



Research Article

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Received: 29 March 2024 / Accepted: 30 April 2024 / Published: 5 May 2024

Development of a Scale to Assess University Faculty's Knowledge, Attitudes, and Practices in Special Education

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DOI: <https://doi.org/10.36941/jesr-2024-0078>

Abstract

With the increasing number of university students with disabilities, university professors play a significant role in teaching and assessment. The purpose of this study was to develop and validate a scale to assess university faculty's knowledge, attitudes, and practices in relation to providing special education services. A total of 210 faculty members recruited from 15 universities in Taiwan participated in this study. The sample included lecturers ($n = 51$), assistant professors ($n = 75$), associate professors ($n = 66$), and professors ($n = 18$). The proposed Faculty Perspectives on Special Education Scale (FPSES), a 32-item scale, includes three subscales: Special Education Knowledge (SEK), Attitudes Towards Students (ATS), and Provision of Services (POS). Data collected were analyzed using descriptive statistics, item analysis, correlation analysis, t tests, exploratory factor analysis (EFA), and confirmatory factor analysis (CFA). Results showed that FPSES has satisfactory internal consistency reliability, with Cronbach's α ranging from .93 to .96 and test-retest reliabilities, with coefficient ranging from .88 to .96. The FPSES also exhibited favorable content validity. Furthermore, the CFA confirmed a good fit between the proposed second-order model and the sample data, thereby ensuring the construct validity. In summary, FPSES is a favorable assessment tool with good psychometric properties, which provides insights into faculty perspectives, attitudes, and practices in the provision of special education services for university students with disabilities. Recommendations are provided for future research and the Office of Disability Services at the university.

Keywords: Higher Education, Scale Development, Special Education, Students with Disabilities, University, Faculty, Validity and Reliability

1. Introduction

The global emphasis on inclusive education has resulted in increased opportunities for individuals with disabilities to pursue higher education (DaDeppo, 2009; Kleinert et al., 2012; Zhang et al., 2018). Such a phenomenon can also be observed in Taiwan, where the Annual Report on Special Education Statistics (Ministry of Education, 2022) revealed a considerable increase in the number of university students with disabilities over the past 15 years. The most significant growth has been seen among those with learning disabilities (LD), intellectual disabilities (ID), emotional and behavioral disorders (EBD), and autism. Students with other types of disabilities, such as cerebral palsy, visual impairments, and hearing impairments, are also increasing, but with a smaller growth rate. Overall, the number of students with disabilities has increased from 8,460 in 2008 to 16,760 in 2022, representing 0.75% and 1.70% of all university students, respectively. This represents a nearly doubled student population and proportion. Notably, 42% and 56% of high school graduates with disabilities in the corresponding year chose to pursue higher education, including enrollment in junior colleges, 4-year technical universities, and general universities (Department of Statistics, 2022).

The trend of increasing enrollment of university students with disabilities in Taiwan is comparable to that observed in the United States (U.S.), which has a longer history of special education development. Research has shown that there is a growing number of students with ID pursuing postsecondary education after completing high school (Grigal, Hart, & Migliore, 2011). Likewise, an increase in enrollment was observed among students with autism and EBD (Kuder & Accardo, 2018; Newman et al., 2011). The most pronounced growth in college enrollment was seen among students with LD (Hadley, 2018). Therefore, it is not surprising to learn that a national survey in the U.S. revealed that within 3-5 years of graduation, 32.7% of high school students with LD decide to enroll in college (Wagner et al., 2005) and this percentage rises to 60.9% if the time period is extended to 6 years (Sanford et al., 2011). This might explain why students with disabilities constitute approximately 11% of the total college student population in the U.S. (National Center for Education Statistics, 2009). Given the fact that Taiwan's special education laws and services in college education are highly referenced from practices in the U.S., two key implications could be drawn from these findings. Firstly, there is likely potential for further increase in the representation of students with disabilities within the broader university student population in Taiwan. Secondly, it is crucial to consider whether our higher education institutions are equipped to accept and provide appropriate educational services to this cohort to meet their abilities and needs.

2. Literature Review

According to the Special Education Act (SEA, 2019) in Taiwan, higher education institutions must develop special education programs and establish dedicated units and personnel to aid in the learning and development of students with disabilities. These programs must include, for each eligible student, the development of an Individualized Support Plan (ISP) tailored to their unique characteristics and needs (Wu & Chen, 2015). The ISP should assess the student's abilities, family requirements, and the special education services needed (Francis & Chiu, 2019). In addition, the development of the ISP should utilize a collaborative team approach that integrates available resources. By doing so, higher education institutions can provide equal opportunities for students with disabilities and facilitate their success in their academic pursuits (Kleinert et al., 2012).

Despite extensive regulations regarding higher education services for students with disabilities, gaps remain between requirements and practices. Research has shown that learning adaptations for Taiwanese university students with cerebral palsy and visual and hearing impairments are not satisfactory (Sheu et al., 2002). Chen (2008) found that university students with disabilities in Taiwan face a number of challenges in their daily lives, encompassing aspects related to learning, psychology, and daily living. Among these, learning difficulties were found to be the most significant. These findings are consistent with those found in previous research conducted in the U.S. (Dowrick et al.,

2005; Wagner et al., 2005), United Kingdom (Riddell et al., 2007), China (Zhang et al., 2018), and Lebanon (Khansa, 2015). To summarize, the challenges in both learning and daily living experiences may contribute to the observed average dropout rate of approximately 9.09% among university students with disabilities in Taiwan, as reported by Lin and colleagues (2008). In contrast, the dropout rate for typical Taiwanese university students is 5.60%.

In accordance with the legal regulations and student needs, university professors are expected to accommodate the learning needs of students with disabilities by potentially adjusting the learning process, environment, and assessment (Murray, Wren, & Keys, 2008; Rao & Gartin, 2003). Adjustments in the learning process may involve the use of diverse teaching methods, such as multisensory instruction, direct instruction, or cooperative learning. Various motivational strategies can also be employed, such as multimedia applications and hands-on experiences to engage students in learning (Hsu & Lin, 2022; Michaels et al., 2002). Adjustments in the learning environment emphasize the physical environment, such as teaching equipment and seating arrangements, which can be tailored to meet students' needs. Professors can also implement varied assessment methods, such as portfolio assessment, performance assessment, or curriculum-based assessment. If necessary, extended testing time, enlarged test papers, electronic test questions, or computer-based testing services may also be provided (Potter, Lewandowski, & Spenceley, 2016; Sireci, Scarpati, & Li, 2005).

University professors are the key individuals responsible for developing curricula and delivering instruction (Connor, 2012; Khansa, 2015; Murray et al., 2008; Zhang et al., 2010). Therefore, it is essential to examine their knowledge of students' learning characteristics and needs, and their attitudes towards students with disabilities. Additionally, it is important to understand how they incorporate knowledge related to special education into their approach to ensure that university students with disabilities receive quality educational services (Zhang et al., 2018). However, there is currently no appropriate assessment tool in Taiwan to evaluate university faculty's knowledge and practices regarding services provided for students with disabilities. To the best of our knowledge, there have been no studies on the development of a standardized scale or assessment of the viewpoints of university professors towards students with disabilities in a Taiwanese setting.

In contrast, there are several measurements available in the existing literature. For example,

Murray and colleagues (2008) developed a 38-item survey instrument to investigate faculty perception of students with LD in areas including general knowledge and laws, teaching and exam accommodations, support and resources, and personal practices. Another 30-item instrument developed by Sniatecki, Perry, and Snell (2008) was used to examine faculty attitudes toward disability and knowledge regarding disability services. Moreover, Cook, Rumrill, and Tankersley (2009) created the 38-item *Faculty Priorities and Understanding Regarding College Students with Disabilities Scale* to evaluate issues pertaining to faculty's legal knowledge, accommodations of policy and willingness, disability etiquette, disability characteristics and universal design for instruction. Moreover, Zhang and colleagues (2010) developed a 34-item instrument to evaluate university faculty members' familiarity with their legal responsibilities, institutional support, and accommodations for students with disabilities as well as their personal perspectives on the education of students with disabilities and level of comfort with them. Although the psychometric properties of Zhang et al.'s scale were assessed and found to be adequate, it was unclear about the other three measures' validity and reliability. Considering Taiwan's unique cultural context, diploma-oriented value characterized by a high percentage of students with disabilities who progress to attend university and specific classification system for disabilities (e.g., cerebral palsy is defined as a distinct category of disability), it is evident that there is a need for a localized scale that measures university professors' understanding and practice in special education.

In summary, the academic community in Taiwan lacks comprehensive theoretical or practical research regarding the attitudes of university professors towards the implementation of special education in higher education institutions, their possession of special education knowledge, and the integration of this attitude and knowledge into curriculum instruction, assessments, mentoring, administrative work, and extracurricular activities. As the number of students with disabilities and

the number of universities admitting these students have both witnessed an unprecedented increase in Taiwan, more diverse and extensive research is required. Given the fact that students' academic performance in higher education significantly impacts their future transitions when entering the workforce or pursuing advanced studies in graduate school (Chen, 2008; Stewart, Mallery, & Choi, 2010), examining the perspectives and practices of university faculty regarding special education is truly an important topic. Therefore, we hope that the results of this research can serve as a reference for future efforts to promote and implement special education in higher education. More specifically, having a clear understanding of university faculty's special education knowledge and practices will facilitate the provision of appropriate and effective services associated with curriculum instruction, learning adjustment, and daily living activities for students with disabilities, which will contribute to students' overall academic success and well-being at university.

The purpose of this study was to develop and validate a scale to investigate university faculty's perspectives and practices regarding special education in Taiwan. The scale evaluates professors' knowledge of special education, their attitudes towards students with disabilities receiving higher education, and their practices in providing services that facilitate students' learning outcomes and adaptation. The scale's validation was assessed through content validity, construct validity, inter consistency of reliability, and test-retest reliability analyses.

3. Methodology

3.1 Participants and Procedure

A purposive sampling method was employed to recruit 210 faculty members from 15 universities in Taiwan to participate in the research. The sample consisted of 105 male and 105 female faculty members, comprising lecturers ($n = 51$), assistant professors ($n = 75$), associate professors ($n = 66$), and professors ($n = 18$). The majority of faculty had taught for 21 years or more ($n = 84$), followed by those with 11-15 years of teaching experience ($n = 42$), 16-20 years ($n = 36$), 5-10 years ($n = 27$), and 0-5 years ($n = 21$). Furthermore, the majority of faculty had served as mentors ($n = 168$), held administrative positions ($n = 135$), and had prior experience teaching students with disabilities ($n = 192$).

The study was approved by the Internal Review Board (IRB) of National Taiwan University. The Office of Disability Services staff of each participating university were asked to be responsible for collecting data. Specifically, they contacted faculty members who planned to attend their mentee's ISP meeting and inquired if they would be willing to participate in this study by filling out a scale. Those who agreed were provided with information pertaining to the research purpose and data usage. After signing the consent form, faculty members were free to respond based on their personal experiences and opinions. The entire data collection process took between 10-15 minutes per participant.

3.2 Measure

The Faculty Perspectives on Special Education Scale (FPSES) was developed in this study to evaluate the level of knowledge, attitudes, and practices that university professors have regarding special education. The theoretical framework of the FPSES was based on the current status of special education implementation in Taiwan with findings drawn from evidence-based research (e.g., Chen, 2008; Lin et al., 2008; Newman et al., 2011; Wagner et al., 2005). Specifically, the development of items for the FPSES is based on various resources including the content of legal regulations, educational policies of schools, and research findings pertaining to learning adaptation of university of students with disabilities and items derived from the scales developed in previous research (Cook et al., 2009; Murray et al., 2008; Sniatecki et al., 2008; Zhang et al., 2010). In addition, we also invited 3 professors who are knowledgeable about special education services provided in university and 5 senior staff

members from the Office of Disability Services to review and assess the appropriateness of items on the FPSES. The feedback they provided also served as an important reference for developing FPSES items.

The FPSES consists of three subscales: (a) Special Education Knowledge (SEK, 11 items), (b) Attitudes Towards Students (ATS, 9 items), and (c) Provision of Services (POS, 12 items). The SEK subscale assesses the level of understanding among faculty members regarding key aspects of special education, such as services offered by the Office of Disability Services, ISP development and implementation, and methods for adjusting teaching and evaluation, as well as important concepts like inclusive education, positive behavior support, and transition. The SEK items are divided into three reflective indicators: legal regulations (LR, items 1-3 & 10-11), general knowledge (GK, items 4-6), and instructional adjustments (IA, items 7-9).

The ATS subscale assesses faculty's attitudes and perspectives towards students with disabilities, including their thoughts about whether these students can acquire subject knowledge and enhance their self-awareness, self-confidence, cognitive abilities, and social interaction skills during the learning process. In addition, it evaluates faculty's beliefs regarding whether attending college can help students improve their competitiveness in the job market and ultimately lead to a better quality of life. The ATS items are classified into three indicators: cognitive abilities (CA, items 12-13), personal benefits (PB, items 14-18), and educational trend (ET, items 19-20).

The POS subscale assesses the relevant special education services faculty members offer, such as assistance or adjustments in teaching, assessment, daily living, learning adaptation based on the needs of their students with disabilities, the provision of counseling services, and attendance at their ISP meetings. The POS items are also divided into three indicators: classroom instruction (CI, items 21-24), assessment modification (AM, items 25-28), and supportive behavior (SB, items 29-32).

The full scale consists of 32 items. Each item was rated based on a 5-point Likert-type scale (1 = completely unclear/strongly disagree, 2 = somewhat unclear/disagree, 3 = neutral, 4 = clear/agree, 5 = very clear/strongly agree). The total score ranges from 32 to 160, with higher scores representing higher levels of understanding and implementation of special education.

3.3 Data Analysis

Prior to performing data analyses, the missing values were screened and replaced by the item mean. The proportion of missing data was small (ranging from 2.5% to 4.8% for individual items, and the missing datapoints were not systematic. Thus, the missing values could be reasonably attributed to random omissions. After examining the missing data, a series of item analysis methods including descriptive statistics, item-total correlations, and item discrimination indexes calculated based on *t* test were used to evaluate the appropriateness of each item on the FPSES. Furthermore, we computed the internal consistency and test-retest reliability coefficients to assess the reliability of the FPSES. We also conducted exploratory factor analysis (EFA) using the maximum likelihood extraction and varimax rotation method to assess item appropriateness and scale dimensionality. Finally, we applied confirmatory factor analysis (CFA) to determine the sufficiency of the FPSES construct validity.

4. Results

4.1 Item Analysis Results

Descriptive statistics revealed that the means of the FPSES items ranged from 3.56 to 4.76, with standard deviations between .46 and 1.16 (see Table 1). Furthermore, results showed that the corrected item-total correlation coefficients were between .59 and .88, indicating that each item was correlated with its corresponding subscale's score. Because the deletion of each item did not result in an increase in the corresponding subscale's Cronbach's α , all items on the FPSES were retained.

Table 1. Descriptive statistics, item analysis and EFA results of the FPSES

Item	M	SD	Item analysis		Factor loadings		
			CITC ^b	Alpha ^c	SEK	ATS	POS
1. I know the mission of Special Education Implementation Committee	3.83	1.00	.72	.92	.67	-.09	.12
2. I know that each student needs to have an ISP	4.01	.94	.67	.93	.62	-.12	.20
3. I know what needs to be documented in the ISP	3.56	1.16	.70	.92	.63	-.03	.07
4. I know the notion of inclusive education	3.80	.97	.78	.92	.70	.05	.11
5. I understand the meaning of positive behavioral support	4.11	.84	.70	.92	.66	.21	.28
6. I know the notion of transition	3.81	1.05	.60	.93	.52	.29	.17
7. I know how to modify learning content for students ^a	3.93	.85	.79	.92	.89	.20	.01
8. I know how to modify teaching strategies for students	3.99	.82	.82	.92	.90	.24	.13
9. I know what modifications can be made to exams for students	4.01	.77	.78	.92	.88	.21	.09
10. I am aware of the rights of students (e.g., extend study periods)	3.90	.93	.66	.93	.60	.22	.28
11. I know what services the Office of Disability Services provide	4.10	.87	.69	.92	.70	.16	.26
12. Students will improve their cognitive ability by attending college	4.36	.70	.80	.96	.05	.80	.20
13. Students can acquire professional knowledge in college	4.16	.87	.85	.95	.17	.87	.09
14. Postsecondary education helps improve students' interpersonal skills	4.30	.80	.82	.95	.13	.80	.27
15. Attending college will enhance students' self-awareness	4.26	.81	.88	.95	.11	.88	.16
16. Attending college will increase students' confidence	4.23	.82	.85	.95	.22	.84	.18
17. College students tend to have a better quality of life in the future	4.31	.69	.84	.95	.11	.84	.19
18. College education ensures students' competitiveness for employment	4.24	.82	.87	.95	.08	.86	.17
19. Access to postsecondary education is a global trend for students	4.19	.90	.77	.96	.18	.73	.29
20. It is a wise choice for students to attend college	4.10	.85	.79	.96	-.03	.77	.27
21. I reserve appropriate classroom seating for students	4.76	.46	.70	.93	.09	.14	.72
22. I provide appropriate materials (e.g., electronic versions)	4.61	.54	.65	.93	.14	.23	.64
23. I allow real-time translators to accompany students to class	4.71	.51	.78	.92	.08	.11	.83
24. I allow students to record class lessons	4.71	.51	.76	.93	.08	.24	.78
25. I use alternative assessments if necessary	4.70	.57	.71	.93	.27	.19	.68
26. I allow students to extend their exam time	4.76	.46	.80	.93	.11	.12	.84
27. I offer students opportunities to remediate grades	4.64	.63	.75	.93	.14	.05	.75
28. I provide computer-based testing services	4.74	.50	.71	.93	.11	.12	.74
29. I provide help with homework	4.63	.59	.83	.93	.28	.29	.76
30. I provide living assistance	4.44	.69	.71	.93	.17	.25	.66
31. I provide psychological/career counseling	4.46	.79	.59	.94	.26	.22	.51
32. I participate in the student's ISP meetings if necessary	4.61	.62	.81	.93	.23	.21	.72
Cronbach's α for the FPSES subscales and full scale							
Special Education Knowledge (SEK; 1-11)				.93			
Attitudes Towards Students (ATS; 12-20)				.96			
Provision of Services (POS; 21-32)				.94			
Full Scale				.94			

^a University students with disabilities. ^b Corrected item-total correlation. ^c Cronbach's α if item deleted.

Furthermore, the item discrimination index was determined by contrasting the top 27% of the sample, with scores ranging between 89 and 127 on the FPSES total scores, with bottom 27%, whose scores ranged from 147 to 160. Findings of the independent sample *t* tests revealed significant differences between the groups for each item, as indicated by critical ratio (CR) values ranging from 7.48 to 15.41. Professors in the high-scoring group outperformed their counterparts in the low-scoring group. The means, standard deviations, and item discrimination indexes are presented in Table 2.

Table 2. Results of the item discrimination analyses

Item	High-Scoring Group (n = 63)	Low-Scoring Group (n = 57)	CR (t)	Item	High-Scoring Group (n = 63)	Low-Scoring Group (n = 57)	CR (t)
	M (SD)	M (SD)			M (SD)	M (SD)	
1	4.57 (.59)	3.47 (.89)	8.05**	17	4.76 (.53)	3.68 (.47)	11.74**
2	4.71 (.55)	3.63 (.59)	10.42**	18	4.86 (.47)	3.53 (.68)	12.52**
3	4.38 (.73)	3.00 (1.04)	8.52**	19	4.86 (.35)	3.26 (.79)	14.48**
4	4.48 (.80)	3.26 (.97)	7.48**	20	4.62 (.66)	3.37 (.49)	11.73**
5	4.67 (.57)	3.53 (.95)	8.01**	21	5.00 (.00)	4.31 (.57)	9.50**
6	4.57 (.59)	3.00 (1.13)	9.66**	22	5.00 (.00)	4.21 (.53)	11.93**
7	4.67 (.48)	3.37 (.75)	11.47**	23	5.00 (.00)	4.32 (.66)	8.25**
8	4.71 (.46)	3.37 (.82)	11.30**	24	5.00 (.00)	4.21 (.62)	10.12**

Item	High-Scoring Group (n = 63)	Low-Scoring Group (n = 57)	CR (t)	Item	High-Scoring Group (n = 63)	Low-Scoring Group (n = 57)	CR (t)
	M (SD)	M (SD)			M (SD)	M (SD)	
9	4.62 (.49)	3.47 (.83)	9.34**	25	4.95 (.21)	4.16 (.75)	8.05**
10	4.71 (.46)	3.21 (.77)	13.13**	26	4.95 (.21)	4.26 (.55)	9.18**
11	4.71 (.45)	3.47 (.83)	10.32**	27	4.90 (.30)	4.10 (.65)	8.85**
12	4.81 (.40)	3.79 (.53)	12.08**	28	5.00 (.00)	4.26 (.64)	9.12**
13	4.76 (.43)	3.32 (.89)	11.72**	29	5.00 (.00)	4.00 (.65)	12.13**
14	4.90 (.30)	3.52 (.76)	13.35**	30	4.95 (.21)	3.79 (.70)	12.55**
15	4.86 (.35)	3.47 (.83)	12.13**	31	4.90 (.30)	3.89 (.92)	8.26**
16	4.85 (.35)	3.37 (.67)	15.41**	32	5.00 (.00)	4.00 (.65)	12.13**

4.2 Reliability Analysis Results

Internal consistency reliability analysis indicated that Cronbach’s α for the SEK, ATS, and POS subscales of the FPSES were .93, .96, and .94, respectively. The full scale’s coefficient was .94.

The test-retest reliability was evaluated based on a random sample of 51 participants (26 males and 25 females) chosen from the participating professors at an interval of 4 weeks. The sample included lecturers (n = 12), assistant professors (n = 18), associate professors (n = 16), and professors (n = 5). Here, Cronbach’s α for the SEK, ATS, and POS subscales was .88, .89, and .92, respectively. The coefficient of the full scale was .95.

4.3 Validity Analysis Results

With respect to the internal correlation in the FPSES, results showed significant correlations among the three subscales. Specifically, the SEK subscale was significantly correlated with the ATS ($r = .32, p < .01$) and POS ($r = .42, p < .01$) subscales, respectively. The correlation coefficient between the ATS and POS was .47 ($p < .01$). In addition, the correlation coefficients between reflective indicators ranged from .20 to .82, all of which reached statistical significance (see Table 3).

Table3. Correlation matrix for the indicator variables of the FPSES

Reflective Indicator	1	2	3	4	5	6	7	8	9
1. Legal regulation	—								
2. General knowledge	.65**	—							
3. Instructional adjustments	.71**	.67**	—						
4. Cognitive abilities	.20**	.33**	.33**	—					
5. Personal benefits	.20**	.35**	.36**	.82**	—				
6. Educational trend	.21**	.27**	.30**	.74**	.82**	—			
7. Classroom instruction	.25**	.30**	.24**	.34**	.39**	.51**	—		
8. Assessment modification	.36**	.36**	.28**	.30**	.35**	.38**	.80**	—	
9. Supportive behavior	.46**	.41**	.35**	.35**	.51**	.44**	.71**	.79**	—

$p < .01$ **

Furthermore, the EFA results showed that the Kaiser-Meyer-Olkin (KMO) measure was .80 and Bartlett’s test of sphericity was significant ($\chi^2_{(496)} = 8041.35, p < .001$), indicating that the sample data fulfilled the requirements of conducting EFA. We performed a scree test to determine the number of factors to retain, and three factors were reasonably extracted, which together accounted for 63.6% of the total item variance. The EFA using the principal axis factoring method and the Varimax rotation procedure showed that each item had the highest factor loading with its corresponding subscale, which ranged between .51 and .90.

The results of the CFA showed that the second-order, four-factor measurement model had a

good fit with the sample data (see Figure 1). Specifically, the results of the absolute fit indices were goodness of fit index (GFI) = .96, adjusted goodness of fit index (AGFI) = .91, standardized root mean square residual (SRMR) = .047, and root mean square error of approximation (RMSEA) = .076. The results of the comparative fit indices were normed fit index (NFI) = .97, relative fit index (RFI) = .95, incremental fit index (IFI) = .98, Tucker-Lewis index (TLI) = .97, and comparative fit index (CFI) = .98. Figure 1 presents the second-order CFA path diagram and the standardized estimates.

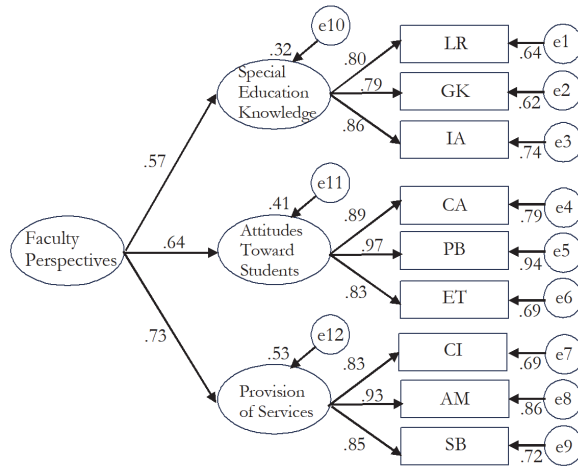


Figure 1: The second-order CFA path diagram and standardized estimates of the FPSES

5. Discussion

As the number of university students with disabilities increases significantly, it is important to assess whether professors have a general understanding of the special needs and services required by these students, as well as how they view students with disabilities attending university (Lipka, Khouri, & Shecter-Lerner, 2020; Zeedyk, Bolourian, & Blacher, 2019). Our proposed FPSES aims to evaluate university professors' comprehension and implementation of special education. To verify the appropriateness of the FPSES, we conducted an evaluation of its psychometric properties. The item analysis results indicated that the mean of each item in the FPSES was reasonable, ranging from 3.56 to 4.76, with SD values falling within an acceptable range of .46 to 1.16. The corrected item-total correlation coefficient for each item with its corresponding subscale was above .50, meeting the standard for high correlation (DeVellis, 2017; Green & Salkind, 2021). Furthermore, removing any item resulted in a decrease in Cronbach's α of its corresponding subscale. In addition, a significant comparison between high-scoring group and low-scoring group was observed on each item, suggesting that items of the FPSES exhibit a strong discrimination function. The CR values ranged between 7.48 and 15.41, surpassing the established criterion of 3.0 (Warne, 2020). Based on the descriptive, item-total statistic outcomes, and discrimination analysis indexes, we determined that each item on the FPSES meets the requirements of item analysis, thereby justifying the retention of all items.

With respect to the reliability analysis results, the Cronbach's alpha coefficients for each subscale of the FPSES ranged from .93 to .96, all exceeding the standard of .80 (DeVellis, 2017; Warne, 2020). This indicates good internal consistency of scores across the three subscales. Among the subscales, the ATS subscale demonstrated the highest coefficient. Examining the mean scores for each item, it is evident that university professors hold consistent and positive attitudes towards the benefits of students with disabilities receiving higher education, including building self-confidence,

acquiring professional knowledge, and enhancing employability. However, there is a notable gap in the special education knowledge possessed by university professors. Of the 12 relevant items, 8 had average scores below 4, and the overall average was below the grand mean of 4.28. Particularly, professors exhibited the least knowledge regarding the content to be documented in the ISP, inclusive education, and transition. It is speculated that because documenting ISP content can be complex and raise privacy concerns, university professors may have limited opportunities to review students' ISPs (Francis & Chiu, 2019). Additionally, because universities are not required to offer special education classes, professors may have a limited understanding of the crucial concepts of inclusion and transition in the field of education classes (Rao, 2004; Zeedyk et al., 2019; Zhang et al., 2010). Transition, in particular, is a specialized term within special education in Taiwan that is typically not well understood by the general public.

Furthermore, the test-retest results indicated that the correlation coefficients for each subscale of the FPSES were all above .70, highlighting the good stability (DeVellis, 2017; Green & Salkind, 2021). The scores obtained by the participants four weeks apart showed minimal variation due to time. Considering that university professors' understanding, attitudes, and practices towards special education are developed through interactions and experiences with students with disabilities during the teaching process (Zeedyk et al., 2019; Zhang et al., 2010), it is reasonable to expect that significant changes would not occur in a short period during the semester. Therefore, the test-retest results are considered reasonable. Overall, the FPSES demonstrates good internal consistency reliability and test-retest reliability.

The FPSES demonstrated good content validity. The content of the items primarily reflects the specifications of the Special Education Act (2019) in Taiwan and the unique characteristics and special educational needs of students with disabilities. Therefore, the item content adequately captures the experiences of university professors in their interactions with students with disabilities in terms of teaching and assessment. Furthermore, the item review experts invited in this study also provided specific opinions and modification suggestions regarding the wording, appropriateness of content, and alignment with practical situations of the items. Both methods contribute to strengthening the content validity of the FPSES.

In addition, construct validity was evaluated from two aspects: the correlation between variables within the scale, and the factor analysis. Firstly, the correlation analysis showed that the scores of the three subscales are highly correlated (ranging from .32 to .47), and the correlation coefficients between the reflective indicators derived from each subscale range from .20 to .82, indicating moderate to high correlations. Both results emphasize the internal consistency and integrity of the FPSES' internal structure. The results of EFA indicated that the factor loadings of each item are greater than the cut-off value of .32 (Green & Salkind, 2021) and have the highest factor loadings within their respective factors, further confirming that the sample data align with the design of the three subscales of the FPSES, and each item effectively measures the intended traits. In addition, the CFA results suggest that the configuration of the variables in the FPSES and their causal relationships are reasonable. The overall model fit and the fit of the internal structure of the model are both ideal. In particular, all factor loadings in the model meet the standard of λ greater than .55, as set for social science research (Tabachnick & Fidell, 2019; Warne, 2020).

In summary, the robust psychometric properties of the FPSES can be contributed to the rigorous scale development procedures which include comprehensive literature reviews, compliance with legal requirement, consideration of services required by students with disabilities, and actual teaching scenarios that university faculty may encounter. Particularly instruments developed in previous research (i.e., Cook et al., 2009; Murray et al., 2008; Sniatecki et al., 2008; Zhang et al., 2010) provide crucial insights into the development of FPSES items. It is also worth noting that despite linguistic and cultural differences among different regions, it is undeniable that higher education institutions worldwide place great emphasis on ensuring whether faculty are knowledgeable about issues pertaining to legal regulations, the notion of inclusive education, faculty attitudes toward students with disabilities, accommodations for teaching and examinations when it comes to

educating students with disabilities. Furthermore, researchers and practitioners also emphasize university faculty's attitudes toward students with disabilities as well as perspectives on providing higher education to this vulnerable student population.

6. Recommendations

It is suggested that future research could utilize samples from different regions to evaluate FPSES' cross-cultural applicability. With the global trend of students with disabilities pursuing higher education, there will be increasing opportunities for professors from other regions to teach this category of students. We further recommend that prospective researchers consider using variables including learning adaptation, academic performance, or transition outcomes as potential criteria to evaluate FPSES' concurrent and predictive validities. Finally, as university professors scored relatively low on items regarding ISP documentation as well as notions of inclusive education and transition, we suggest that Office of Disability Services staff provide professors with knowledge and competency development workshops to enhance professors' understanding of special education.

7. Limitations

Although the FPSES demonstrates good psychometric properties, this study has several limitations. Firstly, because the scale was specifically developed for Taiwanese university faculty, its applicability to professors in other regions requires further evaluation. In addition, due to the lack of appropriate criteria, we did not assess criterion-related validity. Therefore, readers should be cautious when evaluating the concurrent and predictive validities of the FPSES. Furthermore, because the test-retest reliability was assessed based on approximately a quarter of the entire sample over a four-week interval, it is advisable to interpret the reliability results conservatively.

References

- Chen, L. J. (2008). The study on transition lives and transition behaviors of the college students with disabilities. *Journal of Special Education, 28*, 57-95. <https://doi.org/10.6768/JSE.200812.0057>
- Connor, D. (2012). Helping students with disabilities transition to college: 21 tips for students with LLD and/or ADD/ADHD. *Teaching Exceptional Children, 44*, 16-25. <https://doi.org/10.1177/004005991204400502>
- Cook, L., Rumrill, P. D., & Tankersley, M. (2009). Priorities and understanding of faculty members regarding college students with disabilities. *International Journal of Teaching and Learning in Higher Education, 21*(1), 84-96.
- DaDeppo, LL. M. W. (2009). Integration factors related to the academic success and intent to persist of college students with learning disabilities. *Learning Disabilities Research and Practice, 24*(3), 122-131. <https://doi.org/10.1111/j.1540-5826.2009.00286.x>
- Department of Statistics (2022). *Overview of university student dropout and withdrawal rates, as well as the stability of their enrollment*. Ministry of Education.
- DeVellis, R. F. (2017). *Scale development: Theory and applications (4th ed.)*. Thousand Oaks, CA: Sage.
- Dowrick, P. W., Anderson, J., Heyer, K., & Acosta, J. (2005). Postsecondary education across the USA: Experiences of adults with disabilities. *Journal of Vocational Rehabilitation, 22*(1), 41-47.
- Francis, G. L., & Chiu, C. Y. (2019). The way to ultimate wisdom: an exploratory qualitative study on Taiwanese students with disabilities attending college. *International Journal of Developmental Disabilities, 66*(4), 270-281. <https://doi.org/10.1080/20473869.2019.1576408>
- Green, S. B., & Salkind, N. J. (2021). *Using SPSS for Windows and Macintosh: Analyzing and understanding data (8th ed.)*. Pearson.
- Grigal, M., Hart, D., & Migliore, A. (2011). Comparing the transition planning, postsecondary education, and employment outcomes of students with intellectual and other disabilities. *Career Development for Exceptional Individuals, 34*(1), 4-17. <https://doi.org/10.1177/0885728811399091>
- Hadley, W. M. (2018). Students with learning disabilities transitioning from college: A one-year study. *College*

- Student Journal*, 52(4), 421-430.
- Hsu, H. C., & Lin, C. H. (2022). A study of elementary school science teachers' knowledge of curriculum and instruction adaptations for students with special needs. *Bulletin of Special Education and Rehabilitation*, 37, 1-21.
- Khansa, R. (2015). Faculty attitudes toward students with learning disabilities in higher education institute in Lebanon. *Journal of Psychological Sciences*, 1(2), 88-97.
- Kleinert, H. L., Jones, M. M., Sheppard-Jones, K., Harp, B., & Harrison, E. M. (2012). Students with intellectual disabilities going to college? absolutely! *Teaching Exceptional Children*, 44(5), 26-35. <https://doi.org/10.1177/04005991204400503>
- Kuder, J. S., & Accardo, A. (2018). What works for college students with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 48, 722-731. <https://doi.org/10.1007/s10803-017-3434-4>
- Lin, K. T., Lo, C. S., & Chiu, C. Y. (2008). The study of suspending schooling and leaving school for college student with special needs in Taiwan. *Bulletin of Eastern Taiwan Special Education*, 10, 1-19.
- Lipka, O., Khouri, M., & Shecter-Lerner, M. (2020). University faculty attitudes and knowledge about learning disabilities. *Higher Education Research and Development*, 39(5), 982-996. <http://doi.org/10.1080/07294360.2019.1695750>
- Michaels, C. A., Prezant, F. P., Morabito, S. M., & Jackson, K. (2002). Assistive and instructional technology for college students with disabilities: A national snapshot of postsecondary service providers. *Journal of Special Education Technology*, 17(1), 5-14. <https://doi.org/10.1177/016264340201700101>
- Ministry of Education (2022). *Special education statistical yearbook* [In Chinese]. Taipei City: Special Education Transmit Net. Retrieved from <https://www.set.edu.tw/actclass/fileshare/default.asp>
- Murray, C., Wren, C. T., & Keys, C. (2008). University faculty perceptions of students with learning disabilities: Correlates and group differences. *Learning Disability Quarterly*, 31, 95-113. <https://doi.org/10.2307/25474642>
- National Center for Education Statistics (2009). *Number and percentage distribution of Students enrolled in postsecondary institutions by level, disability status, and selected student and characteristics: 2003-04 and 2007-08*. U.S. Department of Education. Retrieved from https://nces.ed.gov/programs/digest/d10/tables/dt10_240.asp
- Newman, L., Wagner, M., Knokey, A., Marder, C., Nagle, K., Shaver, D., & Wei, X. (2011). *The post-high school outcomes of young adults with disabilities up to 8 years after high school. A report from the National Longitudinal Transition Study-2 (NLTS2)*. Menlo Park, CA: SRI International. Retrieved from <https://ies.ed.gov/ncser/pubs/20113005/pdf/20113005.pdf>
- Potter, K., Lewandowski, L., & Spenceley, L. (2016). The influence of a response format test accommodations for college students with and without disabilities. *Assessment and Evaluation in Higher Education*, 41(7), 996-1007. <https://doi.org/10.1080/02602938.2015.1052368>
- Rao, S. (2004). Faculty attitudes and students with disabilities in higher education: A literature review. *College Student Journal*, 38(2), 191-199.
- Rao, S., & Gartin, B. C. (2003). Attitudes of university faculty toward accommodations to students with disabilities. *Journal for Vocational Special Needs Education*, 25(2), 47-54.
- Riddell, S., Weedon, E., Fuller, M., Healey, M., Hurst, A., Kelly, K., & Piggott, L. (2007). Managerialism and equalities: tensions within widening access policy and practice for disabled students in UK universities. *Higher Education*, 54(4), 615-628. <https://doi.org/10.1007/s10734-006-9014-8>
- Sanford, C., Newman, L., Wagner, M., Cameto, R., Knokey, A. M., & Shaver, D. (2011). *The post-high school outcomes of young adults with disabilities up to 6 years after high school: Key findings from the National Longitudinal Transition Study-2 (NLTS2)*. Menlo Park, CA: SRI International. Retrieved from <https://ies.ed.gov/ncser/pubs/20113005/pdf/20113005.pdf>
- Sheu, T. W., Shaow, C. T., Wu, S. S., Lin, H. Y., & Chen, T. Y. (2002). The adjustment of campus life among university and college students with disabilities. *Journal of Special Education*, 16, 159-198. <https://doi.org/10.6768/JSE.200209.0159>
- Sireci, S. G., Scarpati, S. E., & Li, S. (2005). Test Accommodations for students with disabilities: An analysis of the interaction hypothesis. *Review of Educational Research*, 75(4): 457-490. <https://doi.org/10.3102/00346543075004457>
- Sniatecki, J. L., Perry, H. B., & Snell, L. H. (2008). Faculty attitudes and knowledge regarding college students with disabilities. *Journal of Postsecondary Education and Disability*, 28(3), 259-275.
- Special Education Act, Order of the Ministry of Education, Taiwan, No. 10800039361. (2019)
- Tabachnick, B. G., & Fidell, L. S. (2019). *Using multivariate statistics (7th ed.)*. Pearson.
- Wagner, M., Newman, L., Cameto, R., Garza, N., & Levine, P. (2005). *After high school: A first look at the*

- postschool experiences of youth with disabilities. A report from the National Longitudinal Transition Study-2 (NLTS2). Menlo Park, CA: SRI International. Retrieved from <https://files.eric.ed.gov/fulltext/ED494935.pdf>
- Warne, R. T. (2020). *Statistics for the Social Sciences (2nd ed.)*. Cambridge University Press.
- Wu, Y. P., & Chen, M. C. (2015). How to develop legally correct and educationally useful IEPs: Questions and answers. *Special Education Quarterly*, 135, 9-16. <https://doi.org/10.6217/SEQ.2015.135.9-16>
- Zhang, D., Landmark, L., Reber, A., Hsu, H. Y., Kwok, Oi-man, & Benz, M. (2010). University faculty knowledge, beliefs, and practices in providing reasonable accommodations to students with disabilities. *Remedial and Special Education*, 31(4), 276-286. <https://doi.org/10.1177/0741932509338348>
- Zhang, Y., Rosen, S., Cheng, L., & Li, J. (2018). Inclusive higher education for students with disabilities in China: What do the university teachers think? *Higher Education Studies*, 8(4), 104-115. <https://doi.org/10.5539/hes.v8n4p104>
- Zeedyk, S. M, Bolourian, Y., & Blacher, J. (2019). University life with ASD: Faculty knowledge and student needs. *Autism: The International Journal of Research and Practice*, 23(3), 726-736. <https://doi.org/10.1177/1362361318774148>