Research on Behavioral Examination Evaluation Method Based on Multi-Dimensional Objectives

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Abstract: Traditional examinations take the total score as the core evaluation index, which can only roughly reflect students' mastery of knowledge. The evaluation standard is single and lacks in-depth analysis, making it difficult to meet the needs of personalized learning for accurate grasp of students' individual situations. This paper proposes a behavioral examination evaluation method based on knowledge objectives, ability objectives, and quality objectives. By designing two types of multiple-choice questions (with and without correct answers), it examines different dimensional objectives respectively. Through analyzing students' choice behaviors, an analysis report covering the three-dimensional objectives is generated. This report can not only provide a basis for personalized teaching but also serve as the core evaluation basis for further education selection such as the college entrance examination and postgraduate entrance examination. By analyzing the matching degree between the report and admission requirements, screening and ranking can be realized, achieving precise matching between students' major applications and colleges' enrollment, thus providing a new direction for the reform of educational evaluation systems.

***Keywords*:** personalized learning, examination evaluation method, characteristic portrait, behavioral analysis

1. Introduction

In the educational context where the concept of personalized learning is increasingly popular, accurately grasping each student's individual situation is the premise of effective teaching. The traditional examination model mainly focuses on knowledge memorization and measures students' learning outcomes through the total score of the test paper. This evaluation method has obvious limitations: on the one hand, the total score cannot decompose students' strengths and weaknesses in specific knowledge modules and ability dimensions, making it difficult for teachers to design targeted teaching plans; on the other hand, it ignores differences in students' quality, which often have a key impact on students' future major choices and career development [1].

In the context of further education selection such as the college entrance examination and postgraduate entrance examination, the disadvantages of traditional total score evaluation are more prominent: the college entrance examination only uses scores as the basis for voluntary application and admission, leading some students to enter popular majors because their scores meet the standards, but they encounter learning difficulties due to mismatches between their knowledge structure, ability types and professional needs. To break through the limitations of traditional examinations, this paper proposes a multiple-choice examination evaluation method centered on goal orientation. It refines examination objectives into three dimensions: knowledge, ability, and quality. Through the design of two types of multiple-choice questions and the analysis of students' choice behaviors, a multi-dimensional evaluation report is constructed. In further education selection, precise admission is realized through the matching ranking between the report and needs, providing scientific support for personalized learning and further education selection.

2. Design of Examination Evaluation Method

2.1 Corresponding Relationship Between Examination Goals and Question Types

The core of this method lies in "one question for one objective", that is, each multiple-choice question accurately corresponds to one of the three dimensions: knowledge, ability, or quality. Through the differentiated design of two types of questions, the effective examination of different dimensional objectives is realized.

2.1.1 Multiple-choice questions with correct answers

These questions correspond to knowledge and ability goals. Knowledge goals focus on students' mastery of core knowledge such as basic concepts, principles, and formulas; ability goals emphasize students' higher-order abilities such as

knowledge application, analysis, and reasoning.

Such questions set a unique correct answer, and distractors (incorrect options) are carefully designed to reflect common misunderstandings and loopholes in students' knowledge learning or ability formation. Each distractor serves as a signal reflecting students' specific problems.

2.1.2 Multiple-choice questions without correct answers

These questions correspond to quality goals, which include non-knowledge dimensions such as students' thinking patterns, value orientations, personality traits, and career tendencies. Such questions do not set correct answers but classify students' quality dimensions according to the quality characteristics corresponding to different options.

For example, a question examining "career decision-making quality" can be designed as: "When facing a career with stability but limited development space and a career full of challenges but with great potential, which do you prefer? A. Prioritize stability and avoid risks; B. Prioritize potential and accept challenges; C. Seek balance between the two and explore a compromise; D. Rely on others' suggestions and make cautious decisions." Different options correspond to quality types such as "risk-averse," "risk-preferring," "balanced," and "dependent," and students' quality dimensions are classified directly through their choices.

2.2 Generation Logic of Multi-Dimensional Analysis Report Based on Choice Behaviors

This method takes students' choice behaviors in each question as core data, mines historical behavior data to establish a label system reflecting users' behavioral characteristics, and maps target behavioral models, thereby meeting students' personalized learning needs [2-3]. To characterize students' traits and features, the most popular research direction is integrating learning styles [4]. Learning style refers to the unique way learners focus on, process, absorb, and remember new and difficult information [5]. A deep understanding of different learning styles helps design and provide personalized needs.

Experts in different fields have proposed at least 70 theories or models of learning styles [6]. The Felder-Silverman model is the most widely used theory[7], as it is a compromised combination of other classical theories and convenient to be implemented into computer programs with its data collection instrument called index of learning styles. Other notable studies include DunnandDunn’s theory[8], which posits that a learner’s learning style can be influenced by many factors; Kolb’s learning style inventory[9], which describes learner’s internal cognitive processes as a four-stage cycle of learning; and Myers-Briggs Type Indicator(MBTI)[10].

Knowledge dimension analysis: Statistics are made on students' choices in knowledge-oriented questions. If the correct option is chosen, the knowledge module is marked as "well-mastered"; if a distractor is chosen, specific weak points are identified according to the knowledge misunderstandings corresponding to the distractor, and finally a list of mastery status of knowledge modules is formed. Ability dimension analysis: For ability-oriented questions, the correct option indicates that the ability meets the standard, while distractors reflect ability weaknesses. The analysis results of all ability-oriented questions are integrated to form a distribution map of ability strengths and weaknesses. Quality dimension analysis: Students' choices in questions without correct answers are summarized, and classification is conducted according to the quality types corresponding to the options, ultimately forming a portrait of students' quality characteristics.

The analysis report is structured to present students' traits and features in different dimensions. For example: "Knowledge dimension: Excellent mastery of function concepts (95 points), average mastery of trigonometric function formula application (70 points); Ability dimension: Good data sorting ability (80 points), average logical reasoning ability (60 points); Quality dimension: Obvious innovative tendency and strong risk tolerance." It provides clear guidance for subsequent teachers' teaching and students' growth.

3. Significance of the Examination Evaluation Method

3.1 Providing Accurate Basis for Personalized Teaching

The total score evaluation of traditional examinations cannot provide teachers with specific problems of individual students, making it difficult to achieve teaching according to students' aptitude. However, the multi-dimensional analysis report generated by this method can accurately identify each student's weak points in the knowledge and ability dimensions. Teachers can formulate personalized learning plans for students accordingly: design special exercises for knowledge weak points and carry out thematic teaching activities for ability shortcomings, truly realizing teaching based on learning and promoting the implementation of personalized learning.

3.2 Constructing a Scientific Further Education Evaluation System

In further education selection such as the college entrance examination and postgraduate entrance examination, the

analysis report of this method can replace or supplement traditional scores. Screening and ranking are conducted through the matching degree between students' analysis reports and college admission requirements, realizing accurate matching with majors and colleges:

In the college entrance examination, each university needs to clearly announce admission requirement standards according to the training goals of different majors, set characteristic demand items and matching mechanisms for each dimension of knowledge, ability, and quality, and rank according to the final matching scores. Students with higher rankings are eligible for admission. For example, a student's report stating "good mastery of mathematical analysis knowledge, outstanding logical reasoning ability, and obvious innovative thinking" highly matches the needs of the computer major, resulting in a high matching score and priority admission; if another student meets the total score standard but has "weak mathematical analysis knowledge and insufficient innovative thinking," with low matching degree to the computer major's needs, they may not be admitted to the major even with a high score, avoiding the problem of "meeting the score standard but not matching the major." Compared with traditional score ranking, matching ranking can better balance admission fairness and professional adaptation, laying a good foundation for talent training in colleges and universities.

4. Conclusion

The behavioural examination evaluation method based on multi-dimensional goals breaks through the limitations of the single score evaluation of traditional examinations through the accurate design of two types of multiple-choice questions and in-depth analysis of choice behaviors, realizing a detailed portrayal of students' three-dimensional goals of knowledge, ability, and quality. This method not only provides a scientific basis for personalized teaching, helping teachers carry out teaching according to students' aptitude, but also realizes accurate adaptation between students, majors, and colleges in further education selection such as the college entrance examination through the mode of matching ranking between analysis reports and admission requirements. In the future, with the development of educational information technology, the matching algorithm and demand standards can be further optimized to improve the accuracy of evaluation and admission, enabling it to play a greater role in educational teaching and selection practice.

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