Using Origin Correlation Analysis to Study the Training Mode of Applied Talents Under the Background of "New Engineering"

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Abstract. With the continuous development of the information age, higher requirements are put forward for talent training. In order to better meet the development needs of the times, this paper takes the talent training of Application-oriented Undergraduate Colleges as the research theme, tests the effectiveness of the research data of the questionnaire, and establishes a data fusion innovation ability model for empirical analysis. This paper analyzes the four key abilities of independent learning, engineering practice, integrated innovation and green development required by the new generation of information technology industry, and clarifies the problems and challenges faced by talent training. Through the correlation analysis and regression analysis of Origin software, the following research conclusions are obtained: the correlation coefficient between autonomous learning ability and professional ability is 0.075, which is significant at the 10% significance level, indicating that there is a significant positive correlation between autonomous learning ability and professional ability. Therefore, under the background of "new engineering", we should formulate a more scientific and reasonable plan from the aspects of students' autonomous learning ability and innovation ability. Cultivating high-level information technology talents needs to master the necessary information ability.

Keywords: New engineering · Undergraduate colleges · Applied technology · Information science · Talent training model

1 Introduction

At present, China has a place in the field of global new generation information technology, and the industrial scale and volume are leading in the world. There is still a lot of room to transform the traditional economy and cultivate and expand the new driving force of digital economy by using information technology [8]. The development of new generation information technology should accelerate the transformation from large to strong. Technological progress and industrial development have triggered a large demand for compound talents. With the accelerated and in-depth integration of the new generation of information technology and economic and social development, new

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technologies, new products, new business forms and new models continue to emerge, and the supply of compound talents is in short supply [3]. Applied undergraduate colleges and universities are the main body of the cultivation and supply of compound talents and bear the burden of the cultivation of compound talents. It is both important and urgent for Application-oriented Undergraduate Colleges and universities to cultivate compound technical talents to meet the urgent needs of the sustainable development of the new generation of information technology industry [1].

2 The Ability Model of the New Generation of Information Technology Compound Talents

Compound talents refer to talents with basic knowledge and basic abilities in two or more majors or disciplines. The new round of scientific and technological revolution and industrial transformation represented by the new generation of information technology will profoundly change the world development pattern and bring about "great changes not seen in a century". The new generation of information technology has the characteristics of digitization, networking, intelligence, integration, security and green. Under the background of accelerating the integration of the new generation of information technology and the real economy, the new economy characterized by new technologies, new industries, new formats and new models calls for new talents, which requires compound talents to have the ability of independent learning, engineering practice, integration and innovation and green development [4].

2.1 Autonomous Learning Ability

Autonomous learning ability is the ability of taking learners as the main body to continuously improve and sublimate their knowledge and skills, emotion and value through learning, analysis, exploration, practice and creation. Since entering the 21st century, the interdisciplinary integration has accelerated, emerging disciplines have emerged, and frontier fields have been extended. In the context of the new global trend, the new generation of information technology, as the key field of competitive development of countries all over the world, has the characteristics of intensive knowledge and technology, active innovation and strong permeability [5]. It plays an important leading role in economic, scientific, technological and social development. 5g, industrial Internet, big data, Internet of things, artificial intelligence and other technologies are accelerating the iterative evolution along the direction of vertical deepening and integration, which requires the new generation of information technology compound talents to have the necessary professional basic knowledge and independent learning ability, so as to better adapt to the rapid changes of society and the needs of individual all-round development and realize their own sustainable development.

2.2 Engineering Practice Ability

Engineering practice ability is the ability to use engineering thinking, apply the learned knowledge to design, manufacturing, test, operation, management or other engineering

practice links, and solve practical engineering problems. The new generation of information technology industry is a technology driven industry. It has the characteristics of subverting the traditional manufacturing mode, production organization mode and industrial form and deeply enabling the real economy [6]. The characteristics of the new generation of information technology itself and the breadth and depth of its application make it have strong "Engineering" characteristics. This puts forward higher requirements for the engineering professional ethics, engineering thinking ability, engineering practice ability, teamwork and communication ability, understanding and adaptability to the enterprise and social environment that the new generation of information technology compound talents should have to complete engineering activities.

2.3 Integrated Innovation Capability

Integrated innovation ability is the ability to integrate knowledge and technology in different fields and continuously provide new ideas, theories, methods and inventions in technology and various practical activities. At present, a large number of emerging industrial clusters with interdisciplinary background are emerging. The new generation of information technology is in the era of integrated innovation and disruptive innovation [2]. The main thing is the comprehensive integration with major industries such as industry, agriculture, finance and service industry. Innovation is the sustainable driving force of economic development, and integration is the inevitable trend of industrial development, which requires the new generation of information technology compound talents to have innovation consciousness and integration innovation ability.

2.4 Green Development Capability

Green development ability is the ability to have the concept of green development and support and promote the coordinated development of sustainable economy, society and ecological environment in social practice. Scientific and technological innovation is an important driving force to promote the progress of human civilization. In accordance with the requirements of green, recycling and low-carbon, using new generation information technologies such as big data, cloud computing and artificial intelligence to improve the process, process reengineering and management optimization of traditional industries, reduce the economic and ecological costs of production and marketing, and promote the greening of production, manufacturing, management and service methods, which will effectively improve the quality and efficiency of economic development, Promote the transformation and upgrading of traditional industries and the high-quality development of strategic emerging industries to achieve green and sustainable development [10]. Finally, a new engineering talent training mode in line with the training goal of certified talents in engineering education of new engineering is realized.

3 Problems and Challenges Faced by the Training of New Generation Information Technology Talents

As of 2014, the number of students enrolled in higher engineering education in my country has ranked first in the world, accounting for 38.2% of the total number of

undergraduate and junior college students in the country, and it has become a veritable engineering education power. And no more than 20% meet the requirements of the new engineering education professional certification. Innovation and application have always been the two focal points of talent training in applied technology-based undergraduate colleges. However, judging from the current actual situation, there are certain problems at all levels of talent training [9].

Traditional engineering education usually focuses on exam-oriented education, focusing on theory but not practice, paying too much attention to the professionalization and systemization of knowledge, while ignoring and fragmenting the engineering itself. Students generally lack the quality to transform knowledge into abilities, and lack the necessary engineering awareness and systematic thinking. High-level and complex engineering problems are difficult to tackle, resulting in defects in students' comprehensive quality and knowledge structure, the disconnection between school training and social needs, and the mismatch between the supply side and the demand side.

Applied technology colleges and universities should combine their disciplines, the regional economic development goals, and the overall national strategic needs to create disciplines with their own characteristics and conform to the local regional economic development of the colleges and universities, and set a vane for future talent training and technological innovation. The determination of the talent training model should be an all-round, balanced, deep-rooted and implementable development. Finally, through transformation and development, the school-running ideas should be truly transferred to service, support for regional economic development, and transformation, to school-government cooperation, school-enterprise cooperation, and school-enterprise cooperation. Cooperation and integration of production and education will shift to the cultivation of high-level applied technology talents, and shift to the enhancement of students' learning ability, innovation and innovation ability, and employment advantages, Cultivate diversified and innovative high-level application talents in new engineering disciplines that meet the professional certification of engineering education [7].

4 Empirical Analysis

4.1 Data Collection

The research data of this paper comes from the questionnaire survey. A total of 800 questionnaires were distributed in this questionnaire survey, including 400 questionnaires for teachers and 400 questionnaires for students. After the questionnaire was distributed, it was filled in anonymously, so that the answers to the questionnaire can express the real thoughts of students and teachers. In the process of sorting out the questionnaire, the incomplete questionnaire was discarded. After statistics, 785 valid questionnaires were obtained after eliminating the waste volume, and the effective rate of the questionnaire was 98.1%. In order to ensure the reliability of the research conclusion, the validity of the research data is tested. Table 1 shows that the overall kmo value of the questionnaire is 0.850, and the significance of Bartlett spherical test is 0.000. In terms of key abilities, Cronbach's alpha coefficient of autonomous learning ability is 0.793 and single factor load is 0.835; Cronbach's alpha coefficient of engineering practice ability is 0.754 and single factor load is 0.703; Cronbach's alpha coefficient integrating innovation ability is

Table 1. Data Validity Test

Key capabilities	Cronbach's Alpha	Single factor load	KMO	Bartlett
Autonomous Learning Ability	0.793	0.835	0.850	0.000
Engineering practice ability	0.754	0.703		
Integrated innovation capability	0.911	0.811		
Green development capability	0.704	0.773		

0.911 and single factor load is 0.811; The Cronbach's alpha coefficient of green development ability is 0.704 and the single factor load is 0.773. The research data has passed the reliability and validity test, which is scientific and reliable.

4.2 Correlation Analysis

Build a talent training matrix to verify the correlation between the talent training objectives and the above. It can be seen from Table 2 that the correlation coefficient between autonomous learning ability and professional ability is 0.075, which is significant at the 10% significance level, indicating that there is a significant positive correlation between autonomous learning ability and professional ability; The correlation coefficient between engineering practice ability and professional ability is 0.011, which is significant at the 1% significance level, indicating that there is a significant positive correlation between engineering practice ability and professional ability; The correlation coefficient between integrated innovation ability and professional ability is 0.022, which is significant at the 10% significance level, indicating that there is a significant positive correlation between integrated innovation ability and professional ability; The correlation coefficient between green development ability and professional ability is 0.011, which is significant at the 5% significance level, indicating that there is a significant positive correlation between green development ability and professional ability.

4.3 Regression Analysis

In the ability model, different influencing factors have different effects on professional ability. Therefore, further regression analysis is carried out to judge the effect of influencing factors. It can be seen from Table 3 that the regression coefficient of variable autonomous learning ability is 0.111, which is significant at the 10% significance level, indicating that autonomous learning ability can significantly promote professional ability; The regression coefficient of variable engineering practice ability is 0.122, which is significant at 1% significance level, indicating that engineering practice ability can significantly promote professional ability; The regression coefficient of variable fusion innovation ability is 0.355, which is significant at the l% significance level, indicating

Table 2. Correlation analysis results

Key capabilities	Professional ability	Autonomous Learning Ability	Engineering practice ability	Integrated innovation capability	Green development capability
Professional Ability	1				
Autonomous Learning Ability	0.075*	1			
Engineering Practice ability	0.011***	0.075	1		
Integrated innovation capability	0.022*	0.094	0.037	1	
Green development capability	0.011*	0.076*	0.059	0.074	1

Note: ***, **, * respectively indicate significant at the level of 1%, 5% and 10%.

that fusion innovation ability can significantly promote professional ability; The regression coefficient of variable green development ability is 0.101, which is significant at the 1% significance level, indicating that green development ability can significantly promote professional ability.

According to the regression results, in the capability model, the ability of integrated innovation has the greatest impact on the professional ability of applied technology talents, which shows that in the information age, applied technology talents need to master the necessary information ability. As the foundation of applied technical talents, engineering practice ability also plays an important role in the ability model. Autonomous learning ability and green development ability have equal influence, and enough attention should be paid to talent training.

5 The Construction Path of the Training Mode of the New Generation of Information Technology Talents

The goal of talent training in Local Applied Undergraduate Colleges in China should be guided by the development of socialist market economy with Chinese characteristics, so as to improve the integration of talent training and social and economic development, and promote the employment rate of applied talents. Therefore, colleges and universities should deeply analyze the current situation of social and economic development, combined with the situation of talent training, accurately locate the training objectives of Applied Talents under the call of national policies, and further optimize the training mode of Applied Talents under the guidance of the training objectives. At the

Table 3. Analysis of regression results

Variable	Non standardized coefficient		Standardization coefficient	t	Significance
	B	Standard error	Beta		
Constant	0.833***	0.266		3.166	0.002
Autonomous Learning Ability	0.111*	0.055	0.122	1.869	0.063
Engineering practice ability	0.122***	0.064	0.198	2.825	0.005
Integrated innovation capability	0.355***	0.067	0.355	5.106	0.000
Green development capability	0.101***	0.077	0.109	8.477	0.000

Note: ***, **, * respectively indicate significant at the level of 1%, 5% and 10%.

same time, when positioning the talent training objectives, Local Application-oriented Colleges and universities should not only pay attention to the training of professional skills of application-oriented talents, but also pay attention to the systematic learning of their professional theoretical knowledge, so as to distinguish them from the educational objectives of academic colleges and vocational colleges, and clarify the characteristics of talent training in Application-oriented Colleges and universities.

With the goal of cultivating diversified and innovative excellent engineers who meet the professional certification of new engineering: engineering education, we will ensure the realization of the training goal by establishing a new engineering education concept, innovating the teaching organization of engineering education, improving the multi-agent collaborative education mechanism and strengthening teachers' engineering practice ability; Through the implementation of eight constructions: discipline construction, professional construction, teacher team construction, curriculum system construction, innovation and entrepreneurship base construction, multi-agent collaborative education mechanism construction, multi-functional practice platform construction and quality assurance system construction, the completion of the four linkage is guaranteed.

6 Conclusion

A new round of scientific and technological revolution and industrial reform represented by the new generation of information technology is in the ascendant, and technological innovation and industrial development have made continuous breakthroughs, which puts forward new requirements and challenges for the cultivation of compound talents. As the main body of the training of compound technical and skilled talents, there are still some urgent problems to be solved in the training mode of new generation information technology talents. The quantity, structure and quality of talents can not effectively meet the needs of industrial transformation and upgrading and high-quality development.

Socialism with Chinese characteristics has entered a new era and a new historical development stage of China's higher education. The cultivation of applied talents is not only the demand of social economy and scientific and technological development, but also the necessity of educational development. Application-oriented Undergraduate Colleges and universities should take the initiative to meet the challenges of the diversified needs of talents in the new era, actively adapt to the national development strategy and industrial development needs, clarify their own positioning and school running characteristics, strengthen the construction of practical courses, highlight the links of practical education, cultivate students' innovative literacy, and strengthen the construction of teaching staff.

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References

1. Chen Hui, Chen Min. Thoughts and explorations on cultivating new engineering talents in comprehensive universities[J]. Research in Higher Engineering Education, 2017(2).
2. General Office of the State Council. Several Opinions of the General Office of the State Council on Deepening the Integration of Industry and Education [Z]. Beijing: Issued by the State Council, 2017.
3. Gu Peihua, Li Shengping, Shen Minfen, Lu Xiaohua, fan Yinghui. Design oriented eip-cdio innovative engineering talent training mode [J]. Higher education in China 2009(Z1).
4. Li Hua, Hu Na, You Zhensheng. New Engineering: Form, Connotation and Direction [J]. Research in Higher Engineering Education. 2017(4): 16-19.
5. Lu Guodong. Five breakthroughs and preliminary explorations in the construction of "new engineering"[J]. China University Teaching. 2017(5): 38-41.
6. Ye Min, Kong Hanbing, Zhang Wei. New Engineering: From Idea to Action [J]. Research in Higher Engineering Education, 2018(1): 24-31.
7. Zhang Lele, Chen Enlun. The Realistic Dilemma and Reform Path of Student Evaluation in Applied Undergraduate Colleges in the New Era[J]. Inner Mongolia Social Sciences, 2020(3):193-199.
8. Zhao Jinhui, Yuan Haichao, Liu Muhua, Huang Junshi. Thinking and Exploration on the training mode of application innovation compound talents in electronic information engineering under the background of "new engineering" [J]. Modernization of education 2019(56).
9. Zhang Ruichun, Gao Kemin. Research and Practice on the Sustainable Development of Talent Training Models in Local Applied Universities—Comment on "New Exploration of School-Enterprise Cooperation: Research and Practice on Applied Undergraduate Talent Training Models in Local Universities"[J]. Education and Occupation, 2020(3): 115
10. Zhu Kerong, Zhou Hua, Wu Xiaohong. The characteristics of applied undergraduate courses. Construction path and dilemma[J]. Vocational Education Forum, 2019(3): 6266.