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Experience Design for Cognitive Education Based on the SAPAD-AHP Vocational Rehabilitation for Mental Retardation People

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Abstracts: *Reorganize community functional service modules, construct cognitive services for vocational rehabilitation of mental disorders in care institutions, and improve the level of cognitive vocational rehabilitation for people with disabilities. Integrating the SAPAD model and hierarchical analysis to design and research the process of supported employment for persons with mental disabilities, the study delves into user behaviour, completes the mapping of user's behaviour-object-meaning through the model framework, completes the mapping of meaning-object with core meaning clusters, finds the key behaviour of the user and uncovers the real needs of the user, thus systematically improving the service experience of the childcare institution. The AHP quantitative research method is used to find out the core needs of users and to think about and solve problems in a more objective and comprehensive way. In this way, the SAPAD model is refined and innovations are realised at the methodological level, and finally it is applied to the Mindfulness Supported Disability Service System to provide new ideas for improving the problem of supported employment for people with disabilities.*

Keywords: *Mental retardation people; SAPAD; Hierarchical Analysis; Service Design; Vocational Rehabilitation*

1. Introduction

According to a survey conducted by the China Association of Persons with Intellectual Disabilities and their Families and Friends in 2012, there are currently 5.54 million people with intellectual disabilities in China, and 4.3 million people with multiple disabilities, making a total of nearly ten million people [1]. As a disadvantaged group in society, mental retardation people have their own physical deficiencies that make them different from normal people in terms of language and movement, and they are unable to participate in normal social life and need the help and support of society as a whole. Some researchers have demonstrated through practical training that mental retardation people also have work skills, such as car washing skills, cake baking skills, food preparation skills and toilet cleaning skills [2]. It is enough to show that mentally challenged people have the ability to be employed but lack guidance or do not have suitable positions. Mentally challenged people are a group with potential and if steadily employed will reduce the time, effort and money spent on care by others. Helping mental retardation people into employment not only provides direct financial benefits, but also allows them to experience independence and can enhance the development of their self-esteem, the acquisition of social skills and the use of community resources, which will help maintain long-term social stability. A survey of the current employment situation of people with disabilities found that more than 60 per cent of people with disabilities were in a poor employment situation, nearly 70 per cent did not know what kind of work they were suited to, and 62 per cent were in jobs they were not interested in [3]. The employment situation of people with disabilities is closely related to their self-understanding, their knowledge of workplace jobs and their ability to adapt, among other things. Therefore, it is particularly important to develop and carry out vocational rehabilitation programmer for mental retardation people using the concept of career development as a guide, and to conduct in-depth research on cognitive education for vocational rehabilitation of mental retardation people.

Employment is the fundamental way for people with intellectual disabilities to participate in society. Due to the special nature of the disabled group, in actual life they are often passive recipients of blood transfusions from the government and social charities, and their own blood-making function is insufficient, resulting in the disabled group being unable to actively integrate into society, and even more so, lacking the knowledge of vocational rehabilitation, resulting in independent employment and career

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choice. At present, there are three main modes of employment for people with disabilities in China: centralized employment, decentralized employment and self-employment. The majority of them are self-employed, but self-employment itself has certain shortcomings, such as unstable employment, single job content and lack of market competitiveness.

Both national policies and social organizations are a passive model for the assistance of mental retardation people, and there is no systematic analysis of how to improve the experience of vocational rehabilitation cognitive education for mental retardation people from the user's perspective.

SAPAD (Semiotic Approach to Product Architecture Design) is a user-centred modeling framework for solving practical problems, co-founded by Prof. Hu Fei and Prof. Keiichi Sato. Based on product semiotics [4-5], the SAPAD framework is able to start from the user's behaviour and creatively introduces the "meaning" dimension to analyse the user's behaviour, layer by layer, to analyse the meaning behind the behaviour, the framework is able to dig deeper into the stakeholders' deeper meanings, values, potential conflicts and mapping deeper needs in complex interactions. The framework is able to explore the deeper meanings, values and potential conflicts of stakeholders in complex interactions and to map deeper needs [6]. The SAPAD framework has been widely used in many fields. Hu Fei and Zhou Kun [5] et al. use the SAPAD framework to solve the problem of designing community rehabilitation services under the combined medical and elderly care model. Wang Yang et al [7] used the SAPAD framework to optimize the design of driver's umbrellas. Chen Shanshan et al [6] used the combination of both SAPAD and hierarchical analysis as the theoretical support to improve the design of the pediatric dental service module, thereby improving and enhancing the experience of pediatric dental treatment.

Analytic Hierarchy Process (AHP) [8] has the characteristics of combining qualitative and quantitative analysis, systematization and hierarchization, which can objectively quantify each level step by step to obtain research results on the basis of subjective qualitative analysis of the research object based on SAPAD framework. The combination of the two can solve the problem that the analysis process of SAPAD framework is more subjective, thus providing a reference for improving the SAPAD framework.

For the first time in the literature [6], the SAPAD model is integrated with the AHP method and applied to the design of a service system for paediatric dental treatment, providing feasible solutions to improve the user experience. This integrated methodological process applied to the field of service system design can provide increased precision and effectiveness in problem solving. Therefore, the SAPAD-AHP design methodology model is used to try to improve the service system design of supported employment education cognitive experience from the core meaning of the user, as well as the application process in the construction of user behavioural experience, and then optimise its service process and experience to further improve the framework theoretical system of the model. The framework theoretical system is further improved by combining qualitative and quantitative analysis to clarify the key points of the service process design, so that the core needs and objectives can be more focused, thus improving the accuracy of the design and enhancing the vocational rehabilitation education experience of rehabilitated people, and providing better services for mental retardation people.

2. Description of the research process of the SAPAD-AHP method

2.1. SAPAD model meaning clusters based on user behavior dismantling

The SAPAD model is divided into the following steps:

- First, the SAPAD model framework is used to analyse user behaviour and gradually disassemble the tasks and subtasks;
- Then the objects contained in the subtasks, such as people or objects, are listed one by one, and a mapping of behaviour-objects is obtained. The embodied meaning is divided according to 6 levels: physical, semantic, experiential, semantic, pragmatic and social, and the mapping of these 6 levels to all the Ren forms the act-meaning mapping.
- Finally, the 6 levels of meaning were clustered and analysed to produce clusters of meaning.

2.2. AHP-based in-depth analysis to obtain core meaning clusters

The Analytic Hierarchy Process is a method [8] for analyzing the importance of factors. Applying the Analytic Hierarchy Process after the SAPAD model analysis can further clarify the weight of user needs,

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make up for the shortcomings of the SAPAD model which lacks effective judgments on the importance and priority of needs, improve the accuracy and objectivity of user needs analysis, and provide a more accurate user needs hierarchy for user experience service design[9] . The main process of AHP analysis of vocational rehabilitation education experience for mental disorders is as follows: establish a hierarchical analysis structure of needs based on SAPAD preliminary user needs meaning clusters; divide the meaning clusters and corresponding meanings into criterion and solution layers, and establish a two-by-two judgment matrix of each sub-factor based on the hierarchical analysis structure; calculate the need weights on the basis of passing the consistency test, and obtain the criterion layer and solution layer of the hierarchical analysis structure The accuracy and importance of the criteria and solution layers in the hierarchy are obtained. After filtering and summarising the layers, the core clusters of meanings are obtained.

Let the judgment matrix$B = (b_{ij})_{n\times n}$, Using the sum-product method to normalize the elements in B by:

$$\bar{b}_{ij} = \frac{b_{ij}}{\sum_{k=i}^{b_{ij}} b_{ij}} \quad \text{where } i,j = 1,\ 2,\ \cdots,\ n$$

The weights of each indicator are obtained by summing the terms of the same row of the normalized matrix and dividing by n, with the following formula.

$$\omega_i = \sum_{j=1}^{n} \overline{b_{ij}} \ / \ n \tag{1}$$

Solve for the maximum characteristic root of the judgment matrix.

$$\lambda_{max} = \frac{i}{n}\sum_{i=1}^{n} \frac{(B\omega)_i}{\omega_i} \tag{2}$$

Perform consistency tests.

$$\text{CI} = \frac{\lambda_{max}-n}{n-1} \tag{3}$$

$$\text{CR} = \frac{CI}{RI} \tag{4}$$

Where RI is the random consistency indicator, which can be obtained by looking up the table. CR is the consistency evaluation indicator, and when CR < 0.1, the consistency test is passed, indicating that the weight value ω_i is valid.

After calculation, the indicator with the greater weight is obtained as the core meaning cluster. From the process of determining the core meaning clusters, it can be seen that the computational analysis of AHP can provide data support for subsequent design studies, and is more objective and direct and scientifically based than the core meaning clusters obtained directly through the more subjective correlation analysis method of SAPAD.

2.3. Acquisition of new service modules based on mapping results

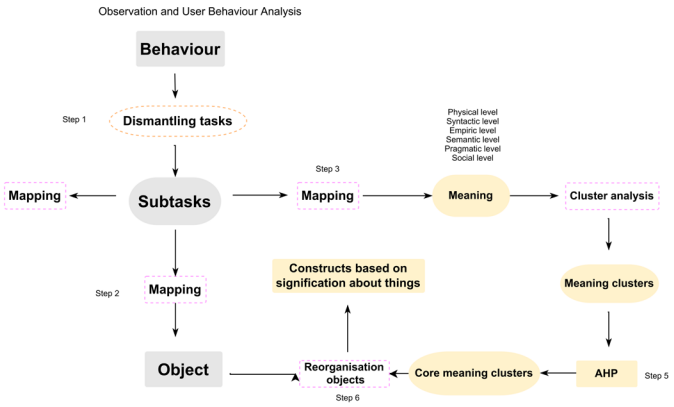

Figure 1: SAPAD-AHP flow chart

After going through the above steps, the final core clusters of meaning are mapped to objects to complete the construction of meaning-based objects. The key behaviours of users are then identified using the relevant objects, thus uncovering the real imperceptible needs of users, and then the functional

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modules of the service experience design are reconstructed based on the conclusions obtained from the model. The essence of the SAPAD-AHP framework [6] is to find the core clusters of meaning, reconstruct the user behaviour through the core clusters of meaning, and optimise the service design functions based on the existing ones. As shown in Figure 1.

3. SAPAD-AHP design example analysis:Take Changsha Sunny Day Charity as an example

At present, China's public interest institutions' education services for people with disabilities are still in the developmental stage, there is not a unified process standard, and the demand for community education services for people with disabilities far exceeds the supply. This study takes the current community education process as a starting point, and analyses the typical behaviour of users by taking the community education experience of mental retardation people as the served party.

3.1. Defining user behavioral paths

Through the cognitive experience design scenario and field research of the Changsha Clear Sky Public Welfare Disability Service Centre in Hunan Province, a number of mentally disabled people were selected for observation. The typical user H with mental retardation who participated in the institution's employment support services was selected as the main research subject and service object, and the content revolved around the daily training activity behaviour of mental retardation people in Changsha Clear Sky Public Yi Zhi Home The study focuses on the daily training activities of mentally disabled people at the Changsha Sunny Day Home. The mental retardation user H is a female, in good physical condition, interested in handicrafts, living in Changsha Yuhua District, with moderate mental retardation, and is currently actively receiving regular rehabilitation training for mentally handicapped persons. Through the participant observation method of tracking mental retardation H's receiving vocational rehabilitation training, then H conducted in-depth interviews with and H's social worker to fully understand the whole process of H's participation in the institution's regular training, and drew up a map of the daily training scenarios of mental retardation H users in Figure 2

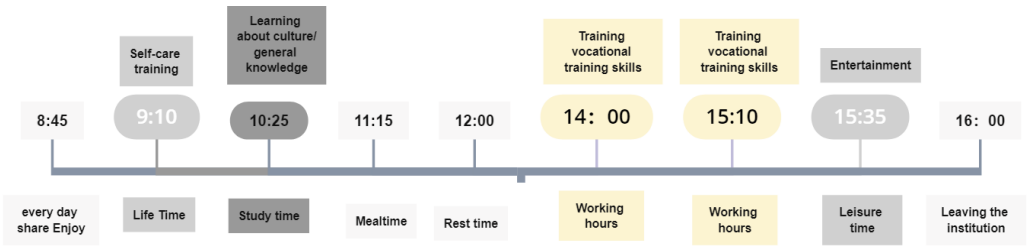

Figure 2: Picture of one-day tracking for H

3.2. Constructing a Clear Sky vocational rehabilitation service system based on meaning

3.2.1. Analysis of the behavior-sub-task-object mapping

The following scenarios were extracted from the educational behaviour of Chang Sha Yi Zhi Home Mental Disability Service Centre, based on the behavioural dimensions of the SAPAD theoretical framework, and divided into six scenarios: A to learn about vocational rehabilitation, B to raise learning needs, C to participate in vocational rehabilitation training, D to review after training, E to apply in life, and F to give feedback. And each activity is divided into tasks and subtasks and mapped to related objects to complete the mapping from behaviour to object. According to the behavioural dimension of the SAPAD theoretical framework, we define the above scenarios as activities in SAPAD. The analysis of meaning extraction and mapping analysis based on user behaviour splitting is one of the key steps in the SAPAD theoretical framework.

3.2.2. Behavior-object-meaning mapping extraction

Based on the behaviours and objects of the mentally impaired, the meanings behind the user's behaviour were listed according to the SAPAD theoretical model, and the resulting meanings were divided into physical, semantic, experiential, semantic, pragmatic and social layers according to the hierarchy, and then the task was mapped to these six layers [5]. As can be seen in Table 1, of the many meanings mapped to the behaviour of the mentally disabled, a total of 20 meanings appear in the semantic layer, 20 in the experiential layer, 20 in the semantic layer, 13 in the pragmatic layer and 3 in the social

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layer.

In the theoretical study of the SAPAD model, the physical layer emphasises physical attributes, such as environment, people, objects, information, etc.; the semantic layer is the interaction or combination of functions between physical attributes, encompassing learning needs, communication interactions, etc.; the semantic layer points to human emotions and personality, related to human emotional appeals and experiences in later service design; the semantic layer is purpose and communication, related to mutual service and understanding between stakeholders in service design; and the social layer reflects human value tendencies and ideologies.

Table 1: Analysis of activity and object mapping

Activities	Surroundings	Tasks	Subtasks	Meanings					
				Physical layer	Syntactic layer	Empirical layer	Semantic layer	pragmatic	social layer
A.Learn about learning about vocational rehabilitation	Home		Parents review policies on the news page	Mobile TV Newspaper	Don't know the policy Access to employment information and channels	Easy access to information online	Inefficient, blind and aimless enquiries	Communicating the need for willingness to learn	
	Home Community	Find out about services/employment for mental retardation people	Parents review community services for the community	Mobile phones, cell bulletin boards	Ask a question Make an offer to study	Community Services Q&A	Feeling helpless with no place to turn for education	Communicating the need for willingness to learn	
	Neighbourhood Council Street		Find out about services	Bulletin Public	access to channels and services.	Direct advice is most effective	Needs are met		
	Service Centre for Mentally Retarded		Information boards for educational information and ways to get involved	Social Worker, Handbook	Access to channels and services, information exchange and ideas	Most direct and effective communication with institutions	Needs are met	Eager to guide recommendations	
	Home	Learn more about the institutional service system	Collate the brochure for information	Handbook	WeChat to get information on institutional training services and how to register		Needs are responded to and feel satisfied		
		Enrolling Institutions	Contact social worker to sign up	Social worker, mobile phone	Enquire about registration		Looking forward to vocational rehabilitation training		Trusted Institutions
B. Participation in vocational rehabilitation training	Service Centre for Mentally Retarded	Training participation	Aptitude test	Test props, equipment, ability scale	Assessing the degree of mental impairment and basic abilities	Assesses, measures individual basic competency needs	Access to Training Service Needs Level Assessment		
			Listening to a volunteer teacher	Training schedule, class schedules	Forming a supportive relationship	Requires many repetitions of instruction	Desire for guidance	Gratitude	
			Listen to a demonstration of skills	teachers, tools, materials, the	Sitting in a circle and listening to a demonstration by a	Multiple repetitions to get started	Satisfaction		
			Raise your hand and ask questions about how to do it	Social Worker	Ask questions and complete a craft	Can get help and guidance in a timely manner	Easy, timely access to help	A sense of relaxed interaction	
			Hands on	tools, materials.	Sharing experiences with each other and partners	Mild mental retardation is easier to understand	Interesting, joyful	Sense of inclusion	
			Take notes and photos	Notebooks, mobile phones	Keeping a diary to record learning and gains	Slow to receive information	Hope to be familiar with it after class	Application in life	
C. Post-training refresher	Home	Looking through the notebook	Reviewing the knowledge	Notebooks	Practice on your own		Desire to master the learning content	Self-confidence	
		Review and comb through	Share what you have learnt with your classmates	Class partners	Demonstrate and discuss how well they have done		Gaining a sense of identity	Emotional communication	
		Go through with information	Browse the Disability Employment Platform	Mobile phone computer	Understand policies and access to employment information and channels	Choose an institution that is more professional	Confidence	Sense of security	
D. Life applications	Service Centre for Mentally Retarded	Share it with your family	Applying a diamond pack to a handmade item as a gift to join	Family, bags	Share their experiences and gains	Introduce the knowledge and skills learned to your family	Happy	Sense of accomplishment	
		Join the practice	Exposure to the process of supported employment products and making a green horse	Teacher, social worker, partner	Sitting in a group and listening to a demonstration by a social worker	Collaborate for greater execution	Gaining a sense of identity	Sense of collective honour	Vocational Rehabilitation Awareness
		Join the charity sale	Participate in a joint community sale at a care home Giving the supported	Teacher, mentally challenged partner, supported employment products	Demonstrate what you have learnt	More collaborative delivery	A sense of achievement in self-presentation	Sense of identity	Sense of social engagement to expand impact
E. Feedback	Home	Feedback to social workers	Exchange dialogue with social worker tips	Social Worker, Insight Form	Feedback and evaluation	Feedback to social workers on course issues in a timely manner	Sense of responsibility	Sense of responsibility	
	Service Centre for Mentally Retarded		Filling in feedback forms in class	Teacher, feedback form	Feedback and evaluation	Raise expectations for further training with social workers	Feel lost without a place to study		

3.2.3. Clustering analysis of user behavioural meanings and construction of meaning clusters

This is because rehabilitative educational behaviours for mental retardation people are not continuous activities, but rather a number of behaviours that come together. The rehabilitation education experience behaviour will change depending on the location and environment, and the object of its action will also

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change, but the meaning of the behaviour is directed in a convergent and correlated way. The goal of the vocational rehabilitation education service system is to realise the core meaning of the rehabilitation life of mental retardation people. We can derive the core demands and meanings of mental retardation people in the vocational rehabilitation education experience in the semantic, pragmatic and social layers, and combine the existing relevant functional modules to disassemble and reorganise the physical layers to build new experiences. Therefore, the association matrix based on Boolean logic algorithm [10] was used to cluster and analyse the semantic, semantic and experiential layers selected for this study. The strength of association of meanings can be divided into four levels: 0, 1, 2 and 3, with "0" representing no association, "1" representing weak association, "2" representing strong association and "The clusters of meaning can be clearly seen in the results of the algorithm, and when the four colours are used in the visualisation of the algorithm and arranged neatly, the clusters of meaning can be clearly and intuitively displayed from light to dark. See Table 2.

Table 2: Significant cluster of semantic level

	Inefficient, blind and aimless enquiries	Feeling helpless with no place to turn for education	Needs are met	Needs are met	Needs are responded to and feel satisfied	Looking forward to vocational rehabilitation training	Access to Training Service Needs Level Assessment	Desire for guidance	Satisfaction	Easy, timely access to help	Interesting, joyful	Hope to be familiar with it after class	Desire to master the learning content	Gaining a sense of identity	Confidence	Happy	Gaining a sense of identity	A sense of achievement in self-presentation	Sense of responsibility	Feel lost without a place to study
Inefficient, blind and aimless enquiries	3	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Feeling helpless with no place to turn for education	3	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Needs are met	0	0	3	3	3	2	2	1	3	0	1	0	0	0	1	0	0	0	0	2
Needs are met	0	0	3	3	3	2	2	0	3	0	1	0	0	0	1	0	0	0	0	2
Needs are responded to and feel satisfied	0	0	3	3	3	2	2	0	3	0	1	0	0	0	1	0	0	0	0	2
Looking forward to vocational rehabilitation training	0	0	2	2	2	3	2	3	0	0	2	2	2	0	0	0	0	0	0	2
Access to Training Service Needs Level Assessment	0	0	2	2	2	2	3	3	3	0	0	0	0	0	0	0	0	0	0	0
Desire for guidance	2	2	1	0	0	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0
Satisfaction	0	0	0	3	3	3	3	3	3	2	3	3	0	0	0	0	0	0	0	0
Easy, timely access to help	0	0	0	0	0	0	0	0	2	3	3	1	0	0	0	0	0	0	0	0
Interesting, joyful	0	0	1	1	1	2	0	0	3	3	3	3	3	3	3	3	0	0	0	0
Hope to be familiar with it after class	0	0	0	0	0	2	0	0	3	1	3	3	3	3	3	3	0	0	0	0
Desire to master the learning content	0	0	0	0	0	2	0	0	0	0	3	3	3	3	3	3	0	0	0	0
Gaining a sense of identity	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	0	0	0	0
Confidence	0	0	1	1	1	0	0	0	0	0	3	3	3	3	3	3	1	1	1	1
Happy	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	1	3	1	1
Gaining a sense of identity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	3	3	1
A sense of achievement in self-presentation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	3	3	3	2
Sense of responsibility	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	3	3	2
Feel lost without a place to study	0	0	2	2	2	2	0	0	0	0	0	0	0	0	1	1	1	2	2	3

The semantic layer focuses on the results of personal emotional factors and independent reflection, and the clustering results reflect the deeper meaning of personal emotions, in this case the user's experience. The cluster analysis yielded seven clusters of meaning as shown in Table 2: (1) aimless consultation, (2) needs responded to, (3) rating assessment, (4) gaining satisfaction, (5) interested and happy to learn, (6) confidence in identity, As shown in the Tab. 2.

The empirical layer emphasises the user's skills of use and life experience in processing information. We got five meaning clusters through the cluster analysis: (1) Direct counselling is the most effective; (2) Repeated instruction and practice are needed; (3) Help is received in a timely manner; (4) The partnership model is more efficient and participatory; (5) Feedback and communication with the social worker is timely.

The pragmatic layer is the purpose of symbols and the communication effects of groups in the Semiotics theory. The semantic layer here expresses the expectations of the user.We got five meaning

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clusters through the cluster analysis: (1) communicating a desire for guidance in learning needs; (2) gratitude; (3) feeling relaxed and included; (4) gaining satisfaction; (5) interest and willingness to learn; (6) confidence in identity.

3.2.4. Extraction of core meaning clusters through AHP

The clusters of meanings obtained from the cluster analysis were further analysed using AHP. The meaning clusters obtained from the above-mentioned behaviours of vocational rehabilitation experience for mental retardation people were used to construct a hierarchical model of experiential needs.

The semantic layer was used as the overall goal, i.e. the target layer, for mental retardation people to understand the vocational rehabilitation experience. The (1) aimless consultation; (2) needs are answered; (3) evaluation assessment; (4) satisfaction gained; (5) interest and willingness to learn; and (6) confidence in identity were as a higher standard tier. Sense of achievement will be (1) helpless and confused with nowhere to turn to for education; (2) gaining confidence; (3) desire for guidance; (4) anticipation, outlook; (5) satisfaction with response; (6) joy. (7) Expectation of vocational rehabilitation training; (8) Convenience and timely help; (9) Desire for familiarity and mastery after the class; (10) Desire to master the learning; (11) Collaborative progress together; (12) Sense of achievement in self-presentation; and (13) Sense of responsibility as strategic layers. A model of the specific vocational rehabilitation cognitive education experience levels is shown in Figure 3.

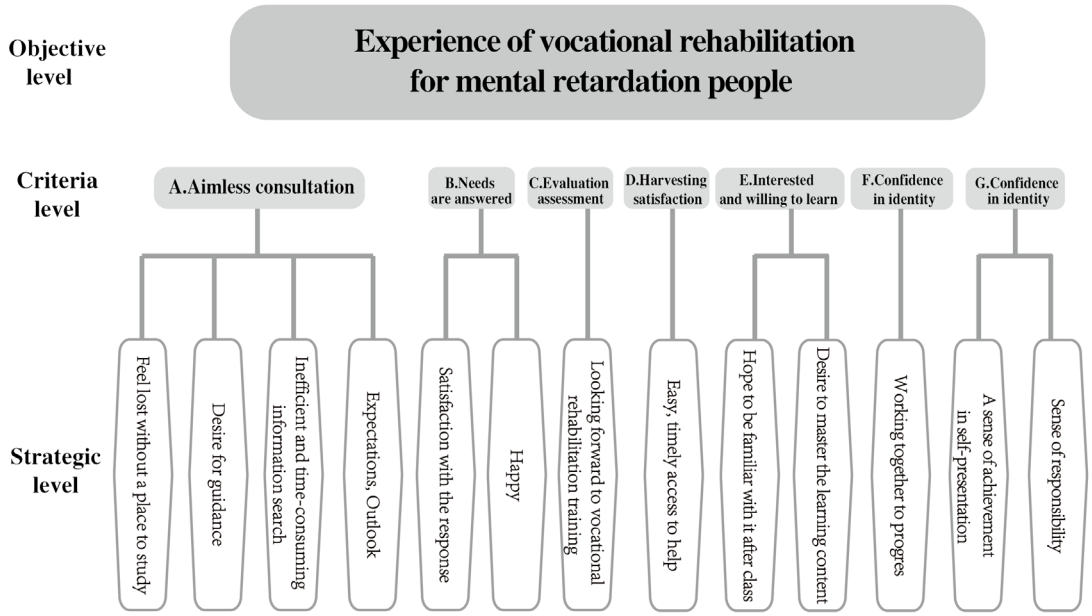

Figure 3: Hierarchical model of the experience of vocational rehabilitation for mental retardation people

In the first step, the seven indicators in the criterion layer were compared two by two through hierarchical analysis, using the 1-9 level calibration method, and the AHP judgement matrix was constructed as shown in Table 3. indicating the relative importance between the indicators of the same level of significance needs, constituting the judgement matrix.

In the first step, the judgement matrix was normalised by formula (1).

Table 3: Criterion level judgment matrix

Indicators	A	B	C	D	E	F	G
A	1	1	1	1/5	1/5	1/7	1/9
B	1	1	5	1/3	1	1/3	1/7
C	1	1/2	1	1/5	1/3	1/5	1/9
D	5	3	5	1	3	1/3	1
E	5	1	3	1/3	1	1/3	1/5
F	7	3	5	3	3	1	1
G	9	7	9	1	5	1	1

In the second step, a consistency test is performed on this judgement matrix to ensure the logic of the

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judgement by judging the validity of the matrix.Using equation (3), λ_{max} was calculated to be 7.4984. Taking n = 7, the value of λ_{max} was substituted into equation (4) to calculate CI = 0.0831 and a table check showed that RI = 1.341. Substituting CI and RI into equation (5), CR = CI/RI = 0.0619 < 0.1 was calculated, indicating that the consistency of the indicators was within the acceptable range and the weight values were valid. Similarly, a CR value of 0.019 7<0.1 was obtained for the judgment matrix of the programme stratum of the cognitive education experience of vocational rehabilitation for mental retardation people, indicating that the consistency of the programme stratum was within acceptable limits.This indicates that all experts' judgement matrices pass the consistency test and that the hierarchical model and weight values can be used as the basis for the next step in the analysis of judgements.

The resulting weights for the programme tier are calculated in Table 4. Similarly, the weights for each tier of the experience and discourse tiers can be calculated. From the calculated weights, it can be seen that the weights for the indicators of understanding the vocational rehabilitation experience in mental retardation people, and gaining satisfaction, confidence in identity, and achievement are higher for the indicators of aimlessness, needs being responded to, level assessment, interest, willingness to learn and feeling relaxed having a sense of inclusion, confidence in identity, passing Learning Needs Desire for Guidance and other factors were related.

Table 4: Weight ranking of vocational rehabilitation for mental retardation people experience criteria

Indicator Ranking	Indicator name	Eigenvectors	Weighting values (%)	Maximum characteristic root	CI value
6	Aimless consultation	0.3493	0.0355		
5	Needs are answered	0.6963	0.0708		
7	Evaluation assessment	0.3133	0.0318		
3	Harvesting satisfaction	1.853	0.1883	7.4984	0.0831
4	Interested and willing to learn	0.8548	0.0869		
2	Confidence in identity	2.6611	0.2704		
1	Sense of accomplishment	3.1133	0.3164		

3.2.5. Mapping Analysis of core meaning clusters and Objects

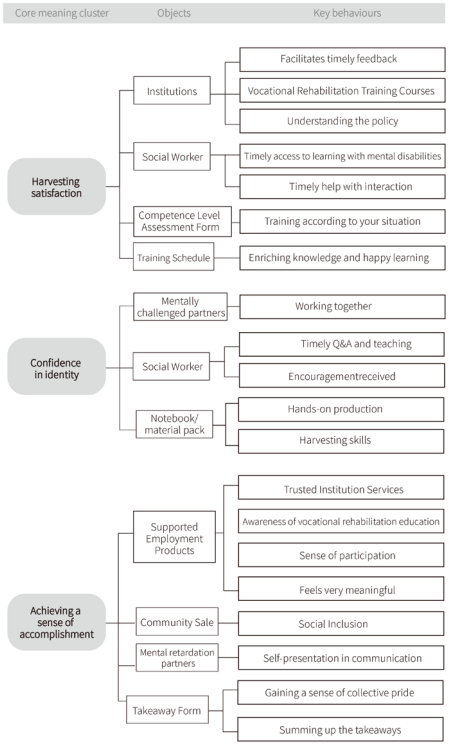

Figure 4: Picture of core meaning cluster, objects and key activities mapping

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The meaning clusters with higher weights obtained through the AHP are: gaining satisfaction, gaining confidence and identity, and achieving a sense of achievement. The mapping of the three core meaning clusters - objects - key behaviours is shown in Figure 4. Similarly, the weights of the experience and pragmatic layers can be calculated to obtain the higher weighted clusters of meaning, which are timely help, efficient and more involved in the partner collaboration model, timely feedback and communication with the social worker, confidence building and relaxation with a sense of inclusion, and communication of learning needs with a desire for guidance.

3.2.6. Design of a behavioural-meaningful-object-based cognitive service system for vocational rehabilitation of mental retardation people persons

The construction of core meaningful relationships clarifies the meaning and goals of the vocational rehabilitation cognitive education service system for mental retardation people. Providing direction to the vocational rehabilitation cognitive education experience can improve the design of vocational rehabilitation service systems.

The analysis results derived from the meaning of user behaviour as the starting point of the study, based on the SAPA-AHP framework, can be an important guide for the comprehensive provision of vocational rehabilitation service education required by mental retardation people in the community. The different tasks are brought together into user activities in the order of user behaviour and designed for the touchpoints of the tasks. In the process of construction, it was found that mental retardation people crave for core needs as the key to vocational rehabilitation cognitive education. The 20 key behaviours were grouped together to obtain 7 main key behaviours such as vocational rehabilitation cognitive education, 2 training skills and psychological education, 3 institutional service management, 4 interactive sense of participation, building confidence sense of achievement satisfaction, 5 providing emotional value to. This is used as a design point to reorganise the design of vocational rehabilitation education experience from and to construct the design of vocational rehabilitation cognitive education service for mental retardation people people in childcare institutions. As shown in Figure 5

The experience service system of vocational rehabilitation cognitive education for mental retardation people can effectively integrate the modules of gaining skills, acquiring identity, acquiring value identity, self-expression, cultural and general knowledge education, and, meeting emotional needs, through the vocational rehabilitation education cognitive experience design to meet the needs of users. It also takes into account the relationship between various stakeholders, such as the government, enterprises, and the community, with service providers each undertaking independent service functions, yet interfacing with each other to achieve the integration of vocational rehabilitation education supported employment, forming a complete vocational rehabilitation service circle for mental retardation people.

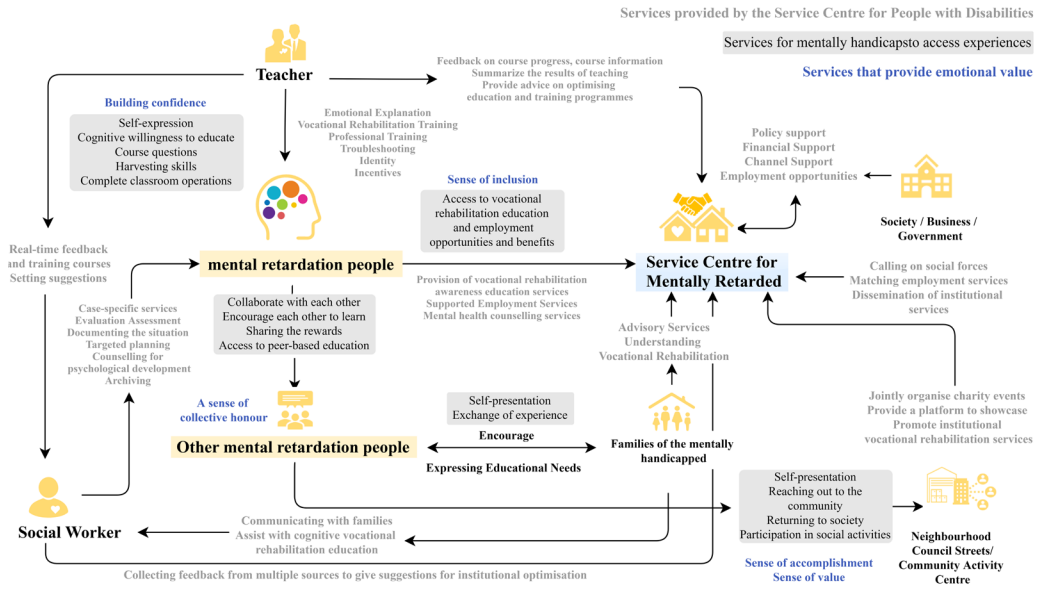

Figure 5: Design of a cognitive education system for vocational rehabilitation of mental retardation people

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4. Conclusion

With the growing number of people with intellectual disabilities, people with mental disabilities are a group of people with intellectual disabilities that cannot be ignored. Due to their physical impairment, they are very restricted in both their self-development and social development. Compared to normal groups of people, it is difficult for them to integrate into society through their own efforts, and they need the widespread attention of society at large in order to integrate into social life. However, the existing service system is still unable to provide professional in-service experiences for people with disabilities and their families, and therefore a new perspective is needed to study the experience of vocational rehabilitation cognitive education services for people with mental disabilities. This study analyses the behavioural process of the cognitive experience of vocational rehabilitation education for people with mental disorders through the SAPAD framework, which breaks down the treatment behaviour of people with mental disorders and parents into tasks, subtasks and behavioural correlates. Based on the theory of product semiotics, the mapping of subtasks to six meaning layers (including physical layer, semantic layer, experiential layer, semantic layer and pragmatic/social layer, etc.) was completed, and then the meaning clusters were obtained by clustering the meanings obtained through the mapping. The meaning clusters behind user behaviour are divided into core and non-core meaning clusters, and the core meaning clusters are the key to successfully finding the core user needs, so a scientific approach is needed to find the core meaning clusters. Because AHP has the characteristics of combining qualitative and quantitative analysis, systematization and hierarchy, the higher weighted indicators calculated by AHP are more objective than the conclusions obtained by directly using the correlation analysis method in the SADAD framework, and the combination of the two avoids the problem of subjectivity and arbitrariness that may exist in the design decision results, making it more feasible and reasonable. Therefore, the AHP is used to analyse the meaning clusters at each level, and the clusters with higher weights are the core meaning clusters, i.e. gaining satisfaction, confidence and achievement. Finally, through the meaning-object-key behaviour mapping, the real needs and design points of mentally challenged people and parents are found. This integrated approach not only makes the experience attendant design process more rational and objective, but also effectively bridges the limitations of existing design methods, and can provide a viable solution to the design of vocational rehabilitation cognitive education experiences for people with disabilities with mentally disabled people as the target users at both the methodological level and the practical level, which is tailored to the needs.

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References

[1] Yang Wenjing. A study on employment services for people with mild intellectual disabilities in social work intervention [D]. Capital University of Economics and Business, 2018.
[2] Pu Yunhuan. Career development theory perspective: vocational rehabilitation of mentally disabled youth [J]. Journal of Guizhou College of Engineering and Applied Technology, 2021, 39(5): 146-153.
[3] Huang Baichun. Research on career planning for people with disabilities [D]. Changsha: Hunan Normal University, 2011.
[4] Hu Fei, Keiichi S, Zhou Kun, et al. From Knowl-edge to Meaning: User-centered Product Architecture Framework Comparison between OMUKE and SAPAD[C]. Paris: Atlantis Press, 2016.
[5] Hu Fei, Zhou Kun, Liu Zhang-sheng. Service Design of Community Rehabilitation for the Elderly Based on SAPAD Framework [J]. Packaging Engineering, 2018, 39(2): 1-7.
[6] Chen Shanshan, Duan Qijun, Li Yajun. A study on the design of children's dental service system based on SAPAD-AHP_Chen Shanshan [J]. Packaging Engineering, 2021, 42(10): 115-123.
[7] Wang Yang. Umbrella Design Research for Driver Based on SAPAD [D]. Guangzhou: Guangdong Univer-sity of Technology, 2014.
[8] Thomas L S. The Analytic Hierarchy Process: Planning, Priority Setting, Resource Allocation [M]. New York: McGraw-Hill, 1980.
[9] Wang Tianxiong, Zhou Meiyu. Construction of Cultural and Creative Product Design Paradigm

ISSN 2616-7433 Vol. 4, Issue 10: 28-38, DOI: 10.25236/FSST.2022.041006

Based on User Kansei Needs [J]. Packaging Engineering, 2020, 41(20): 14-18, 23.
[10] Liu Jiangang, Ma An, Wang Ningsheng. Product Structure Module Clustering Method Based on Design Structure Matrix [J]. Journal of South China University of Technology (Natural Science Edition), 2016(11): 45-48.