



Establishment of an Evaluation Index System on Versatile Talent Cultivation Modes of Universities for Childhood Autism Rehabilitation Based on Delphi Method

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Abstract. A comprehensive method, including literature review, demand survey and group discussion, was employed to form the correspondence questionnaire for experts, and 20 experts were performed with two rounds of correspondences by Delphi method. Finally, the corresponding evaluation index system was established based on index selection criteria and expert opinions. The Cm of the two rounds is 100% and 90.0% respectively, and the coefficient of reliability (Cr) is 0.915. By importance, the Kendall's W coefficient is 0.972 and 0.983 ($P < 0.001$); by feasibility, the Kendall's W coefficient is 0.977 and 0.985 ($P < 0.001$). By means of two rounds of expert correspondences and index selection, an evaluation index system on versatile talent cultivation modes of universities for childhood autism rehabilitation is established to span teaching & research platform, faculty, training & internship, cultivation mode, curriculum, and quality evaluation, including 6 primary indexes and 35 secondary indexes. The research has initially developed the evaluation index system on the talent cultivation modes of universities for childhood autism rehabilitation, and provides new ideas and theoretical guidance for Chinese universities to foster versatile talents for autism rehabilitation.

Keywords: autism · children rehabilitation · talent cultivation · evaluation index system · Delphi method

1 Introduction

Autism, also referred to as autism spectrum disorder, registers a prevalence. Statistics suggest that about 10 million people are diagnosed with autism, among which there are 3 million autistic children aged 0–18, growing at an annual rate of 1%-2%. This means that the autism has changed from a “rare disease” to an “epidemic”, and poses a great challenge to the rehabilitation education of autistic patients in China. According

to the 2021 Annual Blue Book of the Child Developmental Disabilities Rehabilitation Industry, there were 23,000 teachers for rehabilitating autistic children recorded by China Disabled Persons Federation in 2020, and the ratio of rehabilitation teachers to children was 1:130. Though there are many childhood autism rehabilitation institutions across the country, only 1,000 professionals who are internationally certified to provide high-quality intervention services, and on average one needs to serve 2,500 children. There are now 300,000 talents in shortage for children rehabilitation education, and professional rehabilitation teachers are in high demand. But there are few universities engaged in cultivating rehabilitation talents, and present rehabilitation institutions are short of frontline talents. This greatly hampers the rehabilitation of children with autism and sustainability of the rehabilitation practices.

Artificial intelligence is setting off a new round of educational revolution. The deep integration of artificial intelligence and special education brings new hope to special children. Artificial intelligence provides reliable technical means for special children to obtain “inclusive” and “fair” education, and is expected to completely break the tangible and intangible obstacles that limit special children’s effective access to educational resources. Studies have shown that although autistic children often refuse to communicate with others, they are easy to accept the information brought by simulation environment such as electronic devices, and artificial intelligence technology is a favorable means for the education of autistic children. There are no majors in autism rehabilitation intervention in the Chinese education system. Currently only a few affiliated normal universities and junior colleges have opened special education majors. The curriculums mainly pertain to deaf, dumb and intellectual disability education, and few are about autism rehabilitation education. Moreover, most graduates of special education major found their jobs on special education in special schools. Rehabilitation intervention entails psychology, education and even medical knowledge, and years of professional learning and training are prerequisites for getting a job. In fact, most professionals just received simple trainings after employment and the rehabilitation quality and effect were therefore hardly secured. The number of professionals for childhood autism rehabilitation is insufficient. The cultivation of such talents is of high peculiarity due to professional and rigorous practical requirements. Multi-disciplinary integration cultivation mode is therefore crucial to the talent development for childhood autism rehabilitation. To evaluate the feasibility and validity of the versatile talent cultivation mode of universities for childhood autism rehabilitation, Delphi method is employed to explore and investigate the corresponding evaluation index system.

2 Research Methodology

2.1 Establishment of the Subject Research Team

The research team consists of six members, including two with senior title, three with intermediate title and one with junior title. Among them, one chief physician and professor with over 30 years of clinical medical experience serves as the research project leader; three doctors, two nurses and young & middle-aged teachers were previously professors or lecturers with more than ten years of teaching experience. They proceeded with the research tasks of their own.

2.2 Formulation of Expert Correspondence Questionnaire

The research team searched relevant literatures on CNKI and other databases, and widely collected the research findings about childhood autism rehabilitation and talent cultivation at home and abroad, to provide reference for the formulation of expert correspondence questionnaire. Also, we paid study visit to a number of children autism rehabilitation institutions and special education schools in Shanghai, Zhejiang, Jiangsu, etc., and learned about the demand for and current status of rehabilitation talents in China by means of questionnaire survey and interview. Besides this, we referred to the evaluation indexes concerning undergraduate talent cultivation contained in MOE's Overall Plan for Deepening the Education Reform in the New Era (hereinafter referred to as the "New Era Plan") and the Implementation Plan for the Audit and Assessment of Undergraduate Education and Teaching in General Higher Education Institutions (2021–2025) (hereinafter referred to as "Evaluation Implementation Plan"), and drafted the Delphi expert correspondence questionnaire of the first round.

The correspondence questionnaire contains three parts: (1) Instructions: mainly about research background, research objectives and notes to information completion. (2) Content of questionnaire: importance and feasibility of the evaluation indexes on versatile talent cultivation modes for childhood autism rehabilitation, including 6 primary indexes and 49 secondary indexes. Experts were invited to rate the importance and feasibility of all indexes one by one using the 5-point Likert scale. The questionnaire also offers space to supplement information or make revisions, so that the experts involved can make revisions or specify any other opinions or suggestions. (3) Expert basic information form: including demographics and professional work background, etc.

2.3 Selection of Advisory Experts

The research experts must fulfill the following requirements: (1) experts with associate or higher titles in rehabilitation therapeutics, applied psychology, special education, or clinical medicine related to the rehabilitation of children with autism, or those who have been engaged in the clinical rehabilitation of children with autism for more than 5 years and have intermediate titles or higher; (2) bachelor's degree or higher; (3) voluntarily participating in the two rounds of correspondence questionnaires.

2.4 Implementation of Expert Correspondence

The research distributed two rounds of electronic questionnaires via wjx.cn. After the first round, the importance of indexes was rated by mean, coefficient of variation and recognition rate. $\text{Mean} = \text{Total score of index} / \text{total score of expert}$; $\text{coefficient of variation} = \text{standard deviation} / \text{mean}$; $\text{recognition rate} = \text{number of experts choosing "5" or "4"} / \text{number of experts} \times 100\%$. When the coefficient of variation < 0.25 , recognition rate > 0.20 , and importance mean > 3.5 , the index can be retained to constitute the second round of questionnaires.

2.5 Statistical Methods

The data were collated by use of Excel 2021 and SPSS 22.0. Coefficient of variation, mean \pm standard deviation, and recognition rate were used in the statistics of all indexes; the coefficient of reliability (Cr) was used to represent the reliability of correspondence expert; Cm was used to indicate the engagement of experts. When Cm is greater than 70%, the experts are highly engaged. Kendall's W coefficient was used to suggest experts' coordination degree. The value of W ranges between 0 and 1, and when it is closer to 1, the expert opinions are highly coordinated.

3 Research Findings

3.1 Basic Information of Experts

The research invited 20 experts working on teaching, medicine, and rehabilitation in the fields of rehabilitation therapy, applied psychology, special education, and clinical medicine related to childhood autism rehabilitation in Guangdong, Henan, Shandong, Shanghai, Jiangsu, and Zhejiang. They all completed the first round of correspondences, and in the second round, two experts exited for certain reasons. These experts have different disciplinary background, and are geographically distributed, so they are authoritative and geographically representative.

Among these 20 experts, 15 are female (75%) and 5 are male (25%). By age, 4 are aged 20–30 (20%), 5 aged 30–40 (25%), 7 aged 40–50 (35%), and 4 aged 50–60 (20%). By years of working, 4 have worked for 5–10 years (20%), 5 for 10–15 years (25%), 7 for 15–20 years (35%), and 4 for more than 20 years (20%). By degree of education, all of them are bachelor and above, including 9 bachelors (45%), 5 masters (25%), and 6 doctors (30%). By job title, there are 7 experts with intermediate title (35%), 7 with associate senior title (35%), and 6 with senior title (30%).

3.2 Engagement and Authority of Experts

Cm was applied to reflect expert's engagement. In the first round, a total of 20 questionnaires were distributed and all were effective and collected. In the second round, 20 questionnaires were distributed and 18 were effective and collected. The Cm of the two rounds is 100% and 90.0% respectively. The value of Cr ranges between 0.8–1.0, and the mean is 0.915.

3.3 The Coordination and Concentration Degree of Expert Opinions

In terms of importance, the Kendall's W of the two rounds of questionnaires is 0.972 and 0.983 ($P < 0.001$) respectively; in terms of feasibility, the Kendall's W is 0.977 and 0.985 ($p < 0.001$). The results show that after questionnaire revisions in the first round, expert opinions of the secondary indexes were basically consistent, and the P values of the two rounds of chi-square tests were both smaller than 0.001, which indicates a high degree of coordination between the experts. The results are shown in Table 1.

Table 1. The Degree of Coordination and Concentration of Expert Opinions in the Two Rounds of Questionnaires

<i>Dimension</i>	<i>Round</i>	<i>Number of secondary indexes</i>	<i>Kendall's W</i>	χ^2	<i>df</i>	<i>P</i>
Importance	First round	49	0.972	62.368	48	< 0.001
	Second round	41	0.983	57.483	40	< 0.001
Feasibility	First round	49	0.977	62.597	48	< 0.001
	Second round	41	0.985	57.492	40	< 0.001

3.4 Results of Expert Correspondence on Primary Indexes

The primary indexes were mainly selected based on the evaluation indexes for undergraduate talent cultivation specified in MOE's "New Era Plan" and "Evaluation Implementation Plan". The evaluation index system on the versatile talent cultivation modes of universities for childhood autism rehabilitation was finally established with regard to six dimensions of teaching & research platform, faculty, training & internship, cultivation mode, curriculum and quality evaluation. According to assigned value of importance, coefficient of variation, recognition rate and mean, the questionnaire of the first round was revised as follows: (1) six primary indexes remain unchanged, as shown in Table 2; (2) eight secondary indexes were deleted, and five secondary indexes were altered. The index system for the second round was thereby formed, with 41 secondary indexes in total.

Table 2. Statistical Table of the Weights of Primary Indexes

<i>Primary indexes</i>	<i>Mean</i>	<i>SD</i>	<i>CV</i>
A Teaching and Research Platform	14.81	3.38	0.23
B Faculty	18.33	3.96	0.22
C Training and Internship	16.62	2.88	0.17
D Cultivation Mode	15.71	3.09	0.20
E Curriculum	20.82	4.31	0.21
F Quality Evaluation	13.71	3.35	0.24

3.5 Results of Expert Correspondence on Secondary Indexes

Following the second round of expert correspondence, the secondary indexes were modified as follows in accordance with the selection criteria and when combined with expert opinions: Six secondary indexes were eliminated, five secondary indexes were used to build the primary index’s teaching & research platform, five secondary indexes were used to build faculty, four secondary indexes were used to ensure training & internship, three secondary indexes were used to establish a reasonable cultivation mode, twelve secondary indexes were used to optimize the curriculum, and six secondary indexes were deleted. Six secondary indicators are part of the evaluation system, which results in a total of 35 secondary indicators. Table 3 displays the specific contents.

Table 3. Statistical Table of the Weights of Secondary Indexes

Primary index	Secondary index	Mean	STD	CV
A Teaching & research platform	A1 Establishment of research institutes for childhood autism rehabilitation	4.72	0.56	0.12
	A2 Building a network of shared data resource platforms	4.39	0.13	0.06
	A3 Appointing renowned academics and industry experts as subject leaders	4.56	0.76	0.17
	A4 Establishing an internal management system for the teaching & research platform	4.44	0.83	0.19
	A5 Conducting external academic exchanges	4.50	0.50	0.11
B Faculty	B1 Establishing a professional faculty	4.72	0.45	0.09
	B2 Publishing scientific work on autism	4.33	0.75	0.17
	B3 Bringing in industry mentors to teach	4.39	0.76	0.17
	B4 Teachers go on to study autism-related courses at national and international universities	4.39	0.68	0.15
	B5 Teacher training in a domestic autism rehabilitation institution	4.56	0.50	0.11
C Training & internship	C1 Establishment of a practical training center for childhood autism rehabilitation	4.78	0.53	0.11
	C2 Choosing children’s hospitals, rehabilitation institutions, special education schools as internship sites	4.60	0.49	0.11
	C3 Internships for a short period of time during the second and third years of college and intensive internships during the fourth year	4.33	0.82	0.18
	C4 Establishment of an internship teaching system	4.39	0.95	0.22

(continued)

Table 3. (continued)

<i>Primary index</i>	<i>Secondary index</i>	Mean	STD	CV
D Cultivation mode	D1 Conducting pilots for the multidisciplinary integration of child autism rehabilitation personnel training in applied psychology, rehabilitation therapy, and health services and management with the establishment of a professional direction	4.50	0.69	0.15
	D2 Developing talent development programs with reference to advanced domestic and international experience	4.61	0.59	0.13
	D3 Providing an elective platform course in orientation for autism rehabilitation	4.56	0.59	0.13
E Curriculum	E1 Setting up an educational rehabilitation program for children with autism	4.61	0.49	0.11
	E2 Setting up psychology courses related to children with autism	4.56	0.59	0.13
	E3 Setting up a course on child autism rehabilitation therapy	4.45	0.59	0.13
	E5 Focusing on basic rehabilitation training for children with autism	4.44	0.60	0.13
	E6 Focusing on psychological rehabilitation of children with autism	4.39	0.83	0.19
	E7 Focusing on behavioral training interventions for children with autism	4.50	0.69	0.15
	E8 Setting up a cognitive assessment and training course for children with autism	4.56	0.59	0.13
	E9 Setting up sensory integration training courses for children with autism	4.33	1.05	0.24
	E10 Setting up an assessment course on emotional behavioral disorders in children with autism	4.33	0.75	0.17
	E11 Setting up parent education courses for children with autism	4.31	1.04	0.24
	E12 Setting up a lifelong developmental planning course for children with autism	4.56	0.60	0.13
F Quality evaluation	F1 Building a multidisciplinary training model for autism rehabilitation personnel based on sufficient social needs research	4.50	0.83	0.19
	F2 Adequate expert validation of the training standards system	4.50	0.83	0.19
	F3 The school is equipped to meet the needs of multidisciplinary training of autistic children rehabilitation talents	4.61	0.69	0.15

(continued)

Table 3. (continued)

Primary index	Secondary index	Mean	STD	CV
	F4 The curriculum supports the core competence of autistic rehabilitation talents	4.61	0.59	0.13
	F5 Teaching management process specification	4.44	0.76	0.17
	F6 Outstanding talent development characteristics, social recognition, and easy employment	4.56	0.76	0.17

4 Research Conclusions

This research used the Delphi method to conduct two rounds of expert consultation and initially created an evaluation index system with six primary indexes and 35 secondary indexes for assessing the versatile talent cultivation modes of universities for childhood autism rehabilitation. The value of Cr was 0.915, the Cm for the 2 rounds of expert correspondence was 100% and 90%, respectively, the coefficient of variation for both rounds of correspondence was <0.25, and the Kendall’s W coefficient was 0.972 and 0.983, respectively, all of which were tested to be highly statistically significant($P < 0.001$). It demonstrates that the experts in the correspondence have rich theoretical knowledge of university teaching and clinical practice experience and have a high degree of recognition of the content of the indexes; the results of the correspondence are reliable; the experts are highly motivated to participate; and the opinions of the experts gradually converge in the second round, indicating that the opinions of the experts in the correspondence are well coordinated and the research results are reasonable and reliable.

In the future, we will further give full play to the advantages of artificial intelligence in the training of autistic rehabilitation talents, develop equal education for everyone and education suitable for everyone, provide better intelligent education intervention for autistic children, and effectively alleviate the great difficulties faced by tens of millions of autistic children and their families.

5 Conclusions

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