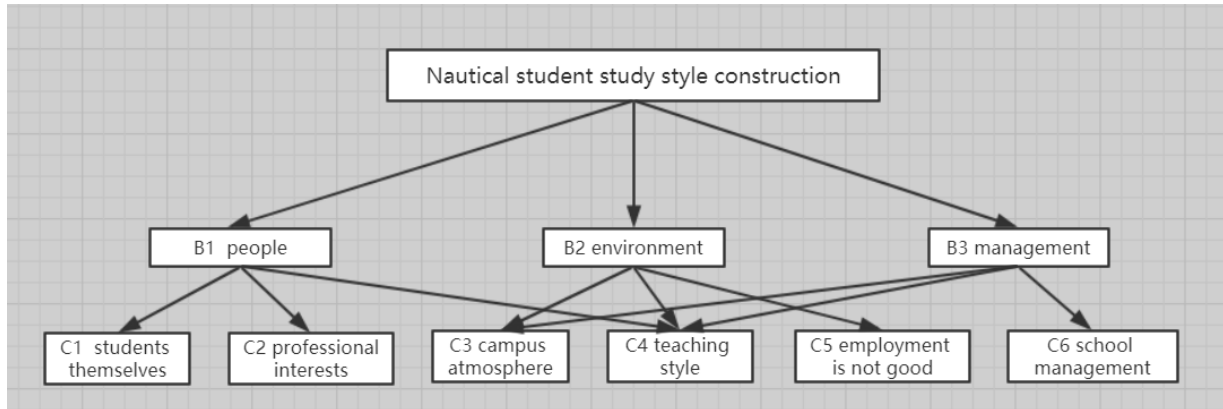


Fig 1: Nautical student study style construction

2.2. Construction Judgment Matrix

Compare the importance of each element of the same level with respect to a certain criterion in the previous level, and construct a pairwise comparison judgment matrix, see Table 1.

Table 1: Index relative importance scale

Scale	Meaning	Scale	Meaning
1	A is as important as B	1	A is as important as B
3	A is slightly more important than B	1/3	A is slightly less important than B
5	A is relatively more important than B	1/5	A is relatively less important than B
7	A is more important than B	1/7	A is very unimportant than B
9	A is extremely important than B	1/9	A is extremely unimportant than B
2,4,6,8	intermediate state between two judgments	1/2,1/4,1/6,1/8	intermediate state between two judgments

2.3. Pairwise Comparison Matrix

The relevant experts are asked to compare the importance of each sub-layer factor to the upper-level factor. The comparison matrix (also known as the judgment matrix) is shown in Table 2-5.

Table 2: A-B judgment matrix

A~B	B1	B2	B3
B1	1	1	1/7
B2	1	1	1/7
B3	7	7	1

Table 3: B1-C judgment matrix

B1~C	C1	C2	C4
C1	1	7	5
C2	1/7	1	1/3
C4	1/5	3	1

Table 4: B2-C judgment matrix

B2~C	C3	C4	C5
C3	1	4	5
C4	1/4	1	2
C5	1/5	1/2	1

Table 5: B3-C judgment matrix

B3~C	C3	C4	C6
C3	1	4	1/3
C4	1/4	1	1/7
C6	3	7	1

2.4. Calculation of Eigenvalues and Eigenvectors

The analytic hierarchy process is used to analyze the factors and their relationship. The key is to find the maximum eigenvalue and eigenvector of each judgment matrix. The author uses the eigenvector method[5] to calculate.

The weight vector w is right multiplied by the weight ratio matrix A, which has:

$$AW = \lambda_{MAX}W \tag{1}$$

2.5. Hierarchical Single Sorting and Consistency Check

At this stage, the maximum eigenvalue and eigenvector of the judgment matrix of each layer are calculated, and the consistency test is performed to calculate the test coefficient $CR = CI/RI$, where RI can check the average consistency index RI table,

$$CI = (\lambda_{MAX} - n) / (n - 1) \tag{2}$$

Using MATLAB R2018a software calculation, it can be seen that each test coefficient is less than 0.1, indicating that the consistency test is passed.

2.6. Determination of the Weight of the Influence Factors

According to the principle of analytic hierarchy process, determine the weight of each influencing factor for the target layer A, according to the calculation and ranking of the Excel Table 6.

Table 6: Influence factor weights and rankings

	Factors and weights			A-C total sort weight	ranking
	B1	B2	B3		
	0.1111	0.1111	0.7778		
C1	0.7306	0	0	0.0812	4
C2	0.0810	0	0	0.0090	6
C3	0	0.6833	0.2628	0.2803	2
C4	0.1884	0.1998	0.0786	0.1043	3
C5	0	0.1168	0	0.0130	5
C6	0	0	0.6586	0.5123	1

Data analysis: in people, the environment. In management, the corresponding weights are 0.1111, 0.1111, and 0.7778. It can be seen that the three main limiting factors are management-based. The six sub-limit factors are: first: school management; second: school atmosphere; third: teaching style; fourth: students themselves; fifth: bad employment; sixth: professional interest. Although the teaching style appears in people, environment and management, the weight ratio is only 0.1043. The conclusion obtained by the analytic hierarchy process is different from the imaginary result.

3. Conclusion

According to the data of the questionnaire survey and the analysis by the analytic hierarchy process, the management is the main reason among the three factors of people, environment and management. According to [Table 6](#), it can be seen that school management is the key to the construction of maritime students' academic style, with a score of 0.5123. Secondly, the campus atmosphere plays an important role in the construction of maritime students' academic style, with a score of 0.2803. School management, campus atmosphere, and teaching style accounted for more than 80%. It can be seen that the main reason for the decline in the study style of maritime students is caused by improper management.

References

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