

Research on the Education System of International Digital Talents Based on Grounded Theory¹

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Abstract. International digital talents are critical strategic resources for countries to improve their comprehensive national power and global competitiveness. To better respond to the challenges of economic globalization, it is essential to deepen the reform of the international digital talent training system, clarify the development direction of international digital talent training, and build an international digital talent training mechanism. Based on the grounded theory, the study constructs a global digital talent education system model with three core categories of "input-process-output" and seven main categories through three-level coding and selects 200 data for analysis. The study results show that the current international digital talent education mechanism is imperfect, and the quality of talent is low; the teaching technology, teacher quality and social resources are poor. At the same time, the study proposes countermeasures and suggestions for the weak links from three levels: input elements, process elements and output elements, providing some theoretical guidance for the school to cultivate better talents.

Keywords. international digital talent; grounded theory; training mechanism

1.Introduction

The National Medium and Long-term Education Reform and Development Plan state that a group of international elites with the knowledge of international rules, who can participate in international affairs and international competition, should be cultivated to meet better the new shape and requirements of China's economic and social opening in the new era[1]. However, the problems associated with the country's digital talent need to be made evident. Therefore, the international digital talent education system should be vigorously promoted from the global advanced education ideas and experiences. With China's "One Belt, One Road" initiative and the concept of building a community of human destiny, academics have further increased research on international digital talent education. Still, at the same time, it leads to a vital retrospective question: What are the mechanism and internal logic of international digital talent education? What are the measurement indicators and needs of global digital talent education? What are the evaluation tools and standards of the international digital talent education model?

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To this end, this study uses the traditional theory approach to conduct an in-depth analysis of the text database composed of internationalized talent cultivation programs and university education reform. It constructs a theoretical model of the factors influencing internationalized talent cultivation around the measures that schools should take to cultivate internationalized digital talents better, to expand the research on internationalized digital talent cultivation.

2. Literature Review

The study reviewed 190 domestic and international documents with the keyword "digital talent" in CNKI (2018-2022). Through literature analysis, the research on digital talent education mechanisms is increasing, and the topics of literature mainly focus on "digital talent, digital transformation, talent education ", rising from 6 articles in 2018 to 73 reports in 2022. However, it can be seen that the relevant research is still minimal. To better build an international digital talent education mechanism, we have conducted a literature review at two levels: the current status of international talent education pathways and the international talent education system.

To promote the development of international talents, scholars have studied from different perspectives; for example, Zheng (2021) proposed to build a hybrid international talent training curriculum system, strengthen the construction of a diverse international talent training faculty, and improve the global talent training guarantee system[2]; Yan (2019) proposed a cross-cultural general education curriculum, joint development of talent cultivation programs by university and enterprises, internationalized faculty, international talent evaluation tools[3]. However, there are also many problems in nationalized human resource development. In terms of a failure of academic subjects, Zhang suggest that the existing model emphasizes the education of international students, the weakness of faculty members who are competent to educate international skills, and the lack of internationalization education concept.

To address the above questions, the study starts from the subject, object, medium and content of international talent education; constructs the global talent education system by grounded theory, gives the maturity coefficient by the entropy method, and gives the strategies for the weak links of international digital talent education.

3 Research Methodology

The research methodology of this paper is Grounded theory, which is a kind of qualitative research that establishes a comprehensive and systematic analysis of objective facts, summarizes the information, and gradually improves the summary theory [4]. In order to better analyze the mechanism of international talent education, the study collects original information from existing international talent education programs and university education reform, labels and conceptualizes the information, realizes hierarchical coding, refines concepts at each level, categories concepts with logical relationships and of the same type, and establishes a theoretical model of factors affecting international talent education based on internal correlations [5] (as in Figure 1) .

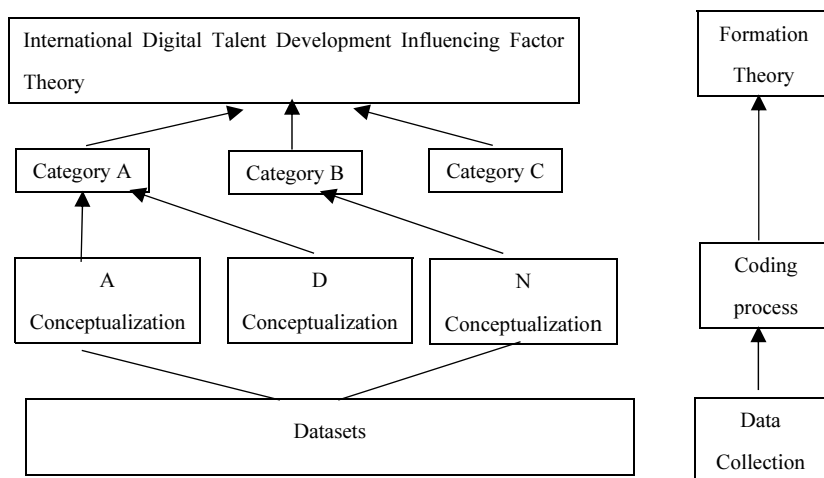


Figure 1. The process of grounded theory research

4. Analysis of the factors influencing the international Digital talent education model

This paper based on the Grounded theory to find the influencing factors through open coding, axial coding and selective coding.

4.1 Data source

The CNKI has created a relatively pure information-sharing platform by rejecting and excluding the invasion of too many commercial elements. Therefore, the original data of this paper were collected from the Internet, and articles with keywords such as "international digital talent cultivation program" were collected. Therefore, the original data of this paper was taken from the Internet, and the articles with keywords such as "international digital talent cultivation program" were collected.

4.2 Open coding

In the open coding, the textual database of internationalized digital talent education programs and university education reform was analyzed and useful information was extracted according to the process of "labeling, conceptualization, and categorization". First, a large number of initial concepts were obtained by tagging each piece of information. An example is the goal of open and inclusive international talent development proposed by the University of Heidelberg. In the globalization of the University of Heidelberg, education for international talents has always been an important educational mission in its historical context [6]. To the relevant German policies and industrial development needs, the University of Heidelberg is open and tolerant, cultivating the creative ability of students to use technology to provide services to the world. Relying on the advanced higher education system in Germany and Europe, the University of Heidelberg integrates its strengths and resources and draws on the best

experts and scholars worldwide. The university should also have an inclusive international faculty. This text data is labelled "international training objectives and models", "development of innovation and technical service skills", "intercultural communication", and "development of international networks of academics". And 56 own nodes were created.

Then, the labeled data are re-decomposed and categorized to form the initial categories and coded and renamed (as in Table 1) to obtain 20 conceptual categories, and finally the categorized nodes are further generalized and refined to obtain new categorized nodes, which are refined to new 13 nodes.

Table 1 .Data conceptualization and preliminary categorization

Label	Conceptualization	preliminary categorization
Improvement of students' practical and innovative skills; scientific dynamics of the discipline.	d1 students' mastery of knowledge	D1 Degree of application of professional knowledge
the use of classroom + practical training; foreign language learning; learning ability.	d2 Student practice activities	
English learning is very important; strengthening the efforts of English teaching.	d3 Foreign Language Improvement	D2 Overall Results
Significant improvement in the performance of professional courses; performance in English of relevant majors.	d4 Professional Performance Improvement	
no difference between internationalized courses and traditional courses.	d5 Classroom enrichment	D3 Teaching content
courses involving general education courses, specialized courses, internationalized lectures, integrated academic exchange programs.	d6 Internationalized knowledge system	
Reduced classroom atmosphere; low student attendance.	d7 Teachers complete class assignments	D4 Teaching attitude
Lack of focus on student efficiency in classes.	d8 Teachers complete task assessment	
high scores on regular grades and high paper scores; basic passing grades at the end; few students fail the course.	d9 Little coverage of curriculum reform	D5 Perfection of the content of classroom reform
The curriculum reform program is a formality; the content of the curriculum reform program is set in a rather vague way.	d10 Curriculum Reform Goals	D6 Clarity of course design objectives
Less-than-optimal results of the curriculum reform; consistency between the results of the curriculum reform and the general curriculum.	d11 Faculty knowledge capacity	D7 Faculty research capabilities
Teachers exploring cutting-edge developments; hiring renowned scholars in the field	d12 Foreign Language Reading for Teachers	D8 Teachers' foreign language skills
Teachers' difficulties in accessing cutting-edge knowledge.	d13 Foreign Language Teaching for Teachers	
teachers' inability to teach in dual English; grammatical errors in teachers' core curriculum terminology.	d14 Teacher-related knowledge	D9 Teacher expertise
vague content of the core courses taught; inability to independently construct professional models.	d15 Single classroom format	D10 Teaching Tools

low student-teacher interaction; merely reading from the textbook.	d16 Teaching method	D11 Teaching process
Dual language lectures; small group lectures; books related to professional English.	d17 Learning Environment	
cross-cultural learning environment; nurturing campus culture.	d18 Teaching hardware	D12 Equipment Perfection
Traditional blackboard lectures.	d19 Teaching Software	
Specialized HRM software; human-computer interaction to achieve international curriculum.	d20 Facility investment efforts	D13Facility Applicability

4.3 Axial Coding

The axial coding is a deeper generalization of the above open codes. Through the logical relationship of "condition-process-cause and effect", the 18 categories of open codes are clustered into 7 new main categories, making the categories more purposeful and theoretical, and the specific axial coding process and results are shown that the initial classification of student performance as the degree of knowledge application and comprehensive realization; process performance as the completeness of course plan content; teaching skills as teaching tools and teaching content; teaching ability as a teaching process and teaching attitude; teaching quality as research ability and professional knowledge; social resources as overseas exchange opportunities and acquisition of knowledge in a thousand languages; and material resources as equipment availability and facility suitability.

4.4 Selective Coding

Selective coding is the process of further mining the core categories from the main categories for the main axis coding [7]. Through continuous deduction and induction, analysis of the relationship between core categories, main categories and sub-categories, and rooting in the original data, three core categories of integrated quality and efficiency, process capability and resource capability were derived to achieve the purpose of constructing the theory, and the specific selective coding process is shown in Table 2.

Table 2 .Example of selective coding

Core category	Main category	Sub-categories
Comprehensive quality and efficiency	Student performance	Knowledge application degree, overall performance
	Course performance	Course program content completeness
Process capabilities	Teaching techniques	Teaching tools, teaching content
	Teaching ability	Teaching process design, teaching attitude
	Teacher quality	Professional knowledge
Resource capacity	Social resources	Overseas Exchange Opportunities
	Material resources	Perfection of equipment and applicability of facilities

4.5 Theoretical Construction of Influencing International Digital Talent Education

Based on the analysis of grounded theory, international digital talent education involves "government-society-school-student" and other subjects, and the education method needs to follow the process of "input-process-output", so we get the theoretical model of international digital talent education influence factors, as shown in Figure 2.

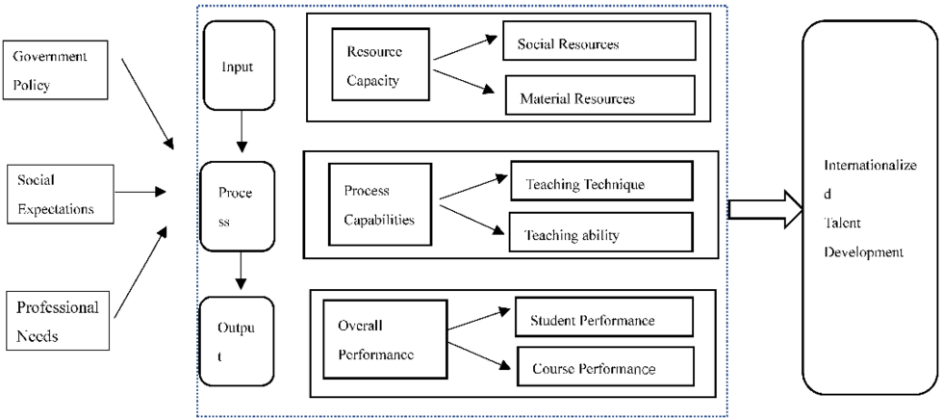


Figure 2.Theoretical model of influencing international digital talent education

4.6 Discussion

The limiting factors for developing internationalized digital talent cultivation exist mainly in resource capacity, process capacity and performance. At present, internationalized talents cultivation is not well targeted, and the design of teaching contents in most schools suffers from the problem that language teaching is not profound; internationalized teachers have insufficient reserves and weak abilities; research on composite internationalized talents cultivation needs to be deepened. There is no efficient integration of training resources and low efficiency of collaborative innovation [8].

To better derive the degree of influence of each factor in the theoretical model of internationalized talent cultivation influence factors, a questionnaire survey is conducted and then further analyzed.

5. Analysis of Data Results

This part reports the results of questionnaire and statistical analysis, and shows the weight coefficients.

5.1 Questionnaire Data, Sample Tests, and Maturity Weight Coefficients

This survey was conducted online, and 200 were returned, with an efficiency rate of 100%. The survey consisted of three main aspects: the first was a survey on respondents' age, occupation, education, and working years; the second part was a judgment on the maturity of international digital talent education in HRM by indicators at all levels; the

third part was an open-ended question for global digital talent construction from two subjects, enterprises and schools.

The study conducted a reliability analysis of the 21-item scale questions using SPSS 20.0 for the survey questionnaire, which yielded a Cronbach's alpha coefficient value of 0.959 and a Cronbach's alpha coefficient value of 0.962 based on standardized items, indicating good internal consistency of the survey questionnaire.

By establishing the original data rectangle, calculating the information entropy of indicators and the weight coefficients of each hand, we determine the maturity weight coefficient of the digital talent education system. The weighting factors for the primary indicators of overall quality effectiveness, process capability, and resource capacity were 0.561, 0.293, and 0.146, respectively. The weighting factors for the secondary indicators of student achievement, process performance, teaching skills, teaching capacity, teaching quality, social resources, and physical resources were 0.258, 0.072, 0.135, 0.080, 0.144, 0.258, and 0.053.

5.2 Analysis of the Results of the Maturity Weight Coefficient

The overall quality of international digital talent education is low. The weight coefficients of comprehensive quality and effectiveness, process capability and resource capability are 0.561, 0.293 and 0.146, respectively. Except for resource capability, the variability of the other two indicators is significant, indicating the worse effect. The education of internationalized digital talents is a dynamic process, and the processability and resource ability directly lead to the quality of internationalized digital talents.

The variability of indicators such as comprehensive performance, teaching attitude and equipment perfection is small, but another quality is still needed.

Weakness of indicators such as degree of professional knowledge application, foreign language ability, frontier knowledge acquisition, and scientific research ability.

6. Countermeasures and Suggestions for International Digital Talent Education

The results of the maturity coefficient of international digital talent education show that the current global digital talent education mechanism development is "uneven and imperfect". To better solve the problems of difficulty in acquiring frontier knowledge and mismatch of facilities and equipment, the study proposes some talent education paths based on the current situation and dilemma of internationalized digital talent development and the existing achievements at home and abroad.

6.1 Optimization of Input Elements

First, the concept of internationalized digital talent education should be established. Closely combined with the relevant national policies and the school's development needs, to cultivate international digital talents to have the core competitiveness to adapt to the development needs of internationalization [9]. Secondly, to build a global digital talent education environment. Universities should purchase relevant databases and improve the accessibility of appropriate scientific research materials abroad.

6.2 Optimization of process elements

Universities should make a detailed master plan for internationalized teachers, increase the proportion of foreign teachers and famous international scholars, organize teachers to go abroad for exchange and study regularly to ensure that the teachers in universities can keep abreast of the international advanced development and guidelines, to improve the internationalized education level. Meanwhile, colleges and universities organize enterprise alum associations to actively return to hire famous entrepreneurs in the industry, and teachers should pay attention to the integration of industry and learning, apply their knowledge and guide students in overseas study and employment [10].

6.3 Output element optimization

The research constructs the internationalized digital talents education system from three perspectives of knowledge requirements, ability requirements and quality requirements, among which knowledge requirements include basic knowledge, professional knowledge and general knowledge; ability requirements include communication, professionalism and innovation; quality requirements can be divided into professional moral quality, professional quality and physical and mental quality.

In the training process, program design should have training objectives, graduation requirements, training characteristics, core curriculum, study schedule and content of books in Chinese and English.

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