

Design and Realization of College Students' Mental Health Evaluation System Based on Fuzzy Judgment

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Abstract: With the enhancement of social competitiveness and efficient operation, college students are facing more and more pressures in all aspects, and incidents caused by psychological problems emerge in endlessly. Many mental health (M H) education forums and websites have appeared on the Internet. Although these forums and websites have made a certain contribution to the psychological knowledge and M H of college students, they cannot effectively manage and improve the psychology of college students. The purpose of this article is to design and implement a M H evaluation system for college students based on fuzzy judgment. This article first summarizes the basic theory of fuzzy evaluation, and then extends its core evaluation factors, combined with the current situation of contemporary college students' M H evaluation in my country, analyzes the existing problems and shortcomings, and designs college students' psychology based on fuzzy evaluation. This paper systematically elaborates the analysis and design of the overall architecture, performance requirements and database of the college students' M H assessment system. This study uses questionnaire surveys, field surveys and other research methods. Experimental research shows that it is equivalent to the traditional college student M H evaluation system. The efficiency of the college student M H evaluation system based on fuzzy judgment is about 20% higher, which fully reflects the system designed this time.

1. Introduction

Entering colleges and universities is an important stage of talent growth, where not only learn knowledge, but also learn to do things and behave, so colleges and universities are the main battlefield for cultivating modern talents [1-2]. Not only to teach knowledge, another important goal is the overall improvement of moral education and quality, so the important role of M H is highlighted [3-4]. With the diversified development of society, the situations and choices we face are becoming more and more complex, which makes the M H and personal endurance more and more important [5-6].

From the establishment of the world's first psychological laboratory by German psychologists Wilhelm Wundt in 1879 to the present, the development of psychology has gone through a course of more than 100 years [7-8]. In order to educate college students on M H, American psychologists introduced M H to college campuses for the first time in 1896. In China, the application of

computer technology in M H testing has made great progress, such as in the medical field, military and other research fields, but as a method and means to solve college students' M H problems, it has only just started[9-10]. Some colleges and universities actively use computer methods to conduct psychological tests, and various test systems have been developed, but these test software have the following shortcomings: First, most analysis methods and system designs are simply based on various scales. The principle is not supported by theoretical methods; the second is the subject's mental state is unstable and difficult to identify, and the data obtained does not have strong reliability and authenticity, resulting in inaccurate psychological analysis and research work [11-12].

The purpose of this paper is to improve the psychological quality of college students, and the purpose is to design and realize the M H evaluation system for college students based on fuzzy evaluation. It compares the traditional college student M H system with the college student M H evaluation system based on fuzzy evaluation, and analyzes the results of this article.

2. Applied Research on the Evaluation System of College Students' Mental Health Based on Fuzzy Judgment

2.1 Analysis of Influencing Factors of College Students' M H

2.1.1 Learning stress factors

After entering the university, many students find that they are no longer excellent, facing the like a cloud of master classmates, they will naturally feel a lot of pressure to study, and always ask themselves to do well and do better, which can easily cause college students' obsessive-compulsive disorder, the analysis of this article is the same, obsessive-compulsive disorder has the highest score among all factors. In addition, university campuses are places for cultivating talents. Students are required to learn more and the difficulty of learning will increase. Some students are not used to it. Naturally, they feel a lot of pressure on learning, which is easy to cause depression. Therefore, study Stress factors are also the main reason that affects the M H of college students.

2.1.2 Informationization factors

This is an information age. Basically, college students have computers. Therefore, college students are all on the Internet. There is a lack of communication and understanding between classmates and classmates. This is also the case for the analysis of this article. Interpersonal relationship sensitivity factor scores are scored in all factors. It is also quite high, second only to the anxiety factor. Therefore, lack of communication and understanding between classmates and classmates can easily cause psychological problems in sensitive aspects of interpersonal relationships. Therefore, information factors are also the main reasons that affect the M H of college students.

2.1.3 Employment factors

The fourth-grade students are at the intersection of graduation and entering the society. Employment issues have always surrounded them. Because they have never entered the society, they are very confused about their employment prospects and do not know what they do best for their future development. They have been in a state of indecision, resulting in extremely unstable M H, especially in anxiety and depression. In addition, the number of college students nationwide is increasing, and job competition is very stimulating, which will cause a lot of problems.

2.2 Analysis of M H Education in Universities

2.2.1 Carry out psychological measurement and establish student psychological files

At present, domestic colleges and universities have generally carried out psychological archives work. Although these work are often only aimed at college freshmen and lack continuous and systematic follow-up investigation and research, which hinders the development of M H education to a certain extent, its role should not be underestimated. For schools, the establishment of student psychological files will help the school to educate and train students in a targeted manner. Through measurement, students with problems can also be found as early as possible, counseling, counseling and treatment can be given as early as possible to avoid more serious problems. For students, they can understand their own psychological characteristics through measurement, so that they can develop and improve themselves. For psychological researchers, collecting a large amount of first-hand information can provide strong support for the research and practice of M H education in colleges and universities. The first-hand information can provide strong support for the research and practice of M H education in colleges and universities.

2.2.2 Effective use of the Internet to carry out M H education

As far as M H education in colleges and universities is concerned, many colleges and universities are now discussing educational issues such as online M H and online ethics, and opening M H education and psychological counseling websites, such as the red website of Tsinghua University. Therefore, while the Internet brings new psychological problems, it also brings a larger space for psychological education.

2.3 Design of the M H Evaluation System for College Students Based on Fuzzy Evaluation

2.3.1 Database design

The database is the basis of the information storage and processing of the M H system, and an important part of the system development and construction. The design and installation of the relevant database are indispensable when developing Web applications. The system database is responsible for storing a large amount of entity information in the system and The connection is organized with a certain data model. In addition to the usual data table design, it also includes user-defined functions, views, and stored procedures. The correct installation of the database is a prerequisite to ensure the smooth running of the Web application. The system database is mainly used to realize the following functions:

- 1). Record and manage user information in different roles for identity verification when logging in;
- 2). The system can store M H learning materials;
- 3). Record students' consultation messages and teachers' reply messages;
- 4). Record forum messages and reply records;
- 5). Store the psychological assessment questionnaire, and you can add, modify, and delete various information in the questionnaire.
- 6). Record the questionnaire and attribution factor information of the question attribution, and the score of the question answer option is used to calculate the evaluation result;
- 7). Store the historical records of student assessments.

2.3.2 System function requirement analysis

According to the specific needs of the project in the feasibility analysis stage, accurately locate the target of the system, learn more about user needs, conduct specific investigations in various departments of the school, and clarify the sub-functions of the system.

The integrity of the system interface. The system interface reflects the overall structural framework of the M H assessment system, such as psychological tests, psychological consultations, and message modules.

M H assessment management. Mainly releases psychological knowledge and announcement information, downloads and uploads related attachments, and reviews the information released by the publisher to ensure the effectiveness of the released information. File data is established for each student, including: student basic situation files, class files, student psychological evaluation and analysis, psychological survey results, student psychological counseling, etc.

System maintenance function. Manage the psychological test result information, modify the password, set the evaluation index, calculate the statistics, etc.

Query function. It can query the personal information of the consultant, and the user can perform detailed query by name and department, and statistical query on the evaluation results.

2.3.3 System function module design

The system is divided into three functional modules:

Query management. Users can perform detailed query by name and department, and perform statistical query on evaluation results, etc.

Evaluation content management. Evaluation content modification, evaluation content view, evaluation content addition, evaluation content deletion.

System management. Add users, query users, delete users, and set permissions. The module also establishes file data for each student, which includes: student basic situation files, class files, student psychological evaluation and analysis, psychological survey results, student psychological counseling, etc.

2.4 Research on Fuzzy Method of Fuzzy Comprehensive Evaluation

The basic idea is to use the F linear transformation principle and the principle of maximum membership after considering various factors related to the thing being evaluated, construct a model, and make a comprehensive evaluation of fuzzy things.

There are three elements of comprehensive evaluation:

(1) Factor set: $U = \{u_1, u_2, \dots, u_m\}$, suppose there are m factors related to the evaluation;

(2) Comment set: $V = \{v_1, v_2, \dots, v_n\}$, suppose there are n possible comments;

(3) Single-factor judgment refers to judging a single factor one by one to obtain the F set on V, that is, judging u_i ($i=1, \dots, m$) to obtain $(r_{i1}, r_{i2}, \dots, r_{in})$, so it is An F mapping from U to V

$$f : U \rightarrow F(V) \quad (1)$$

$$u_i \rightarrow (r_{i1}, r_{i2}, \dots, r_{in}) \quad (2)$$

The F mapping f can determine an F relationship $R \in \mu_{m \times n}$ called the evaluation matrix. When judging, the importance of each factor is not consistent, and the priority should be determined by a weighted method. Use a set of data to represent the weight distribution of each factor on the F set of U, that is, $A = (a_1, a_2, \dots, a_m)$ and then do the composite operation of these weights and the evaluation matrix R to obtain a comprehensive evaluation set $B = (b_1, b_2, \dots, b_n)$, then

$$AR = B = (b_1, b_2, \dots, b_n) \quad (3)$$

Among them

$$A = (a_1, a_2, \dots, a_m) \quad (4)$$

$$R = (r_{ij})_{m \times n}, r_{ij} \in [0,1] \quad (5)$$

It can be seen from the comprehensive evaluation process that when the factor u_i is considered alone, the degree of membership r_{ij} ($j=1, 2, \dots, n$) of the evaluation of u_i to the comment v_j . The composite operation is performed through the F relationship, and the final result is as follows:

$$b_j = \bigvee_{i=1}^m (a_i \cap r_{ij}), j = 1, 2, \dots, n \quad (6)$$

3. Experimental Research on the Evaluation System of College Students' Mental Health Based on Fuzzy Judgment

3.1 Subjects

In order to make the experimental results of this article more scientific and effective, this experiment conducted a survey of students by going to a local university and using the SCL-90 symptom self-rating scale. This time a total of 100 students were surveyed, including 40 women, 60 males (slightly more males than females in this school) to ensure the scientificity of the experimental results. These data are scored according to the SCL-90 scale to establish a mathematical model.

In order to further conduct an experimental investigation on the M H evaluation system of college students based on fuzzy evaluation, this experiment also conducted face-to-face interviews with teachers to compare the traditional M H evaluation system of college students to the college student M H evaluation system based on fuzzy evaluation. Do you want to make a comparative analysis to judge the feasibility of the system designed in this article?

3.2 Research Methods

Questionnaire survey method. This article asks relevant experts to set up targeted questionnaires and conducts the survey in a semi-closed manner. The purpose is to promote the correct filling of the students under investigation.

Field research method. In this experiment, we went to a local university and conducted face-to-face interviews with psychological education teachers and recorded data. The data obtained was sorted and counted. These data not only provided theoretical support for the topic selection of this article, but also provided more of this article. The final research results provide a reliable reference.

Mathematical Statistics. Use related software to conduct statistics and analysis on research data.

4. Experimental Analysis of College Students' Mental Health Evaluation System Based on Fuzzy Judgment

4.1 Analysis of Influencing Factors of College Students' M H

This experiment adopted a questionnaire survey method and used the universal SCL-90 symptom self-rating scale. The selected indicators were F1-somatization, F2- obsessive-compulsive

symptoms, F3-interpersonal sensitivity, F4-depression, and F5-anxiety, F6-hostile, F7-fear, F8-paranoia, F9-psychopathy, F10-other. The data obtained is analyzed using the analytic hierarchy process and the data is shown in Table 1.

Table 1: Analysis of Influencing Factors of College Students' M H

	F1	F2	F3	F4	F5	F6		F7	F8	F9	F10
1	2.16	3.10	3.11	2.01	2.69	2.32		1.82	2.79	2.81	2.52
2	1.20	1.82	1.01	1.00	1.52	3.00		1.27	1.63	1.02	1.02
3	1.10	1.87	1.02	1.00	1.50	3.20		1.27	1.11	1.00	1.00
4	2.42	3.10	3.11	2.56	2.10	3.83		2.57	1.87	1.70	3.72
5	1.72	1.41	1.12	1.23	1.17	1.14		1.20	1.00	1.23	1.25
...											
99	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
100	2.87	2.91	2.45	2.73	2.42	3.21		2.27	3.00	2.71	3.87

It can be seen from Table 1 that among the many factors that affect the M H of college students, the hostile emotion factor accounts for a larger proportion, which shows that college students are bored with things and cannot restrain their impulse. It can be seen that impulsivity and other aspects are still one of the reasons for the greater influence of contemporary college students' M H.

In order to further research and analyze the impulsive emotions of college students, this experiment also investigated the psychological status of a local university in 2021. The data obtained is shown in Figure 1.

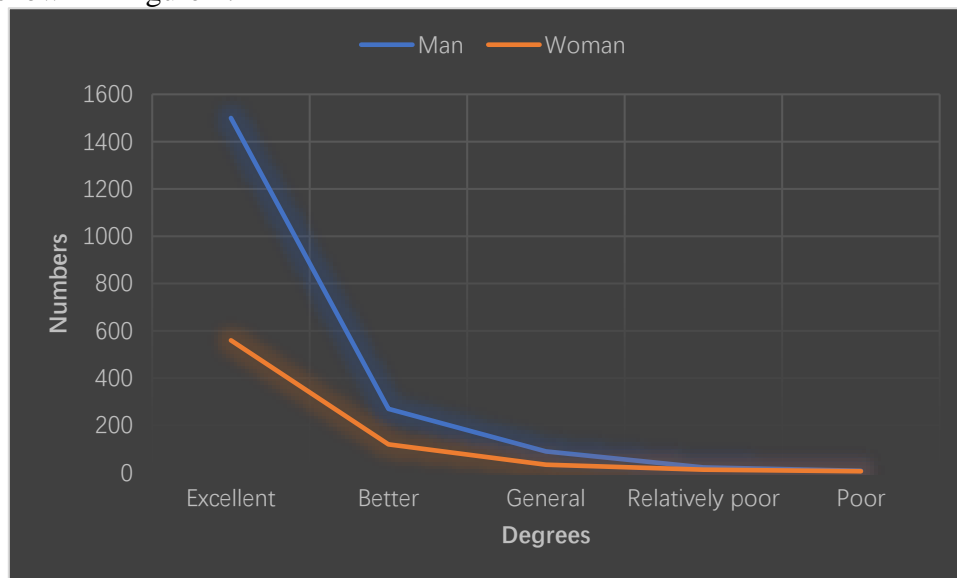


Figure 1: Analysis of student impulse

Through the above data analysis, mental health teachers can take different measures to conduct psychological education for college students with psychological problems, and analyze the overall mental health trend of students, so as to facilitate the grasp of the direction of college students' mental health education, and obtain good results.

4.2 Comparative Analysis of the Evaluation System of College Students' M H

In order to further carry out the experimental analysis of the college students' M H evaluation system based on fuzzy evaluation, this time, the performance comparison between the traditional college student M H evaluation system and the college student M H evaluation system based on

fuzzy evaluation is analyzed with teachers and students. The experimental data obtained are shown in Table 2.

Table 2: Comparative Analysis of the Evaluation System of College Students' M H

	Convenience	Robustness	Effectiveness	Others
Fuzzy judgment	66.8%	65.1%	70.2%	60.2%
Traditional	53.3%	54.1%	50.3%	55.9%

It can be seen from Table 2 that compared to the traditional M H evaluation system for college students, the fuzzy evaluation-based M H evaluation system for college students has better performance, especially in terms of efficiency. The fuzzy evaluation-based M H evaluation system for college students is nearly 20% higher, Which fully reflects the feasibility of the college students' M H evaluation system based on fuzzy judgment.

On the basis of comparing the traditional mental health evaluation method with the fuzzy evaluation-based mental health evaluation system for college students, in order to further study the mental health system of college students based on fuzzy evaluation, this experiment conducted interviews with teachers. The ten-point scoring system is used to explore teachers' satisfaction with it. Most teachers think that the system is more convenient. The data obtained is shown in Figure 2.

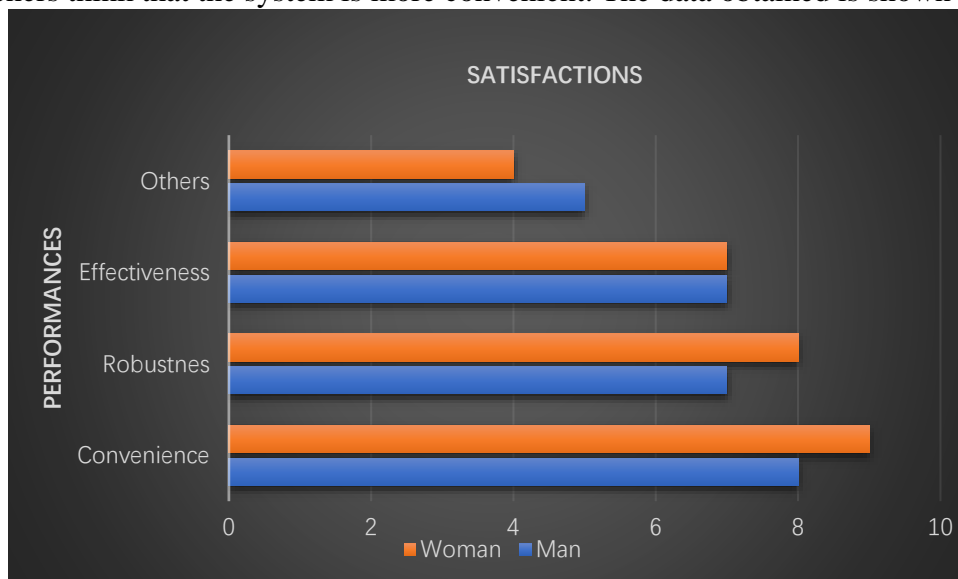


Figure 2: Satisfaction with the system

5. Conclusion

Carrying out students' M H education in colleges and universities can effectively prevent and treat students' psychological problems, and promote the overall development and healthy growth of students has an important role. At the same time, it is also an important part of education, teaching, ideological and political work, and management under the new situation. The application of fuzzy judgment in the M H education of colleges and universities not only reduces the tediousness of manual testing, but also shortens the time, and strengthens the sense of the times, pertinence, effectiveness and initiative of school moral education.

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