Development Evaluation System of Psychological Vocational Education Based on Artificial Intelligence

Yaqiong Ren

1Shandong Polytechnic College, Jining, ShanDong, 272067

*Corresponding author e-mail: 452939174@qq.com

Abstract. Choosing a career is an important choice in every student's life, and it is particularly important to evaluate the development of vocational education for students. However, many students today do not have a clear positioning, do not know themselves clearly, do not know what their appropriate work, unable to make a suitable career development plan, thus facing greater employment pressure. Based on this, this paper introduces the development of a professional psychological assessment system for students, which can help students better understand their own interests, personality and professional ability tendency through scientific professional psychological tests, so that teachers can more accurately evaluate students' development ability and psychology. Based on the analysis of the existing vocational assessment software, the system improves a series of defects such as inflexible report form and incomplete functional modules. In addition, the reliability and validity of the selected scale were analyzed by retest method in this paper. The Pearson plot correlation coefficient basically met the requirements of 0.6~0.8, with an interest of 0.66, a personality of 0.71 and a personality of 0.79, indicating that the measurement content of this system has a high reliability and relevance validity.

Keywords: Artificial Intelligence, Psychology of Vocational Education, Occupational Measurement, Career Assessment

1. Introduction

There are many choices in life, and choosing the right career is one of the most important. However, many students today do not have a clear positioning and do not have a clear understanding of themselves, so they are unable to make appropriate career development plans, thus facing great employment pressure [1]. In recent years, with the development of science and technology, artificial intelligence has been constantly combined with various fields of society, producing good social benefits [2]. With the rapid development of vocational education psychology, how to accurately evaluate students' development potential in order to cultivate talents has become the focus of vocational education [3]. From the perspective of psychology, based on artificial intelligence technology, effective occupational psychological assessment can help students understand their own personality and potential career abilities, and help them make appropriate career development plans [4]. In addition, schools can effectively evaluate students' developmental psychology and abilities so as to provide
them with better career guidance.

Teaching students according to their aptitude has always been a truth in education circles. But how to discover the different student's occupation characteristic, needs to carry on each aspect comprehensive evaluation and the evaluation. In foreign countries, the talent assessment work started early, and has now formed a relatively mature and perfect assessment technology experience [5]. In China, in recent years, the work of occupational psychological assessment has developed rapidly, and vocational tests have been widely used in the selection of talents [6]. However, there are not many specialized software and systems for students' career assessment and development assessment, and there are many deficiencies in the only software: the positioning of the assessment system is not accurate, the scientific content of the assessment is difficult to ensure, and the assessment software is expensive and cannot be popularized [7].

For vocational schools, it is necessary to develop practical and simple vocational psychological assessment software according to the individual characteristics of students and the needs of the society, so as to better evaluate students' career development ability [8]. Based on the psychological characteristics of vocational school students, this paper compiled the vocational psychological assessment system, which, based on the analysis of the existing vocational assessment software, improved a series of defects such as inflexible report form and insufficient integrity of functional modules [9]. It integrates all the information of occupational tests into the database, making it more convenient for all kinds of users to use, and realizes the operation mode of one server corresponding to multiple clients, enabling administrators to flexibly set, make scales and present test results [10].

2. System-related Technologies

2.1. Selection of Scale

The proper scale is the key to develop the vocational psychological test system. As a measuring tool of occupational psychology test, any scale should have its application purpose, applicable scope and certain reliability and validity. When choosing the scale, we should follow the scientific method to choose carefully, so that it can accurately reflect and evaluate the students' psychological behavior characteristics and developmental tendency. The following principles should be followed in the selection of the existing numerous occupational test scales: first, the scale should be standardized and standardized, and the procedure of compiling the scale should be conducted in accordance with the standardized order of reliability test, validity test and item analysis of the test scale. Secondly, the selected scale should conform to the group characteristics, closely related to the knowledge level, age level and psychological characteristics of the group. Thirdly, the scale used should be closely combined with the prediction task. This paper studies the career development tendency of vocational school students, which should be the basis for choosing the scale. In this paper, a total of five test scales including temperament, interest, professional values, personality and personality traits were used.

Based on the above principles, this paper also tested the reliability and validity of the selected scale. In terms of reliability test, this paper calculates and analyzes the retest reliability coefficient of the same student group by using the traditional paper-and-pencil test. The formula is as follows:

\[ R = \frac{\sum X_1 X_2}{N - M_1 M_2} \frac{S_1 S_2}{S_1 S_2} \]  

Where, \( X_1 \) stands for the score of the same subject in the two tests before and after, \( X_2 \) stands for the average score of the two tests before and after, \( M_1 \) is the standard deviation of the two tests, and \( N \) stands for the number of subjects. \( S_1 \), \( S_2 \), \( S_3 \), \( S_4 \), \( S_5 \) are the standard deviations of the two tests.

In the aspect of validity testing, the teacher group's evaluation of students in all aspects is taken as the effectiveness table, which is compared with the students' own evaluation. The formula involved is as follows:
$K = \frac{P_a - P_e}{1 - P_a}$ (2)

Where, $P_a$ is the actual consistency rate of the two observations, and $P_e$ is the expected consistency rate of the two observations.

2.2. System Related Technology Introduction
NET development platform: launched by Microsoft in November 2000, the official version of NET2005 is powerful, compared with the previous version, the development process is convenient. Its core components include: building blocks for creating an Internet operating system; Basic structures and tools for building and managing credit generation services; NET device software capable of enabling new intelligent Internet devices.

VB.NET: Microsoft's latest platform technology, is a language of the net framework SDK, its mechanism is similar to Java.

ADO.NET: it provides platform interoperability and scalable data access.

SQLServer2008: this version of the product is by far the strongest and most comprehensive version of SQL Server. It is reliable, efficient, and intelligent.

C/S pattern: the C/S structure enables different distribution of functionality between the client and the server, giving full play to the client's processing power, and not depending on the network.

3. System Design
How to realize the efficient operation of the professional test system, the function design before the system deployment is an important link. In this system, the design and development of each functional module is the most critical place. The system is mainly divided into two functional modules (see Figure 1): user information module and user test module. The former is mainly used to realize user login function and daily management, while the latter, as the core module, is used to realize user career assessment.

![Figure 1. System functional architecture diagram](image-url)

Database design. As a collection of information, database is a tool that can store and process data. Creating a well-performing database schema and building a flexible and logical database helps optimize the role of the database in organizing and presenting information. This system adopts the method of double database, which contains different data tables according to different requirements at both ends of the database. The data tables involved in the student career assessment system include: user information table, which is used to store the basic information of the tested person; The basic information table of the scale, the system has a total of five test scales including personality, interest, temperament, occupational value, personality traits; Test result information table, there are five measuring scales, there are five corresponding results table; System information table, which is mainly
used to store the data necessary to maintain the normal operation of the system.

4. System Implementation and Testing

4.1. System Function Realization

According to the actual needs, this system designs two kinds of authority roles, which are the school management end and the student end. In the server side can be the collection of test information, data import and export, data operation and other functions. Students can only take professional tests and view the results of personal tests.

(1) System login implementation: administrator login and ordinary user login. Select normal user login, then enter the normal page. The contents of the login interface include user name, password, user type and verification code. If it is the first time to enter, you can click the registration button to register. After success, return to the login page to log in. Note that different user types enter different pages and can operate different functions.

(2) Realization of the main functional modules of the system

Career assessment module: When users register, they can use the functions of this module, which is the core of the whole system, mainly divided into administrator rights and student rights. Among them, the main functions of student authority are as follows: first, student career test. After students select the career test function, the system will read the test questions and answers selected by users from the existing data, and generate a test interface. In the test interface, students can test. When the students answer all the questions and submit them, the system will match the test types obtained according to the scoring criteria with the test types in the database, and then present the test results to the students. The test results will be stored in the database for later analysis and appropriate test reports. But if the student does not answer all the questions, the student will not get the test results. Second, the user personal information consummation function. In the "related services" option in the system, students can improve their personal information and modify and delete it. Third, test results download function. Once the test is done, the results will be available for download.

Administrator authority function: first, professional test question management. Administrators can modify, delete and query the test question information, answer information and type information. Second, the user feedback management function. Administrators can view user feedback after testing.

Statistical analysis module: This module mainly presents the test result data in a visual form (chart, bar chart, etc.), and provides the tester with more detailed statistical analysis report and personality dimension analysis chart.

4.2. System Test

Software testing is the inspection of software design and coding, and is the key to software quality assurance. If the testing is not sufficient, the defective software may be put into operation, which will have a certain impact on users. It is necessary to test the system before it is put into operation, and find the hidden errors in the system through the operation of the program. The most important thing for the occupational psychology test system is whether the scale validity and reliability it uses meet the requirements. Therefore, the validity and reliability were tested again in this system test.

In this paper, the previous reliability and validity test methods are used to issue questionnaires to the students who conduct online system test and conduct the test. The test results of system validity and reliability are shown in Table 1.
Table 1. Test results of system validity and reliability

| Name of gauge          | Completely accord with myself | Basic coincidence | Basic nonconformity |
|------------------------|-------------------------------|------------------|---------------------|
| Interest               | 19%                           | 77%              | 4%                  |
| Character              | 16.10%                        | 81.30%           | 8.60%               |
| Temperament            | 13.40%                        | 83%              | 9.40%               |
| Personality traits     | 10%                           | 87%              | 3%                  |
| Professional values    | 15%                           | 81%              | 4%                  |

Based on the school teachers’ evaluation of students in various aspects, the validity test was conducted on the retest students. The results are shown in Table 2. The validity coefficient between the teacher's assessment and the students’ own answers was significantly correlated. Accordingly, this psychological questionnaire has high relevance validity and the system runs well.

Table 2. Correlation results of validity coefficients

| Validity test items | Pearson product-moment correlation coefficient | Significance level |
|---------------------|------------------------------------------------|-------------------|
| Interest            | 0.44                                           | P<0.01            |
| Character           | 0.59                                           | P<0.01            |
| Temperament         | 0.66                                           | P<0.01            |
| Personality traits  | 0.51                                           | P<0.01            |
| Professional values | 0.52                                           | P<0.01            |

Visual presentation of comprehensive test results: when the user finishes the test, the system can present different report forms according to the user's choice. The results of the comprehensive occupational psychology test output in the form of a bar chart are shown in Figure 2.

Figure 2. Comprehensive results of occupational psychological test

Other module tests: administrator module function tests. Administrator is the management of the entire system, testing the management of the various operations are correct. Testing of common module functions. The main test files can be uploaded, online questions can be realized, various navigation button design is reasonable, jump is correct, can achieve the expected effect.
5. Conclusion

The deep integration of artificial intelligence and social industries is an inevitable trend of development. This paper focuses on the problems faced by the psychology of vocational education and combines the artificial intelligence technology to design an evaluation system for the development of psychological vocational education based on artificial intelligence, which is used to measure students' vocational interest and ability tendency. Compared with some similar occupational psychological test systems, this system not only has common basic functions, but also realizes the following features: flexible and diversified report form, which is displayed in EXCEL style, and users can adjust report elements by themselves; The basic functional modules are complete, including four basic functional modules, namely the individual answer system, the group data processing system, the data management query system and the reporting system. The assessment is rich in content, including five tests. In general, the system is simple to operate, practical and convenient, and suitable for psychological development evaluation of vocational education in schools.

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