Preliminary Investigation of the Integrated Evaluation Model based on Random Forest Method

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Abstract—With the deepening of reforms, as the closing year of the "Modern Vocational Education System Construction Plan (2014-2020)", it has witnessed the development of vocational education. Its development trend is "only specialization" and "light basic courses". Currently, the random forest method is very popular. This method forms a "forest" by building many decision trees, and votes on multiple trees to make decisions. This method can improve the classification accuracy of new samples effectively and it is more suitable for the research proposed. Random forest evaluation model has three functions: formative, diagnostic and summative. This paper establishes a comprehensive evaluation model for basic courses to make the evaluation more standardized, comprehensive and operability. And this evaluation system can supervise all stages of teaching.

1 INTRODUCTION

Based on the function of collage moral education, this article establishes a digital, diversified, standardized, timeliness, effectiveness and comprehensive development evaluation model to promote native language learning. In addition to focusing on the "instrumental" aspect, i.e., becoming a person who can understand others' opinions but cannot communicate with them, we also want to reflect the "humanistic" aspect of mother-tongue education -- becoming a free person who can pass on the profound culture of the nation, and who has the ability to aesthetically distinguish between right and wrong and the ability to live. We would like to see the 'humanistic' nature of native language education. It is to become free people who can inherit the profound culture of their own people and have the ability to distinguish right from wrong and life. Therefore, collage Chinese education should not be confined to this subject area, but should be guided by the idea of "overall Chinese", facing society and the future, feeling life and learning to live in language learning. Our goal is to bring language education to a unity of instrumentality and humanism. As a result, those who understand education must do it naturally, rather than abide by the established laws. Instead of seeking unity, it is better to develop individuality. The full name of OLO is "structure of the observed learning outcome", which means observable. Solo classification is a method to evaluate students' academic achievements with grades^[1]. It can evaluate students' academic achievements, drawing college entrance examination mathematics questions on students' ability and core literacy requirements, and it is easy to measure different levels of learning. Therefore,

based on the solo classification theory, the author's research is to find the "Curriculum Standards (2017)". At the same time, in order to guide teachers' teaching and students' learning, and to change the interests of teachers and students. This is the requirement of the college entrance examination in the last three years. In addition, it also promotes the proposition maker to optimize the structure of the test paper and improve the quality of the test paper, and promote learning and development.

2 CURRENT STATUS AND PROBLEMS

The academic evaluation system in the United States enjoys a long history of research. For example, the academic evaluation model of "core curriculum" and "STS curriculum" in its smart education environment integrates the teaching characteristics of the curriculum into the curriculum system of sub-discipline teaching, so that students can take the initiative to construct new knowledge from old knowledge, thus forming the milestones. However, in China, the research on academic evaluation in vocational education institutions is mainly concentrated in Taiwan, which is famous for the diversity of its evaluation methods. The "CIPP model" and "Taylor model", which are commonly used by universities in China, mainly manage and evaluate students' credits, but less monitor the academic effects in terms of quality and quantity. The traditional academic evaluation system only focuses on the memory of the system knowledge of certain subject, which is specifically manifested in the reproducibility test of declarative knowledge, while ignoring students' experience and gains in the learning process and learning methods. Searching the keywords in CNKI, we can only find 1759 items for "academic

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evaluation”, 6 items for “academic evaluation of Chinese”, but 0 items for “academic evaluation of Chinese at college”. In the result of “academic evaluation of Chinese”, there is only one for the study of academic evaluation of Chinese at vocational college.

John B Biggs and Kevin f Collis believe that in all forms of learning on and off campus, we need to have the evaluation criteria of quality and quantity are different between different disciplines, The quantitative evaluation of learning achievement has been applied in a mature theory, but there is still a lack of qualitative evaluation. Therefore, they believe that we need to have a tool to evaluate students' learning outcomes, which can be helpful to students' learning .Learning diagnostic evaluation, formative evaluation and summative evaluation [2].Piaget believes that cognitive development is a process of construction, which is realized in the interaction between individual and environment.Children's cognitive development can be divided into four stages: perceptual motor stage (0-2 years old), pre operation stage (2-7 years old), and cognitive development stage.Piaget's theory of cognitive development stages includes concrete operation stage (7-11 years old) and formal operation stage (11-16 years old).Yajie believes that these four stages are stable and irreversible, that is, students only fully meet all the requirements of the previous stage.For example, if a child does not have the concept of conservation, then he can.In order to infer that he can not understand arithmetic operation, at this time, he should not be taught arithmetic.Considering the specific characteristics of the subject, it is difficult to apply to the subject curriculum. But Biggs and his colleagues are studying how children at different stages respond to different questions in different subjects.In fact, students' performance does not match Piaget's cognitive development theory.A child's answer in history class shows that he has reached the stage of concrete calculation, but his performance in mathematics class is not so good. In order to infer that he has reached the stage of formal operation,what is the cognitive development level of this child.Some students in the previous answer to the mathematical question has been shown in the specific operation stage, but after a few weeks to answer the same problem is shown in the pre operation stage.Based on this, Biggs and his colleagues believe that it should be based on students' thinking patterns when answering questions .Construction to determine the level of development of students, thus proposed solo classification theory.

2.1 Traditionalization of evaluation instruments

Evaluating students' academics is to enhance their subject competence, not to prove their learning outcomes. Evaluating students' academics in the form of open and closed papers or essays alone is not only not conducive to allowing freshmen to make the mental transition from secondary school to university, but also cuts the links between disciplines and fails to accurately measure the development of ability and literacy.

2.2. Unilinear evaluation subject

The evaluation model is based on top-down one-way linear qualitative evaluation. The teacher as the subject of evaluation is in a relatively antagonistic position with the students, the object of evaluation. Many front-line teachers mostly evaluate from the general characteristics of Chinese subjects, which lacks systematization and scientificity, lacking systematic and scientific nature, and lack of theoretical support in educational philosophy, psychological research, and practical implementation models. Although most higher vocational institutions have set up multiple evaluation subjects, such as teachers' participation, students' self-evaluation, students' mutual evaluation, teachers' and students' mutual evaluation, and supervisors' random evaluation, etc. The proportion of this part of evaluation results is small or even not counted in the final comprehensive evaluation. As the last link in the education chain, the singularity of evaluation subjects is very likely to point education and teaching in the wrong direction.

2.3. Evaluation criteria are difficult to operate

Although we have made regulations on the proportion of students' regular grades and final grades, there is no scientific and unified standard for the specific evaluation method of regular grades, which are often composed of attendance, regular homework, classroom performance and so on. In practice, teachers who teach College Chinese are responsible for teaching hundreds of students, and the task of keeping process information is large and tedious. It is not easy to keep a complete record, let alone to organize and study the scattered successful cases in time^[3]. Therefore, it is difficult to summarize the inner regularities and establish a proven academic assessment model. In contrast, most researchers are far away from front-line teaching, lacking a large number of actual cases,concrete implementation models and mostly analyzing successful cases.Therefore, they are unable to establish a typical evaluation model for verification and promotion,which leads to the arbitrariness, contingency and non-standardization of the evaluation model.

3 HOW TO OPTIMIZE AND MODEL THE ACADEMIC ASSESSMENT OF COLLEGE CHINESE

The development plan of China's higher vocational education clearly puts forward that “Reforming students' academic assessment and evaluation methods, carrying out innovative and entrepreneurial practical activities, combining the advantages of various assessment and evaluation styles such as traditional examinations, vocational skills appraisal, vocational skills competition.Learning process tracking feedback, and establishing a scientific and socialized evaluation system that meets the characteristics of higher vocational education professional talents cultivation and is oriented to learning ability, vocational ability and comprehensive quality. A scientific and socialized evaluation system

oriented to learning ability, vocational ability and comprehensive quality.’ The fundamental purpose of the integrated assessment model is not to diagnose or prove, nor just to let students master universal knowledge, ability and strategies of languages in isolation, but to improve, so that students can use languages to acquire comprehensive ability to solve practical problems in an integrated way, with emphasis on sustainable development. An improved evaluation model is established on the basis of the function of cultivating morality in the subject of Chinese at college. It will take into account the characteristics of students’ development condition at higher vocational college, that is, students’ independence and strong self-awareness. And it will help students establish correct self-evaluation awareness and self-cognition abilities, and achieve the ultimate ideal goal of free, comprehensive and harmonious development of students, through the diversification and interaction of the evaluation subject, as well as the introduction of certain social norms and ethics.”

3.1. Core Concept Definition

Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable. Abbreviated as “SOLO”, this taxonomy (Structure of the Observed Learning Outcome), meaning the structure of observed learning outcomes, was developed by J.B. Biggs, a professor at Newcastle University^[4]. It is a qualitative assessment method that defines student achievement by observing student learning outcomes characterized by a hierarchical description. Generally, students’ thinking is structured in five levels including pre-structure, single-point structure, multi-point structure, associative structure, and abstract extension structure. Figure 1 shows its five levels. SOLO classification theory suggests that when the knowledge students have learned accumulates to a certain amount, a qualitative transformation can occur to a higher level. This developmental assessment from quantitative to qualitative assessment enables the analyst to clearly observe the level at which the student’s thinking is located and make plans for the next stage of learning. The academic evaluation of Chinese is a value assessment for students’ verbal practice ability to understand and use language in specific language situations. It systematically collects data and information in accordance with the curriculum objectives, using various methods of measurement and non-measurement to conduct value analysis and assessment on the development and changes of students in the process of language learning and various elements that affect their development and changes, providing a basis for educational decision-making of the education of Chinese. The purpose of academic evaluation of Chinese is to promote the overall development of students. Specifically, it is to confirm the progress of students in language learning practice and their levels of language through evaluation, to diagnose

students’ problems in language learning, and to promote teachers’ and students’ reflections as well as students’ development.

Figure 1. Solo classification theory divides five structural levels

3.2. Establishment of evaluation index system

Based on SOLO taxonomy, integrating the advantages of traditional assessment and COMET evaluation combined with the characteristics of language subjects. The evaluation system should not only take into account the three-dimensional objectives, task and problem-oriented, in line with the dual needs of higher education institutions to focus on students’ quality improvement and job competence, but also constructs a diversified developmental evaluation criteria. For the core essence and characteristics of the model, this paper proposes a detailed and systematic stage evaluation framework and participants. For example, the evaluation content can add evaluation questions such as graphical questions, text reconstruction questions and task execution, etc., and simulate the site to generate specific simulation problems to test students’ thinking and language ability to solve actual complex problems. The evaluation model can set progressive level 1 indicators such as “Chinese+Professions”, “Chinese+Society” and “Chinese+Information” according to the development stage of ability, and the essence of each indicator is interconnected. Under the primary indicators, secondary and tertiary subsystems are proposed, which focus on the cumulative evaluation of weight. The establishment of the mode of academic evaluation is to intensively display the establishment of values of the academic learning. Professor Feng Ping believes that evaluation is a cognitive activity of human beings. It aims at grasping the meaning or value of the world, not revealing what the world is, but what the world means to people, and what is the significance. Borrowing the views of Professor Feng Ping into the academic evaluation modeling, our model is to show current stage and value orientation of the academic work, and to reveal the existence of the value of students’ learning results. When modeling the academy of Chinese, the fundamental starting point should be not to harm the legitimate rights and interests of students; the evaluation content should be designed based on the student’s current stage, original experience and cognitive background; it is necessary to take into account the students’ self-use and self-worth evaluation in the

process of establishing the evaluation scale; when determining the scope of the target, it is necessary to negotiate with the students.

3.3. Equations“Chinese+Professions”

This index is based on the content of College Chinese learning, but not limited to the language subject itself. This evaluation model integrates relevant educational contents, takes real problems as the guide, and uses the work demonstration as the teaching results to drive the educational teaching activities, so that the basic courses can blossom in the professional field, and forms the first-level evaluation index.

3.4.“Language + Society” evaluation index”

This indicator is to guide language learning to be deeply linked with life and social hotspots, and to guide students' language learning to return to society from book learning in secondary schools. With practical activities as the main learning carrier and relying on the community and related units, we should create an integrated evaluation system of campus-community-job, establish two or three levels of sub-systems such as learning interest, attitude, collaborative ability and adaptability to social needs to promote the testing of learning results^[5], let the mainstream social values guide the motivation and direction of learning, and move from campus subject evaluation to practical evaluation.

3.5. “Chinese+Society’evaluation index”

This index organically links language and modern technology, relying on big data and artificial intelligence, and establishes an informatized classroom, with no limitation of territory, space and time. Teachers and students participate in the evaluation, and establish secondary evaluation indexes in four dimensions, reaction, behavior, learning and results, so as to rationalize and effectively use the evaluation of teaching resources. Under the long-term influence of the notion that “language is a tool for communicating ideas”, the nature of the Chinese curriculum is positioned as ‘basic instrumentality’, while ignoring the activities of students' language. The result is that books are seriously out of touch with practice, and students lack the opportunity to experience and understand.

4 CONCLUSION

Through the above methods, we integrate a variety of evaluation methods, such as diagnostic evaluation, formative evaluation and summative evaluation, establish a comprehensive and systematic graded evaluation scale. Combining classroom and practice, creating authentic language learning situations and assign learning tasks, which changes students' learning styles and teachers' teaching evaluation methods. It enables teachers to incorporate talent training goals into the evaluation system in the selection of evaluation indicators, and link

the previous evaluation micro-circle with the national talent training goals, so as to solve the surface symptoms and the root causes.

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