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Students' Ability Evaluation Structure Model of Local Finance and Economic Universities

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Abstract

The students' ability evaluation of local finance and economic universities is conducive to the cultivation of talents, and to promote local economic development. In order to objectively evaluate the students' ability of local finance and economic universities, this paper divides the ability of college students into three dimensions, including basic quality and ability, professional competence, the ability of innovation and practice. This paper builds the students' ability evaluation indicator system of local finance and economic universities, and designs evaluation indicator system scale tables. Collecting data from high school students, teachers and the employers through paper questionnaires and web-based survey, this paper uses principal component analysis to extract ability factors, and establishes the students' ability evaluation structure model of local finance and economic universities. This study provides a theoretical reference for the objective evaluation of students' ability and training students' ability purposefully.

Key words: Local finance and economic universities; Ability evaluation; Structural model; Principal component analysis

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INTRODUCTION

With higher education of our country from the elite education into the popular stage, the increasing number of university graduates has become an indisputable fact. Facing the current employment situation and employment, compared with students of key finance and economic universities, students of local finance and economic universities face the more pressure of employment and personal development. As an important base where they cultivate talents for society, local finance and economic universities should pay more attention to the cultivation of their students' abilities. It is an important topic for local finance and economic universities which need to make further study that how to make the students to adapt the society and enhance the comprehensive quality. To cultivate and improve the students' comprehensive quality, the first thing is that universities must build a scientific and reasonable ability evaluation model which can evaluate the ability of university students, so as to objectively evaluate the students' ability of local finance and economic universities. Therefore, studying on the university students' ability evaluation structure model is beneficial to evaluate university students' ability, help local finance and economic university to better train and upgrade university students' ability.

The main purpose of this paper is to build a scientific and reasonable ability evaluation model of local finance and economic university students on the basis of the previous studies that domestic and foreign scholars used the evaluation methods of the university students' ability and marked related research, so that we can use it to better evaluate the students' ability of local finance and economic university. Different form existing studies, firstly, based on the questionnaire rationality of the relevant experts, this paper modify the questionnaire several times, and formed the ability evaluation scale of local finance and economic university students eventually.

We select upperclassmen, teachers of local finance and economic universities and employers who always mainly employ local finance and economic university graduates as the three class respondents in this model. The choice of these three class respondents as the main respondents made this model practical significance. Secondly, in this paper, we obtained data through the open questionnaire investigation, used the principal component analysis to extract ability factors, and on this basis, we build the students' ability evaluation structure model of local finance and economic university.

This paper is organized as follows: the second part is the literature review, in which we review existing researches on the construction, the evaluation indicators and methods of the ability; the third part is the research procedure, in which we introduce the design principles, the analysis model and the indicator factors analysis; the fourth part is the construction of this model, in which we design questionnaires of the ability evaluation indicator system, and obtain data through paper investigations and web-based investigations. Then we use the principal component analysis method to extract ability factors, build the students' ability evaluation structure model of local finance and economic university; the fifth part is the conclusions.

1. LITERATURE REVIEW

Lots of scholars researched the construction of the ability and the ability evaluation methods very early, conducted some in-depth discussion and had very abundant research results. The research results of the ability focused on two factors of the ability theory, multiple factors of the ability structure theory and intelligence hierarchy theory (Xu Ping, 2006). British psychologist Spearman used the factor analysis method, proposed the two-factor theory in which he thought that the ability includes general and special factors; general factors are common to each type of mental activities, special factors are different, which refer to the special field knowledge. An American psychologist Thurstone proposed multi-factor theory in which he thought human ability is composed of computing power, verbal comprehension, fluent word, memory, deductive reasoning, spatial perception ability and speed of perceived competence. American psychologist Guilford proposed the mental three-dimensional structure theory in which he thought intelligence structures should be considered from three dimensions: operation, content, product. American psychologist Vernon's intelligence hierarchy theory deepened Spearman's two-factor theory. Koljatic and Kuh (2001) used the questionnaires, multiple regression, and effect analysis to evaluate students' self-learning ability. Weiss (2002) made a detailed introduces for the American students' learning ability from the evaluation aims, the evaluation background and the evaluation specific content. Mignani (2005) used the item response theory model to evaluate students' learning ability of computer science, and did the classification of students according to the ability students had reached. Matteucci and Stracqualursi (2010) used Graded Response Model (GRM) to analyze statistical students' learning ability to provide a simple description of the students' learning ability distribution. Steenhuis (2011) used the simulation method to evaluate the ability of students, and the simulation results showed that the simulation method can effectively evaluate the students' learning ability. Yang (2013) collected chemistry experiment ability assessment problems from 22 chemistry teachers and 2 chemistry professors, finally got 60 problems, and investigated the freshman of Taiwan Technical University to evaluate the freshman' chemical experimental ability. Results showed that the freshman' chemical experimental ability was very weak in some areas.

Scholars also had some beneficial research on the competence, evaluation indicator and evaluation methods. Zhang Xiangdong et al. (2009) analyzed the impact to students ability structure of college enrollment, and analysis results showed that students ability after enrollment should include: the self-learning ability, adaptability, practical ability, team work ability, communication, expression ability and creating ability. Zhu Anhong et al. (2009) used analytic hierarchy process, fuzzy membership function and linear function to establish a comprehensive evaluation model of college students during the new period. Gao Yongxia et al. (2010) used the principal component analysis to extract the university students' comprehensive quality indicators, and built a university students' comprehensive quality theory evaluation model. The results showed that this model can evaluated the students' ability comprehensively. Yang Yu (2011) constructed a set of students' ability and quality evaluation system from the perspective of technological innovation, and put forward the implementation measures of the evaluation system. Zheng Tianchi (2011) used statistical methods to study the evaluation methods of university students' employment ability, and he thought that the employment ability of university graduates should include knowledge integration ability, social and interpersonal skills, psychological adjustment ability, application ability, team cooperation ability and practical ability. Zheng Chunsheng (2012) investigated 17 ability of 175 College Students of 31 provinces (city, area): art, computer, organization and leadership, Chinese writing, oral expression, interpersonal (communication, cooperation), creativity, physical fitness, English listening, English reading, mathematical logic, analysis, critical thinking, the ability of visual space, self-awareness and self-examination, observation, emotional management. He used T-test method to analyze the differences in these abilities between urban and rural students.

From above scholars' studies, we can see the scholars have deeply studied on the ability, ability evaluation indicator and evaluation method. However, most existing studies are qualitative research, quantitative research is less. There is lack of research on the ability evaluation structure model of local finance and economic university students. At the same time, compared with normal universities, local financial and economic universities have special characters. Therefore, in order to objectively evaluate the ability of local finance and economic university students, this paper establishes the ability indicator system, collects data through questionnaire, uses principal component analysis method to extract ability factors, and eventually build a scientific and reasonable ability evaluation structure model to evaluate local finance and economic university students' ability.

2. ABILITY EVALUATION INDICATOR SYSTEM RESEARCH

2.1 Design Principles of the Ability Evaluation Indicator System

As the core foundation of the evaluation of local finance and economic university students' ability, every indicator of the ability evaluation indicator system needs to be decomposed according to training students' ability and quality targets of local finance and economic universities. Every indicator can reflect the overall situation of research objectives from two aspects of quality and quantity. At the same time, these quantitative indicators would be specific and measurable. This ensures that the system is more scientific and feasible.

This paper adopts a method of combination of qualitative and quantitative analysis to select each indicator. When we chose these indicators, we must follow representative, hierarchy, independence, feasibility and comprehensive principles.

Representative principle: these ability evaluation indicators should be representative, and could reflect some representative ability of local Finance and Economic university students.

Hierarchy principle: these indicators should be a kind of hierarchy, so as to reflect the different ability of those students.

Independence principle: these indicators we chose would not have the cross relation, but independent of each other, in order to avoid the interaction among evaluation indicators.

Feasibility principle: the meaning of these indicators must be clear; the data of these indicators that we need to calculate are easily collected; the calculation methods should be simple, feasible and easy to be mastered.

Comprehensive principle: the design of these indicators should reflect overall situations of local finance and economic university students' ability, so as to ensure the comprehensive ability and reliability

Selection principles mode of the ability evaluation indicator system are as shown in Figure 1.

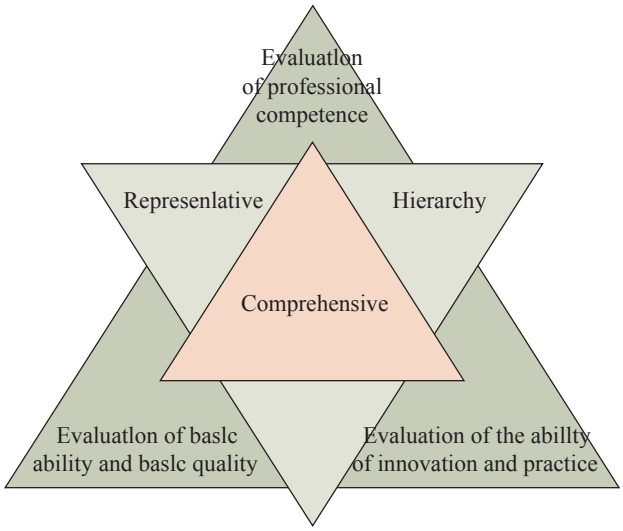

Figure 1
Principles Mode of the Ability Evaluation Indicator System

2.2 Indicator Factors of the Ability Evaluation Indicator System's Analysis Model

According to the above five design principles, based on the three basic elements of university students' basic quality and ability, professional ability, practice and innovation ability, we select upperclassmen, teachers of local finance and economic universities and employers who mainly employ local finance and economic university graduates as the three class research respondents in this model. Upperclassmen have a good understanding and practical experience of their professional knowledge and ability through their study and work in the universities. Teachers have a clear grasp of university students' knowledge and ability. Employers can provide the demand of local finance and economics college students' ability. On the basis of these, we can learn the importance of the ability requirements from different aspects, so that we could be easy to find out the diversity of results. Through the analysis of the three types of questionnaire results, we extract the key indicators about ability training and development for students, and then, on the basis of differences among the evaluation indicators, analyze quantitative distribution of their importance from different aspect in the system, so as to determine the weight of each indicator. The analysis model is as shown in Figure 2:

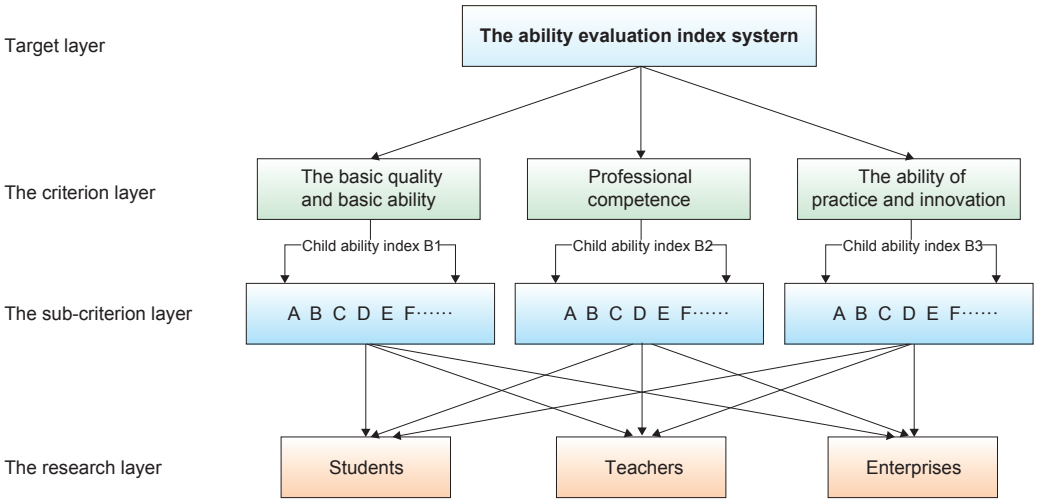

Figure 2
The Analysis Model of the Ability Evaluation Indicator System

2.3 Analysis of the Ability Evaluation Indicator System's Indicator Factors

University students' ability and quality is a comprehensive reflection of many indicators. From the compositions of the ability structure, different researchers have different opinions, which is the same as the previous analysis. British psychologist Spearman used the factor analysis method to propose the two-factor theory of the ability structure; American psychologist Thurstone proposed the multi-factors theory that mental activities are composed of a number of unrelated factors or the original raw ability, and that human ability is composed of the computing power, verbal comprehension, fluent word, memory, deductive reasoning, spatial perception ability and speed of perceived competence. American psychologist Vernon proposed the intelligence hierarchy theory. Based on these research results, this study analyses and researches evaluation indicators of university students' ability from all levels. Combined with the relevant definitions of university students' ability and the needs of personnel training development in today's society, we research the ability students from the perspective of teachers, students, society and seek related experts' advice to build three evaluation modules, which cover the contents of three aspects, amount to 22 of second-level evaluation indicators according to the five principles. These indicators are shown in Table1:

Table 1
Ability Evaluation Indicator System

	First-level indicators	Second-level indicators
Ability evaluation indicator system	Basic quality and basic ability B1	Comprehensive communicative ability (C11), Psychological adjustment ability (C12), Math proficiency ability (C13), Economic and legal thinking ability (C14), Computer skills (C15), Humanities and scientific accomplishment (C16), Physical quality (C17), Ideological and political quality and legal quality (C18)
	Professional ability B2	Ability to grasp knowledge (C21), Ability to use professional tools (C22), Professional research ability (C23), Professional exploration ability (C24), Professional innovation ability (C25), Professional orientation ability (C26)
	Innovations and practical ability B3	Interpersonal communication ability (C31), Adaptability (C32), Application ability (C33), Decision-making ability (C34), Innovation and lifelong learning ability (C35), Teamwork (C36), Organization and management capacity (C37), Critical thinking ability (C38)

3. CONSTRUCTION OF THE LOCAL FINANCE AND ECONOMIC UNIVERSITY STUDENTS' ABILITY EVALUATION MODEL

3.1 Design and Implement of Ability Evaluation Indicator System Scale Tables

By reading the relevant literatures and research results, we deeply understand local finance and economic university students' actual situations. According to the elements of the ability evaluation indicator system, we design three scale tables: students ability training (SA), major surveys on teachers' ability and quality (TAI) and the request of enterprise to university students' ability (UAI).

The scale tables are used Likert 5 point scoring system to score, in which "1" represents incompatible completely and "5" stands for compliance fully. The SA scale table has five measurement items. The TAI scale table and the UAI scale table have three measurement items. The measurement theory conceptual model is shown in Figure 3:

Before the formal investigation, we select local financial and economic university students to do random pre-test questionnaires and investigate some related questions of the questionnaires when they are completed. From results, no new indicators are found and the questionnaire content is easy to understand. At the same time, we invite related experts to discuss and amend topics to ensure that the questionnaire has good content validity and eventually design the 25 items' questionnaires.

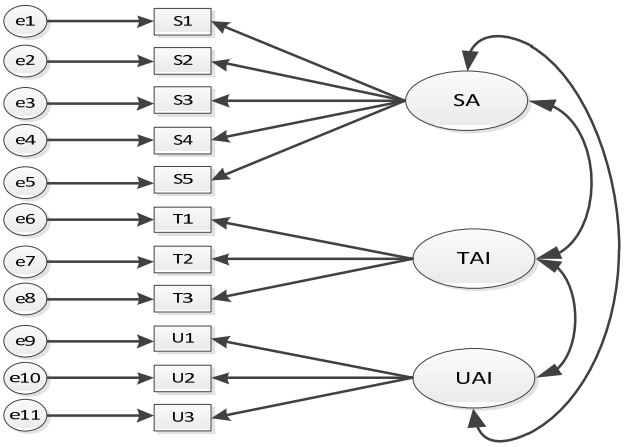

Figure 3
Measurement Theoretical Concept Model Diagram

The survey used two ways: paper survey and web-based survey. This paper makes upperclassmen, professors, career guidance teachers of local finance and economic universities, and employers for investigation. The survey obtains a total of 2043 questionnaires, including 1139 copies of valid questionnaires, and the rate of effective questionnaires was 55.8%. These specific surveys and statistics are given in Table 2.

Table 2
Questionnaires and Statistics

Types of survey	Methods of survey	Questionnaire amounts	Valid questionnaires	Effective rate (%)	Proportion of male (%)	Illustration of the survey
Paper survey	Paper questionnaire	1057	699	66%	48	From the local finance and economic university students
Web-based survey	Invitation survey	986	440	45%	54	The questionnaire website of independent design (http://www.210.40.86.251 /)is the platform of this survey

3.2 Test to Questionnaires of Ability Evaluation Indicator System

3.2.1 Structural Validity Test of Questionnaires

By the statistical software SPSS16.0 to do factor analysis, we use KMO and Bartlett to analyze the 33 official forecast topics. This analysis results show KMO = 0.917. According to Kaiser's view, it belongs to the good class that KMO>0.8. Bartlett' test results show that the sphericity test value is 4.470E+3, SIG = 0.000 <0.01. This indicates the questionnaires' data are suitable for factor analysis.

According to Kaiser's criterion, we use principal component analysis to extract factors, and determine the number of valid factors according to the scree plot of common factors. The scree plot of common factors is shown in Figure 4. From Figure 4, eigenvalues of three front common factors have changed very obviously. After the fourth eigenvalue of common factors, the eigenvalues tend to stabilize. Therefore, it is appropriate that the evaluation structure model retains three factors.

We use three factors to analyze the scales. The results show that the explained variance of three factors' eigenvalues is 48.321%. From rotated component matrix, there is a big cross on the load in the two above factors of some of the items. We delete them, and do the second factor analysis. Among them, the "professional innovation" has an extremely accessible from the load of the factor 1 and factor 3 (0.448 and 0.445, respectively). So these two topics were deleted. We do the third factor analysis for the remained 22 of the items, and obtain the load factor matrix, as shown in Table 3:

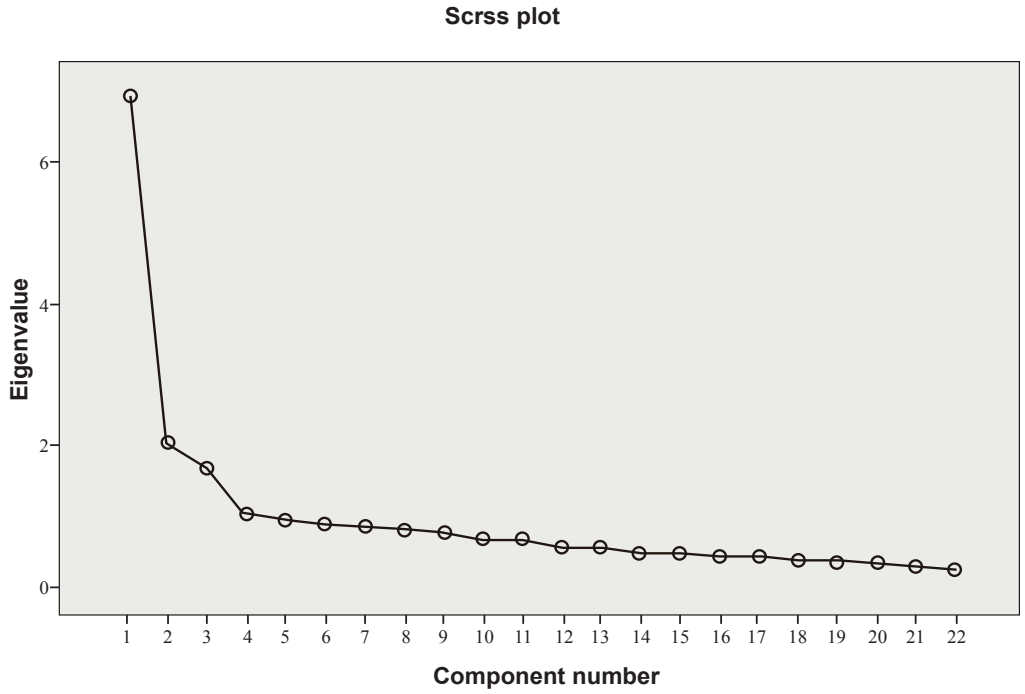

Figure 4
The Gravel Common Factors Plot

Table 3
Rotated Component Matrix

	1	2	3
Comprehensive communicative ability	0.639		
Psychological adjustment ability	0.662		
Mathematics application ability	0.599		
Economic and legal thinking ability	0.539		
Computer skills	0.609		
Humanities and scientific accomplishment	0.612		
Physical quality	0.595		
Ideological and political quality and legal quality	0.568		
Ability to grasp knowledge		0.668	
Ability to use professional tools		0.648	
Professional research ability		0.568	
Professional exploration ability		0.632	
Professional orientation ability		0.609	
Interpersonal communicative ability			0.679
Adaptability			0.654
Application ability			0.609
Decision-making ability			0.643
Innovation and lifelong learning ability			0.651
Team work ability			0.612
Organization and management ability			0.623
Critical thinking ability			0.679
Characteristic root	5.492	2.103	1.749
The factor loading amount	24.083	29.486	38.941

Note: The extraction method: principle component analysis

3.2.2 Test of Questionnaires' Reliability

By using SPSS16.0 statistical software to analyze the questionnaire' reliability, we find out the questionnaires' reliability Cronbach α equals 0.840. At the same time, we divide the data into two pairs, we obtain the comprehensive analysis results that Spearman-Brown' reliability is 0.736, which indicates the questionnaires have good reliability.

3.3 Construction of University Students' Ability Evaluation Structural Model

According to the results of factor analysis, we select the basic quality and basic ability, professional competence, innovation and practical ability as internal variables, covering a total of 21 variables. These three factors are used to build the evaluation structure model of local finance and economic university students. The evaluation structure model is shown in Figure 5:

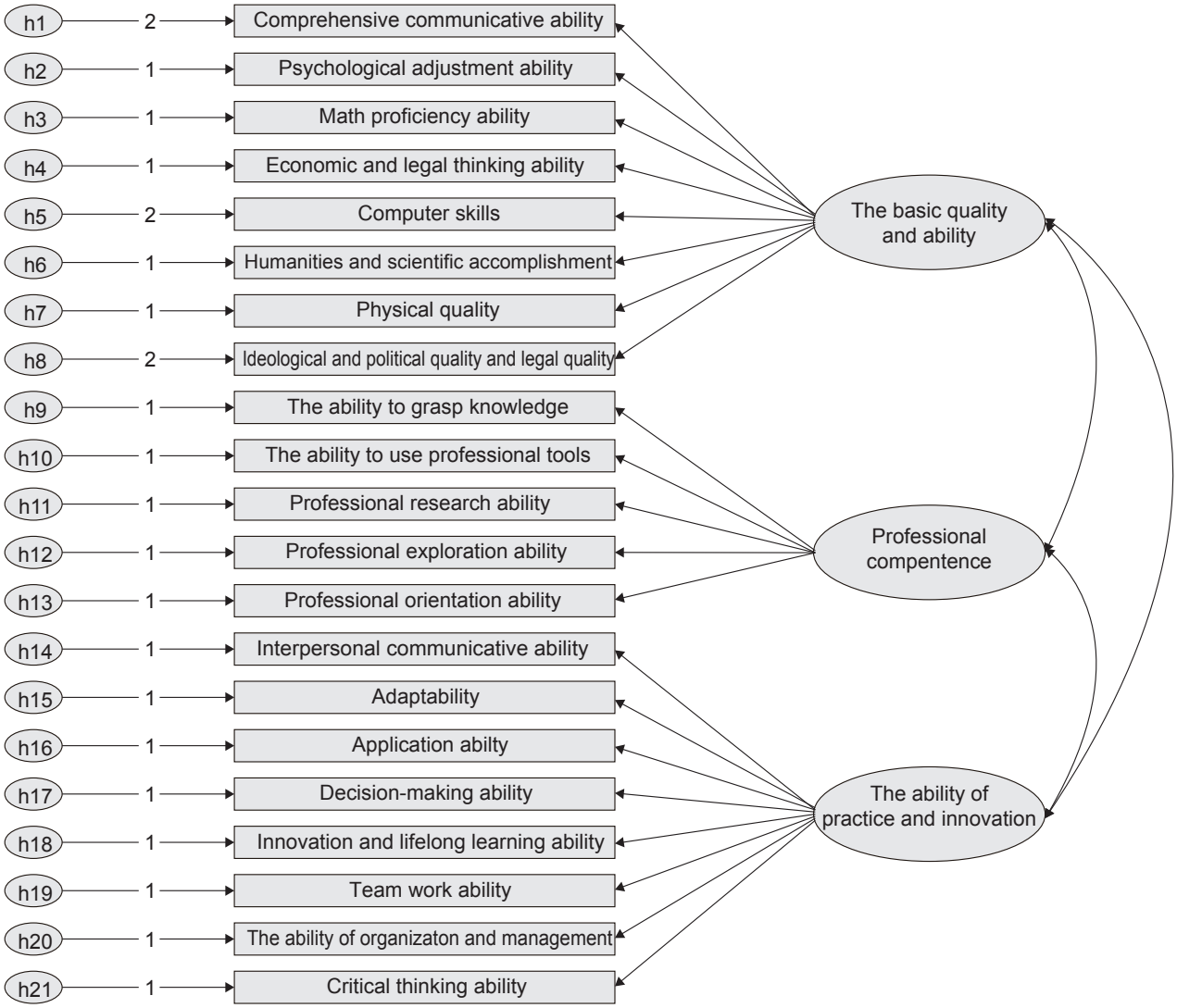

Figure 5
Ability Evaluation Structural Model

CONCLUSION

Based on existing research results, we analyze the ability indicator system elements of local finance and economic university students. This paper builds the ability evaluation indicator system of local finance and economic university students from the three dimensions: the basic ability and basic qualities, professional competence, innovation and practical ability, and design scale tables. We obtain data through paper investigations and network investigations. This paper uses principal component analysis to extract ability factors, and eventually builds the ability evaluation structural model of local finance and economic university students. On one hand, the model can guide students initiatively to improve their own ability, and to promote their continuous self-improvement. The evaluation results are valid judgment

valuable reference information from which the social and enterprise can learn about students' comprehensive ability and quality. On the other hand, universities can find the deficiencies in teaching from the evaluation results to improve the quality of teaching. Therefore, this model has important practical significance for the talents' cultivation of local finance and economic universities.

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