

Identification and Analysis of Influencing Factors of College Students' Degree of Learning Effort based in ISM

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Abstract—Speaking of the development of education, talent is the key, but nowadays the slack study of college students is a universal phenomenon. To explore the influential factors of college students' learning effort has become an urgent problem to solve. According to the data results of the questionnaire, this paper selects ten factors that affect the degree of college students' learning effort, analyzes the relationship among the factors by using the expert survey method, establishes the adjacent matrix, and constructs the hierarchical structure of the factors by using the explanatory structure model. Establish the hierarchical relationship and function path that affect the degree of college students' efforts. It is found that learning resources and good intentions are the direct influencing factors, and family education is the core influencing factor. Through the construction of "family-school cooperation ecological circle", the problem of family education is improved.

Keywords—degree of learning effort; ISM; factor analysis; education

I. INTRODUCTION

Chen Baosheng, minister of education, stressed that it is necessary to promote the "four returns" and regard the quality and effect of talent training as the fundamental standards for testing all work [1]. Among the three functions of talent training, scientific research and social service in colleges and universities, talent training should be its most fundamental and core function. There are two main problems in contemporary college students' learning, one is that the efforts they pay are not enough, and the other is that the efforts they pay are not proportional to the returns they get. Many college students are faced with the problem of missing a subject and restudying, their professional skills and their own comprehensive quality are low, and their work after graduation can not meet the standards of employers. A large number of pre-post training must be carried out, which slows down the progress of talent training. Therefore, it is of practical significance to analyze the factors that affect the degree of college students' learning efforts and put forward the corresponding countermeasures.

The research results on learning input at home and abroad can be divided into two categories: on the one hand, it is about the research on the theoretical basis of learning investment.

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American scholars have put forward many conceptual frameworks: the development of "student center theory". Chikolin's "good behavior in undergraduate Education", pace's "quality of effort" and Kuhn's "Learning input". The concept of learning input in the academic field forms two important connotation dimensions: one is based on individual learning input and the other is based on interactive learning input; the other is behavioral input, emotional input and cognitive input [3]. Wang Wen wrote the connotation change and Measurement improvement of Chinese College students' Learning input, and combined with CCSS to improve the measurement tools, verified that the learning input structure under the new framework has good validity and reliability [4-5].

On the other hand, with regard to empirical research on the development and measurement of learning input scales, Navalele and Catherine Tarly believe that any assessments of the quality of education cannot be separated from students' expectations and goals. Using the 5-year survey data of NSSE, it is proved that the original NSSE tool can not be applied to the survey of all students. However, the empirical research on the degree of learning investment in China is still in its infancy, and the representative research is mainly the "Survey of Learning Investment of Chinese College students", which is carried out by Luo Yan, School of Education, Tsinghua University. Tan Xiusen, Shandong University of Science and Technology, is responsible for the investigation and Research on the Learning Environment of Contemporary College students, and Bao Wei, Peking University, on the academic Development of College students in Beijing.

The degree of college students' learning investment refers to the time and energy invested by students in their personal studies and effective educational activities in and out of the classroom, the essence of which is the interaction between students' behavior and college conditions [6]. The degree of study effort of college students refers to the energy they pay in their study from their own wishes and ideas. That is, the subjective willingness of college students to invest in learning how much. Compared with the degree of participation in learning, the degree of effort reflects the actual efforts of college students.

According to the current literature at home and abroad, most of them study the degree of college students' learning investment, but the research on the degree of college students' learning effort is rare. With regard to the research on the factors that affect the degree of college students' learning investment, most of the results obtained by scholars are the stacking of factors, and there is no important degree of prominent factors, but the hierarchical relationship can be clearly obtained by using the explanatory structure model. Thus we can get the importance of each factor. Through the distribution of questionnaires to determine the factors that affect the degree of college students' learning effort, a total of 100 questionnaires were sent out, and the reliability and validity were analyzed according to the final data results. Through the expert investigation method, the relationship between the factors is determined. The primary and secondary importance of factors is determined by explaining the structural model (ISM) [2].

II. ESTABLISH AN EXPLANATORY STRUCTURE MODEL OF THE FACTORS INFLUENCING THE DEGREE OF STUDY EFFORT OF COLLEGE STUDENTS.

A. Collect and Sort Out the Constituent Elements that Affect the Degree of College Students' Learning Efforts

Through the study of a large number of relevant literature, this paper summarizes and analyzes the factors that affect the degree of college students' learning effort, and formulates a questionnaire that affects the degree of college students' learning effort. According to the results of the final summary of the data, After reliability and validity analysis, the following ten influencing factors were determined:

TABLE I. FACTORS INFLUENCING THE DEGREE OF LEARNING EFFORT OF COLLEGE STUDENTS

order number	factor	describe
1	Lazy inertia	Can College students overcome laziness and study hard
2	Emulation	Don't want to be overtaken by other students so as to study harder
3	Learning atmosphere	Learning atmosphere from dormitory, class, friend, etc.
4	Personal foundation	The degree of accumulation of basic knowledge in College students' own Learning
5	Learning habits and methods	The study habits and methods developed by College students from an early Age
6	Teacher force	The teaching level of teachers in their schools
7	Learning resource	The laboratory, books, teaching and research resources of the school
8	Family background	the background of the college students' family
9	Academic motivation	Clear goal Planning of College students themselves
10	Love problem	the emotional problems of college students

B. An Analysis of the Influencing Factors of College Students' Learning Effort

According to the method of explaining the structural model, the 10 influencing factors are sorted on rows and columns, that is, the relationship between e_i and e_j factors is expressed as 0 and 1, e_i has influence on e_j , fill in 1; e_i has no effect on e_j , and fill in 0. By consulting the literature and using the expert investigation method, the relationship among the factors is determined, and the adjacent matrix is obtained.

TABLE II. ADHESION MATRIX

$$A = \begin{bmatrix} 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

By using the calculation of the square of the sum of adjacent matrix and unit matrix, the reachable matrix is obtained. The region of reachable matrix is divided, and the result is that the region is indistinguishable. The reachable matrix is decomposed and divided between levels. The results of level division are as follows: $L_1 = \{7, 2\}$, $L_2 = \{6\}$, $L_3 = \{1, 3, 4, 10\}$, $L_4 = \{5, 9\}$, $L_5 = \{8\}$.

The skeleton matrix is extracted according to the reachable matrix, and the hierarchical directed graph is drawn according to the skeleton matrix, that is to say, the hierarchical structure model of the system elements is established.

C. Establish an Explanatory Structure Model.

According to the hierarchical directed graph, the elements are transformed into words, and the primary and secondary factors that affect the degree of learning effort of college students are clearly seen, as shown in fig. 1.

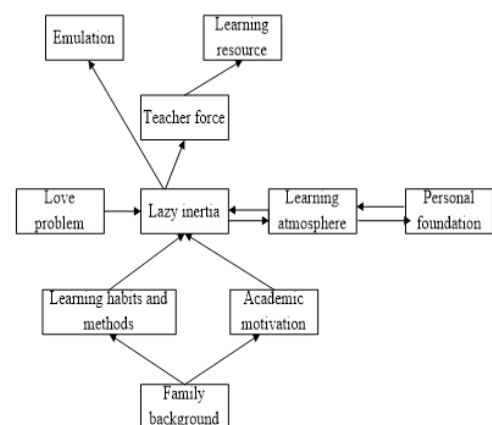


Fig. 1. hierarchical structure model diagram

III. AN ANALYSIS OF THE INFLUENCING FACTORS OF COLLEGE STUDENTS' LEARNING EFFORT

A. Core Influencing Factors-Family Background

The family background is located at the bottom of explaining the structural model, which is the most important factor affecting the degree of study effort of college students, and directly affects the learning habits and methods, and learning motivation. Both the family environment and the parents' cultivation are especially important to the students' learning and development. Parents are the best teachers of children, and the living environment of students is very important. Most of the concerns about students' learning are about how students should work hard, or to focus on the teaching level of schools and teachers, often ignoring the education of the family. Relevant research shows that parents are educated and children grow up in a family with good learning atmosphere, which are more conducive to developing good learning habits and methods.

B. Key Influencing Factors-learning Habits and Methods, Learning Motivation

Learning habits and methods, learning motivation are relatively more important factors, both of which affect the laziness of college students, and are affected by family background. Therefore, college students must develop good learning habits, find suitable learning methods, establish clear learning motivation, so as to study better and harder.

C. Basic Factors-laziness, Learning Atmosphere, Personal Foundation and Love Problems

The influencing factors in the middle position, such as laziness, learning atmosphere, personal foundation and love problem, are the basic layer, in which lazy inertia, learning atmosphere and personal foundation influence each other. These factors have an important influence on the degree of learning efforts of college students, and are more likely to affect their own emotions, thus affecting the enthusiasm of college students for learning.

D. Transition Factors-teacher Force

The factor at the second level is teacher force, which directly affects the learning resources at the first level. The teacher's force is very important to the development of the university, which is a factor that affects the degree of study efforts of college students. Strong teachers can bring more scientific research projects and funds to the school, thus providing students with more learning resources. If the teacher's classroom atmosphere and teaching mode can be accepted and liked by more students, the students are interested in this course, they will give more efforts, which will be helpful to the students' study.

E. Direct Influencing Factors-learning Resources and Competitive Intentions

The learning resources and the willingness to be competitive are located at the top level of the explanatory structure model diagram and do not affect each other. It can be

seen that these two factors are the shallower layer and the least important factor. The lack of learning resources will not seriously affect the degree of learning efforts of college students, good victory will stimulate students' own energy and desire, eager to obtain more knowledge, so as to achieve good results, being competitive is a human instinct. However, it can not arouse the enthusiasm of college students to a great extent, and can only maintain the heat for three minutes. Schools should provide more learning resources, not only for students who work hard, but also to arouse students' enthusiasm for learning to a certain extent.

IV. CONCLUSION

Based on the hierarchical structure of explanatory structure model, this paper establishes the hierarchical relationship and action path that affect the degree of college students' effort. According to the research of this paper, it is shown that among the ten factors that affect the degree of college students' learning effort, Learning resources and competitive intentions are the direct influencing factors, and family education is the core influencing factor. Therefore, we should put forward countermeasures and suggestions to improve the degree of learning efforts of college students.

A. Create a Good Family Education Atmosphere

The influence of various kinds of capital on students' learning investment under the background of family is a cumulative process. Parents should pay attention to the agglomeration of all kinds of family capital and begin in the early stage of their children. For the development of students, some things that are not easy to be paid attention to or something other than intellectual factors are particularly important, such as the development and cultivation of these non-intellectual factors, such as persistence, interest, motivation, will and so on, and the establishment of values. The reasonable educational expectations of their children, the good cultivation of family cultural habits and the high quality interaction related to learning should also be cultivated while parents pay close attention to the growth of their students. On the one hand, parents can first train their children horizontally, for example, to enroll in some extracurricular classes, find out their children's interest in learning, and then cultivate vertically. For subjects where their children are weak, they should encourage more guidance and make up for their shortcomings. Parents should communicate and learn more with their children to help them solve their difficulties. On the other hand, parents should closely cooperate with the school, build a "home-school cooperation ecological circle", actively participate in the activities organized by the school, communicate with teachers to understand the situation of students in school, and educate their children in a scientific way.

B. Construction of the "Home-school Cooperation Ecological Circle"

The factors of college students' learning effort are not only influenced by themselves and their families, but also inseparable from the role of school education. The construction of "home-school cooperation ecological circle" is not only conducive to timely communication between schools and

parents and effectively solving the problems of common concern between the two, but also can provide scientific and comprehensive educational guidance to parents through communication. The school can also have a deeper understanding of students, have the use of teaching activities. Learn from the experience of running schools abroad and set up a committee for the promotion of home-school cooperation, which is specially responsible for the process supervision of home-school coordination and the handling of complaints on focus issues; Regular teleconferences with parents to develop specific educational plans for students in schools and families, as well as supervision and inspection of implementation, in order to improve the effectiveness of home-school cooperation; The implementation of the school open teaching day system, allowing parents to visit school teaching activities and sports competitions, learning arts festivals and other activities, open teaching day can be close to the relationship between parents and schools, so that parents are familiar with the educational environment of their children and teachers and classmates, Long-term persistence can also establish parents' sense of trust in the school; Combining online and offline, creating the WeChat official account of the school class, using the new media to publicize the importance of education, sharing scientific educational methods, providing effective guidance for parents to educate their children, and creating parents to contact QQ groups can also be of importance. Teachers share and communicate the problems of students in school through QQ group in time, so that students can be transparent in school, so that parents can better understand their children's school performance, and can correct and correct the problems in time.

C. Training the Upper-type Personality

As an individual college student, it is necessary to realize that the learning style of university is different from that of senior high school, and autonomous learning plays a major role in university learning. In order to establish students' personal

view of independent learning and the concept of autonomous control of time, college students should strive to cultivate advanced personality. Self-motivating methods can enhance the willingness to be competitive, such as the development of detailed learning plans, and the implementation of competitions between dormitories, on time to complete the plan to be rewarded; Overcome laziness by self-hinting, constantly implying that you want to become excellent and reject laziness; through communication with teachers and excellent students, find a suitable learning method, and then cultivate good learning habits.

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