Research on Special Education Informatization Development Index

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Abstract: This study adopts the methods of subjective and objective weights, the comprehensive evaluation index, the H province special education informationization development present situation and differences were analyzed, aimed to explore the key factors that affect special the balanced development of education informationization, find out the source of H province special education informatization development, with the coordinated development of constructive Suggestions are put forward.

1. Introduction

Special education is an important part of China's education cause, and special education informatization is also an important part of China's education informatization. Relevant departments at all levels and the social from all walks of life support for special education work care, attention, strength significantly increased, according to the special education development in our country and the education teaching reform focused summary of experience, in June 2010, the national medium and long-term education reform and development plan outline (2010-2020) [1]through help special populations education informatization development potential and make up the defects, advantage, based on society, promote the harmony of education and social fairness and justice. In May 2014, the standards for information technology application ability of primary and secondary school teachers (trial), training curriculum standards for information technology application ability of primary and secondary school teachers, standards for information-based leadership of primary and secondary school principals and other documents were issued, providing basic basis for the training, admission, training and assessment of special education teachers. In the same year, the special education promotion plan (2014-2016) [2]was released, which mentioned strengthening the construction of special education resource classrooms and barrier-free facilities. In 2017, the second phase of special education promotion plan (2017-2020)[3] was promulgated to strengthen the construction and application of special education informatization. Research field has been basically formed the Chinese special education informatization basic theory and research system architecture, such as Zhang zhuoxing discussed the implementation mode and strategy of the application of

information technology in the field of special education, and used the advantages of information technology to promote the rapid development of special education [4]. Zheng quan and Chen Lin put forward the construction countermeasures different from the general educational resources from the five categories of design, development, implementation, management and evaluation[5]. Li qing investigated the research status of special education software based on tablet computer from three dimensions: applicable object, application field and degree of specialization[6]; By means of questionnaire survey and interview, zhang Shirley investigated the professional development status of information technology application of special education teachers in western China[7]. Zhong Wenting, Guo Jiong according to domestic and foreign literature, case, special education development report summarizes special education informatization development key point, analysis of relationship between key points and six elements affecting education becoming an information based society development, it is concluded that the informationization environment construction, the informationization teaching resources construction, teachers' information technology teaching, information technology application ability training and development needs, dimension[8].

2. Ease of Use

Starting from the school level of H province, this paper analyzes the development situation of special education informatization in H province, so as to further study the development defects of the province and find the suitable development direction and target.

2.1. The Research Object

In this study, "paperless" questionnaire survey was adopted. The survey samples covered 79.39% of special education schools in the province, with 121 valid questionnaires and an effective rate of 90.2%[9]. SPSS21.0 was used for factor analysis and reliability analysis of the survey data. Cronbach's alpha was 0.845, and the reliability and validity of the questionnaire were relatively high. Confirmatory factor analysis was conducted on them, χ^2/df=2.825,GFI=0.923,IFI=0.939,SRMR=0.047,RMSEA=0.075,and the extracted values of variance were all greater than 0.8[10], The statistical analysis software Mplus7.0 was used to conduct factor analysis on the questionnaire data, and 21 questions were finally extracted. The 21 questions were divided into five dimensions, namely, the core index system of five dimensions, namely, information infrastructure, digital education resources, information teaching application, management information, and information security mechanism,indicating that the internal structure of the questionnaire was relatively stable. Maintaining the Integrity of the Specifications

2.2. The Research Indicators

By studying the policies and papers related to the informatization of special education, this study aims to understand the important dimensions of evaluating the informatization development of China's special education. In basic education informatization indicator on the construction of a building to extract some indicators with the characteristic of special education school[11], such as different disability categories of students using the multi-function classroom, different kinds of disabled students use of personalized auxiliary equipment and system, the teacher in the face of different kinds of disabled students, teachers and students access to resources website, etc.

Table 1: Indicators and weighs.

Level indicators	The weight	The secondary indicators	The combination weights
Information infrastructure	0.19	The number of information terminal equipment per teacher	0.14
		The number of information terminal devices per 100 students	0.13
		Total bandwidth of school network access	0.18
		Average utilization rate of multimedia classrooms	0.14
		The proportion of schools with three or more multi-function classroom forms[	0.20
		The number of personalized auxiliary devices in the school	0.21
Digital teaching resources	0.22	The construction of school-based resource Banks	0.36
		The proportion of schools with complete digital resources matching the textbooks	0.25
		Personalize the use of software system resources	0.22
		Teachers acquire digital resources through multiple channels	0.17
Application of informationization in teaching	0.23	The main link that USES information means to assist teaching	0.27
		The frequency of rehabilitation course teaching by information technology	0.38
		Percentage of teachers who can use information technology to teach	0.17
		The use of digital teaching resources by teachers	0.18
Management informatization	0.17	Information management system commonly used in schools	0.26
		Management information system basic data application category	0.31
		Security monitoring system campus coverage of the school proportion	0.17
		Campus card to achieve the function	0.25
Information security mechanism	0.19	Percentage of it professionals	0.21
		The leadership level of the school in charge of information work	0.27
		The proportion of informationization expenditure in the total expenditure of school education in the same period	0.16
		The proportion of teachers who participate in school-based training of educational informationization	0.18

2.3. The Research Methods

After dimensionless data, this study adopts the combination of subjective and objective weighting method based on game theory, namely analytic hierarchy process (AHP) and CRITIC method, to assign weights to indicators[12].

$$W_j = \sigma_j R_j / \sum_{j=1}^{n} \sigma_j R_j \quad (1)$$

Note: σj represents the index variability, R_j represents the conflict between the j indicator, W_j represents the objective weight of the j indicator

The comprehensive development index integrates the complex index system to reflect the differences in the development of special education informatization, and comprehensively and systematically understand the level of special education informatization in this province.

$$\mathrm{EDI} = \sum_{i=1}^{m} W_i \left(\sum_{j=1}^{n} W_{ij} Z_{ij} \right) \quad (2)$$

Note: EDI is the comprehensive development index of special education informatization, m is the number of first-level indicators, and n is the number of second-level indicators corresponding to each first-level indicator. Wi is the corresponding first-level index weight, Wij is the corresponding second-level index weight, and Zij is the corresponding second-level index standardized data.

3. Result Analysis

In terms of informatization infrastructure and informatization teaching application, H province basically meets the national standards for informatization of special education, with relatively good development level. However, the development index of digital education resources, management informatization and safeguard measures is generally lower than the national standard of special education informatization. According to the comprehensive development index of various regions in H province, the comprehensive index of H province is 51.76, which is in the middle and lower reaches of the informatization development of special education in China. The province has significant differences in the development of digital teaching resources, application of informatization teaching, management informatization and guarantee mechanism, which shows a leap-forward distribution.

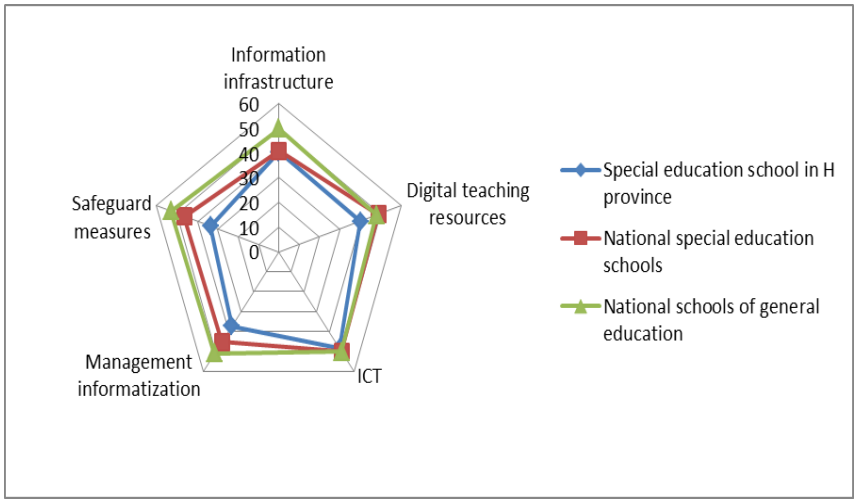

Figure 1: Exponential graph of each dimension.

3.1. Analyze the Basic Indicators

Special education informatization develops balanced and low difference in infrastructure. Special education schools in H province have basically achieved network access, with the broadband access rate reaching over 93%. The average school has a broadband access of 120Mbps, and the number of information terminals per 100 students is 14.42. The number of information terminals per teacher (0.93) is relatively poor compared with the national (1.21). Special education schools in H province have basically achieved network access, but there is still a certain gap compared with the 92.39% access rate of ordinary primary and secondary schools. The bandwidth of most schools reaches 10-20m, and the bandwidth of schools in coastal areas reaches 100Mbps to 1000Mbps. In the later period, the construction of broadband network should be continued to strive for the full coverage of the network, so as to create better conditions for teachers and students to easily and quickly obtain and utilize online resources. Of multimedia classroom accounted for 84%, compared to common multimedia classroom of primary and secondary schools, 92% have a certain gap, projectors, computers and the curtain as the core configuration of the multimedia classroom is a special education school information-based teaching environment of the main components, the level to a great extent, reflects the special education schools to carry out the informatization level of the basic condition of construction of teaching.

There is a big gap between the development of digital teaching resources in H province and the national level. The proportion of schools with school-based resource database in H province is 22.3% lower than 30.31%. The proportion of schools with complete teaching resources matching teaching materials in H province is more than 43%, and the proportion of schools using personalized software system resources in the province is 53.76%, far lower than the national 83%. Digital teaching resources are the basic guarantee and important support for the realization of special education informatization, and the quantity and quality of resources determine the development degree.

H province informationization teaching application development index is the highest, but failed to realize defect compensation education resources, special-education teachers in classroom teaching, experiment and research in the process of using equipment and is little difference in basic education, teachers have a relatively low level of personalized rehabilitation training in the present, be able to use information technology to carry out the discipline teaching teacher ratio is 75%,

lower than the entire province average level (80.33%).As an extension of senses, information technology can support the presentation, simulation and amplification of teaching contents, compensate the congenital deficiency of disabled students to some extent, and cultivate students' sensory perception, cognitive ability, life skills and ability to integrate into society. Therefore, special education teachers should be equipped with corresponding information teaching ability, and try to realize defect compensation, potential development and rehabilitation training with the help of information technology. However, the information teaching ability of special education teachers is generally weak. In the application dimension of information-based teaching, in the indicator of "information technology use in each link", the proportion of teachers in special education schools who can use information technology to develop courses is 74.41%, which is somewhat different from that of ordinary primary and secondary schools. Compared with ordinary schools, there is still a big gap between the use of information means in classroom teaching, teaching research and lesson preparation. There is no difference between the use of teaching software of special education teachers and that of ordinary school teachers. The application ability of commonly used software is strong, and the level of professional software application ability is too low. Moreover, special software-assisted teaching suitable for students with different defect types is rarely used.

The information management system of special education schools in H province is not perfect, the input and development stage are at a low level, and the campus security monitoring system of special education schools fails to reach full coverage. According to the research result of IC card in a serious shortage of the popularity of special education school, and its function seriously short, many schools are not even one cartoon, the campus card for identification and automatic registration of check on work attendance is not popular, is not conducive to the school to school, class, to the student's attendance status monitoring at any time, is not conducive to teachers and parents understand the student out of school and activities. The management information system of special schools has the most commonly used functions of middle school students' information management, financial information management and archival information management. In contrast, the proportion of schools with office automation management and logistics service management functions is low. The management information system has imperfect functions, single styles and narrow application scope of basic data.

According to the survey, the number of school-based training that teachers participated in by the school in the last year was very small, especially the number of school-based training that teachers in blind schools participated in was the least, which was not up to the national average level of special schools.Due to the lack of information funding investment, information team construction, information training is not balanced. The guarantee measures in H province need to be further improved. Teachers in special education schools lack the ability to apply information technology, fail to carry out professional training, and the construction of information teachers and investment in information technology are all at a low level.

3.2. Special Index Analysis

This research adopts SPSS21.0 of H province samples of different types of multi-function classroom are analyzed, found that H province use most of the multi-function classroom for chamber music rhythm (65.16%), multi-sensory training room (42.86%), language training room (41.86%), psychological assessment room (34.78%), assessment and training room (33.43%), hearing measure (29.54%)[13].

Similarly, according to existing data, it is found that sign language learning software (48.25%), listening language training system (32.65%), individual rehabilitation education support system (20.36%), audiobooks (18.22%), psychological assessment and testing system (15.97%) are the

most commonly used in special education schools in H province to assist disabled students in rehabilitation training[13].

According to the teaching and medical rehabilitation equipment is equipped with standard "the blind and the deaf school teaching and medical rehabilitation equipment is equipped with standard", "society-adaptation schools teaching and medical rehabilitation equipment is equipped with standard equipped with requirements of various kinds of rehabilitation equipment, found that the blind use of braille imprinter, help reading machine, special keyboard, the blind readers, the blind typewriter, point; Hearing rehabilitation equipment, audio-visual integration training apparatus and pure tone audiometer used in schools for the deaf; The number of devices used in autism and hyperactivity disorder instrument, music intervention instrument and so on in the mentally retarded school is not up to standard.

4. Conclusions

4.1. Infrastructure is Beginning to Take Shape, and Balanced Development is the Key

The basic indicators of special education informatization in H province have been very mature, but the rehabilitation equipment still needs to be improved. Assistive technology is an important support means for the disabled to compensate for their functions, live independently and integrate into society[9]. The low penetration rate of assistive technology in special education makes it difficult to realize defect compensation. At present, the most commonly used special equipment in special education schools include fixation reading machine, blind computer, braille engraving machine, electronic fixation device, point display device, blind reader, braille typewriter, etc. Language impairment training equipment, language impairment measurement equipment, hearing rehabilitation equipment, etc. Mental retardation school commonly used mood and behavior intervention instrument, visual music intervention instrument. Auxiliary software is bound to have a broad application prospect. Complete personalized equipment can help special students to carry out rehabilitation training better and faster, and facilitate students' study and life. It is a very important information equipment for special schools. Some low-cost and practical personalized equipment should be a person, such as hearing AIDS, visual AIDS and other portable personalized equipment.

4.2. To Optimize the Allocation of Special Education Resources, Defect Compensation is the Key

The application of educational resources can be tailored to students' defects and reduce the learning disabilities caused by their own defects. For example, students with hearing impairment mainly obtain information through vision. Information technology should provide support for developing audio and video resources with subtitles. Large text books and readable resources should be provided to support visually impaired students whose vision is blurred or completely blind. Students with mental retardation have serious cognitive impairment, so the production resources should be focused, specific image, sound and image. Different types of special schools have great differences in the content of school-based resource base, so the lack of school-based resource base construction indicates that the current pertinence of special education resources is not strong. "Learning resources should be tailored to reduce learning disabilities caused by their own defects, such as visual access to information, information technology should provide support for the development of audio and video resources with subtitles, etc.

4.3. The Teaching Application Ability Further Strengthens, the Application Level Enhancement is the Key

Special education students is special, because it faced the defects of different types, different types of disorders caused by defects, difference of students' learning and rehabilitation needs, these are the informationization teaching factors must be considered, such as the deaf students' listening condition, deaf school teachers should provide visual information for the deaf students as much as possible, such as video, with text rendering clear, content clear courseware; Teachers in blind schools should pay more attention to the cognitive level, attention and stability of students with intellectual disabilities. Therefore, when making courseware, they should consider how to focus students' attention and stimulate their learning interest, such as making courseware with bright colors, using video, animation and other visual media resources, and using less text to present information. Visually impaired students have blurred vision, so it is necessary to pay attention to the recognition of font size and color when making courseware. Advanced information technology combined with professional rehabilitation courses can help students with visual function training, auditory function training and intellectual training. For example, high quality rehabilitation courses and advanced rehabilitation teaching equipment can help deaf students improve their hearing level and even communicate with others normally, and can help mentally handicapped students regain various abilities such as movement, perception, cognition and language communication.

4.4. To Promote the Construction of Management Information, Improve the Information Management Mechanism is the Key

The management information system of special education schools still needs to be further optimized. Both the realization of its functions and the application of basic data need to be further improved[14]. The management information system should be optimized and improved according to the individual needs of special education schools. Special-education schools of various types of special education school management system based on data application category is relatively narrow, used in the sector performance appraisal, learning analysis, planning, ignoring the special requirement of the special education school, should intensify of the construction of the personalized information management system, continue to broaden the management system application scope, enhance the level of special education informationization management mechanism. Special education information management system should realize the basic work of data and business integration between different departments, ensure the standardization, standardization and reliability of information according to standard coding, strengthen the systematic and intelligent management of education, and promote the sharing and convergence of information education management platform.

4.5. The Safeguard Mechanism Needs to be Strengthened, and In-Depth Technical Research and Development is the Key

To improve the guarantee of teachers' information technology training, it is necessary to increase the use of information technology to improve disabled students' ability to compensate for defects, their ability to sense perception and cognitive development, and their ability to combine rehabilitation with teaching[15]. According to the standards of information technology application ability of teachers in special education, teachers' information technology application ability construction with the integration of training, examination and certification is implemented, and the evaluation results of information technology application ability are incorporated into the teacher

certification system. We will accelerate the establishment of an open and multi-level training system for teachers to apply information technology, and actively carry out pre-service and post-service distance education and training. Advocating network inter-school collaborative learning, improve the level of information technology teaching. Gradually popularize the expert-led online teaching and research, improve the pertinence and effectiveness of teachers' online learning, and promote the professional development of teachers. Adopt a variety of methods and means to help teachers effectively apply information technology, update teaching concepts, improve teaching methods, improve teaching quality.

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