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CONSTRUCT VALIDATION OF SPECIAL EDUCATION TEACHER COMPETENCIES FOR INCLUSIVE EDUCATION: A CONFIRMATORY ANALYSIS APPROACH

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Abstract

This study aims to validate the construct of special education teacher competencies, which include pedagogical, social, and professional competencies. Data analysis was conducted using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) on 71 special education teachers in East Java. The CFA results showed that the three competency dimensions had good model fit based on the Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA) values. Among the three dimensions, professional competency had the highest level of fit, thus best representing the core competencies of special education teachers. In addition, teachers with more than ten years of work experience and special education backgrounds (PLB) demonstrated higher levels of adaptive professional competency. These findings provide empirical evidence regarding the essential competencies of special education teachers and can serve as a basis for developing competency improvement programs that support inclusive education practices.

Keywords: *Teacher Competency; Inclusive Education; CFA; Special Needs Teachers.*

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Abstrak

Penelitian ini bertujuan memvalidasi konstruk kompetensi guru pendidikan khusus yang meliputi kompetensi pedagogik, sosial, dan profesional. Analisis data dilakukan menggunakan exploratory factor analysis (EFA) dan confirmatory factor analysis (CFA) terhadap 71 guru pendidikan khusus di Jawa Timur. Hasil CFA menunjukkan bahwa ketiga dimensi kompetensi memiliki kesesuaian model yang baik berdasarkan nilai Comparative Fit Index (CFI) dan Root Mean Square Error of Approximation (RMSEA). Di antara ketiga dimensi tersebut, kompetensi profesional memiliki tingkat kesesuaian tertinggi sehingga paling merepresentasikan kompetensi utama guru pendidikan khusus. Selain itu, guru dengan pengalaman kerja lebih dari sepuluh tahun serta berlatar belakang pendidikan luar biasa (PLB) menunjukkan tingkat kompetensi profesional adaptif yang lebih tinggi. Temuan ini memberikan bukti empiris mengenai kompetensi esensial guru pendidikan khusus dan dapat menjadi dasar pengembangan program peningkatan kompetensi yang mendukung praktik pendidikan inklusif.

Kata Kunci: *Kompetensi Guru; Pendidikan Inklusif; CFA; Guru Pendidikan Khusus.*

A. Introduction

Education in Indonesia is a fundamental human right, as enshrined in Article 31 of the 1945 Constitution, which mandates free and compulsory basic education for all citizens. The article affirms that every citizen has the right to education and is required to complete basic education, with all costs borne by the state. As part of its efforts to achieve educational equity, the Indonesian government has implemented an inclusive education system that enables students with disabilities and those with special needs to learn alongside their peers in mainstream schools (Kusuma, 2021). To ensure equitable access to inclusive education, the government, supported by local authorities, has established inclusive schools—educational institutions that integrate the learning processes of both regular students and those with disabilities within a unified program (Kusuma, 2021; Anggriana & Trisnani, 2016).

Since the enactment of Ministry of Education Regulation No. 7 of 2009, the Ministry of Education, Culture, Research, and Technology has continued to improve Indonesia's inclusive education system. One such initiative is the issuance of Ministry Regulation No. 48 of 2023, which

mandates all regular schools to admit students with disabilities and gifted learners. This regulation effectively dissolves the distinction between regular and inclusive schools (Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi, 2023; Media Indonesia, 2023).

The integration of students with disabilities into mainstream classrooms, however, presents a range of challenges. The diverse needs and abilities of these students require a high level of sensitivity and competence from teachers (Kusuma, 2021). Wulandari and Hendriani (2021) emphasized that the successful implementation of inclusive education is highly dependent on teacher competence. Teachers must possess skills and knowledge that are directly aligned with the principles and practices of inclusive education.

As the number of inclusive schools in Indonesia continues to grow, new challenges have emerged. Wardah (2019) noted that disparities in the competencies of inclusive education teachers—commonly referred to as special education teachers—remain a pressing issue. Field reports indicate that many subject teachers, particularly those without a background in special education, struggle to provide adequate services for students with disabilities.

Wardah (2019) further explained that competency gaps among teachers without a background in Special Education (PLB) often lead to mismatches between students' needs and the services provided. These teachers tend to rely on their existing knowledge and general teaching competencies, which are not always suitable for inclusive settings. In addition to service delivery issues, planning deficiencies also reflect the lack of alignment between teacher competencies and the practical demands of inclusive classrooms.

Preliminary interviews conducted by the researchers revealed that some special education teachers do not prepare Individualized Education Programs (IEPs) for students with disabilities. This practice contradicts Government Regulation No. 17 of 2010, Article (j), which stipulates that special education teachers must be able to design and implement individualized learning programs. This process includes conducting

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identification, assessments, and the development of IEPs tailored to the abilities of students with special needs (Wardah, 2019; Rosita & Suherman, 2020).

Previous research has highlighted three essential competency domains for special education teachers: pedagogical, social, and professional (Bukvić, 2014). Pedagogical competence refers to the ability to teach and manage classrooms effectively (Suciu & Mata, 2011), while social competence involves communication with students, parents, and the school community. Professional competence encompasses the knowledge, skills, and attitudes necessary to design effective learning experiences (Peraturan Direktur Jenderal Guru dan Tenaga Kependidikan, 2023; Liakopoulou, 2011).

These three competencies are considered essential for special education teachers to implement inclusive education effectively and meaningfully (Hamill, Jantzen, & Bargerhuff, 1999; Deng et al., 2016; Rabi & Zulkefli, 2018). However, studies focusing on these competencies are still limited. Most existing research remains qualitative or descriptive, outlining what competencies are required without empirically validating them. Empirical studies that specifically validate competency indicators for special education teachers in inclusive settings are still scarce (Zafira & Gunansyah, 2018; Rosita & Suherman, 2020; Wulandari & Hendriani, 2021; Hidayat et al., 2025).

In light of this gap, the present study aims to validate the core competencies required by special education teachers, particularly within the context of inclusive education in mainstream schools. The scope of this study covers the identification, validation, and interpretation of teacher competencies that are essential for effective inclusive practices. Specifically, the study examines three primary domains pedagogical, social, and professional competencies. The findings of this study are expected to provide both scientific and practical contributions toward strengthening the inclusive education system, particularly in the development of teacher competencies.

B. Method

This study employed Confirmatory Factor Analysis (CFA) as the primary method of data analysis. The use of CFA aligns with the aim of this research, which is to validate the competency constructs required by special education teachers. According to Hair et al. (2019), CFA requires researchers to determine the number of factors and the associated variables in advance. This method is typically used when the researcher has specific expectations regarding the number of latent factors, the observed variables that define each factor, and the hypothesized relationships between them (Thomson, 2004).

Although the total sample size was relatively small (N = 71), the sampling technique employed in this study was purposive sampling, in which participants were selected based on specific criteria: having additional responsibilities as special education teachers and having attended at least one professional training related to special education. To minimize parameter estimation errors, separate CFA models were conducted for each dimension (Hair *et al.*, 2019).

The use of Jamovi software for data analysis was technically justified by the relatively small sample size in this study. Jamovi is specifically designed to handle statistical analyses for small to moderate samples. Its automated and systematic assumption-testing features enable researchers to ensure the appropriateness of data analysis even with a limited number of participants (Hair et al, 2025).

The competencies measured in this study include pedagogical, social, and professional competencies. Each item in the questionnaire was adapted from previously validated instruments. Pedagogical and social competencies were measured using instruments developed by *Vantieghem et al.* (2023) and *Sklavaki* (2022), while professional competence was assessed using items from *Junghohann and Gebhardt* (2023). All items were carefully adapted to reflect the context of inclusive education in Indonesia.

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Data were collected through an online questionnaire distributed via an online form. The survey link was shared across several professional networks, including the *Musyawarah Guru Pendidikan Khusus* (MGPK) in Surabaya, the Special Education Teacher Group in East Java, and other regional special education teacher communities. The city of Surabaya was selected as the research site because it has been one of the pioneering cities in implementing inclusive education in Indonesia, having formally adopted inclusive practices since 2011.

C. Results and Discussion

1. Result

The study consisted of 71 special education teachers from various regions in East Java, with the following demographic descriptions

Table 1. Samples Demographic Description

No	Kategori	Keterangan	Jumlah
1	Education level	Bachelor Degree	56
		Master Degree	15
2	Educational Background	special education	16
		Psychology	27
		Primary education	9
		Subject-matter background	19
3	Teaching roles	Subject Teacher	23
		Homeroom teacher	29
		Guidance and counseling Teachers	19
4	Teaching Level	Elementary school	38
		Junior high shchool	33
5	Experience	Less than two years	14
		3-10 years	15
		More than 10 years	42

Prior to conducting CFA, the researcher performed Exploratory Factor Analysis (EFA) to assess and confirm the measurement model. The pedagogical dimension resulted in two distinct factors, whereas the social and professional dimensions each yielded a single factor. According to

Hair et al. (2019), EFA is commonly used to uncover underlying factor structures, which are subsequently validated through CFA.

Table 2. CFA Results for Inclusive Pedagogy Competencies

No	Item	Z	Stand. Estimates	p
	Inclusive Support Pedagogy			
1	I encourage regular students to help their peers with special needs.	9.20	.898	<.001
2	I assign tasks to students with special needs according to their abilities.	4.95	.568	<.001
3	I ensure that each student with special needs is included in a group for every assignment.	8.61	.857	<.001
4	I appreciate every student with special needs in my class.	7.22	.760	<.001
	Inclusive Teaching Pedagogy			
1	I adjust the classroom environment to accommodate students with special needs in my class.	6.83	.716	<.001
2	I implement differentiated instruction for students with special needs in my class.	10.78	.992	<.001
3	I provide feedback for each student with special needs in my class.	5.28	.596	<.001
4	Feedback or learning reports for students with special needs are adjusted to their individual abilities.	7.33	.758	<.001

Table 3. Model Fit Result for Pedagogy Competencies

Inclusive Support Pedagogy						
X2	df	p	CFI	TLI	RMSEA	Cronbach Alpha
2.46	2	.292	.997	.990	.056	.841
Inclusive Teaching Pedagogy						
X2	df	p	CFI	TLI	RMSEA	Cronbach Alpha

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Inclusive Support Pedagogy						
2.56	2	.278	.996	.998	.063	.850

Prior to CFA, an EFA was conducted to confirm the structure of pedagogy competency models. The analysis revealed that pedagogical competency comprised two distinct subdimensions. Pedagogical competence in this study was found to consist of two subdimensions: inclusive support pedagogy and inclusive learning pedagogy. The CFA results (Table 3) indicate that both models demonstrated good fit, with all indices exceeding the recommended thresholds. The inclusive support pedagogy model showed a CFI of .997, TLI of .990, and RMSEA of .056, while the inclusive learning pedagogy model had a CFI of .996, TLI of .998, and RMSEA of .063.

According to Hair et al. (2019), models with fewer than 12 observed variables are considered acceptable if the CFI and TLI exceed .99 and RMSEA is below .08. Nonetheless, caution should be exercised when interpreting these values, given the small sample size, which may inflate the fit indices.

Aside from pedagogical competence, this study also highlights social competence as a critical domain for special education teachers. The CFA results for this dimension (Table 5) indicate a good model fit, with a CFI of .990, TLI of .990, and RMSEA of .061—all within acceptable thresholds as stated by Hair et al. (2019).

Table 4. CFA Results for Inclusive Social Competency

No	Item	Z	Stand. Estimate	p
	Social Collaboration			
1	I collaborate with other teachers to provide learning materials for students with special needs in my class.	7.94	.817	<.001
2	I am able to work collaboratively with parents to support the development of	6.71	.720	<.001

	students with special needs.			
3	Parents of students with special needs feel comfortable discussing their child's progress at school.	9.13	.900	<.001
4	The Individualized Education Program (IEP) for students with special needs at my school is developed in collaboration with the Special Education Teacher.	4.66	.549	<.001
5	I am involved in developing Individualized Education Programs (IEPs) for students with special needs at my school.	4.43	.571	<.001

Table 5. Result for Model Fit Result for Social Competency

Social Collaboration						
X2	df	p	CFI	TLI	RMSEA	Cronbach Alpha
6.33	5	.275	.990	.990	.061	.819

The final core competency required of special education teachers is professional competence, which refers to the ability to identify and implement all stages of the learning process for students with special needs. Findings from this study indicate that professional competence is the most prominent among the three dimensions. This is reflected in the model's fit indices—CFI and TLI—being the highest compared to pedagogical and social competencies, as well as a reliability score of .902 for this dimension (Table 7).

Table 6. CFA Results for Inclusive Professional Competency

No	**Item**	**Z**	**Stand. Estimate**	**p**
	Adaptive Instructional Professional			
1	I am able to identify various characteristics of students with special needs.	9.03	.859	<.001

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No	Item	Z	Stand. Estimate	p
	Adaptive Instructional Professional			
2	I am able to apply instructional strategies that support the abilities of students with special needs.	10.70	.951	<.001
3	I am able to use assessment methods appropriate to the abilities of students with special needs.	7.50	.760	<.001
4	I can use instructional media appropriate to the characteristics of students with special needs	10.99	.965	<.001

Table 7. Model Fit Result for Professional Competency

Adaptive Instructional Professional						
X2	df	p	CFI	TLI	RMSEA	Cronbach Alpha
2.21	2	.331	.998	.998	.0383	.902

Table 8. Mean Results based on teaching experience

Experience/ Competencies	Inclusive Support Pedagogy	Inclusive Teaching Pedagogy	Social Collaboration	Adaptive Instructional Professional
Less than 2 years	12.64	13.92	17.64	11.57
3 – 10 years	13.13	12.80	16.80	12.13
More than 10 years	14.52	14.69	16.78	14.52

Table 9. Mean Results based on educational background

Educational Background/ Kompetensi	Inclusive Support Pedagogy	Inclusive Teaching Pedagogy	Social Collaboration	Adaptive Instructional Professional
Psychology	13.81	14.14	17.81	13.11
Special Education	14.37	14.31	17.75	14.37
Primary School Teacher	13.00	15.00	13.22	12.00

Educational Background/ Kompetensi	Inclusive Support Pedagogy	Inclusive Teaching Pedagogy	Social Collaboration	Adaptive Instructional Professional
Education Subject-Related Education	13.89	13.57	16.84	13.78

This study also compared the mean scores based on teachers' educational backgrounds and teaching experience. The results indicated that the lowest mean score was found in instructional professional competence among special education teachers with less than two years of experience (M = 11.57). In contrast, the highest mean scores were observed in collaborative social competence, both by teaching experience (M = 17.64) and educational background (M = 17.81).

1. Discussion

The findings of this study indicate that the three core competencies required by special education teachers are pedagogical, social, and professional competencies. In this study, pedagogical competence was further divided into two dimensions: inclusive support pedagogy and inclusive instructional pedagogy. At the same time, the social and professional domains were represented by collaborative social competence and adaptive instructional professional competence.

All three competency models demonstrated good model fit, with RMSEA values below .07 and CFI values exceeding .95 (Tabachnick & Fidell, 2007). These results indicate that the three competency models for special education teachers in this study are statistically appropriate and valid representations of the constructs.

Pedagogical competence in inclusive support focuses on how teachers create a safe and equitable classroom environment for students with special needs. Florian and Black-Hawkins (2011) emphasize that a safe classroom—one that promotes equity between students with and without disabilities—is the most fundamental component of inclusive teaching.

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The indicator "I encourage regular students to help their peers with special needs" showed the highest loading, suggesting that the ability of teachers to bridge relationships between regular and special needs students is a key aspect of pedagogical support competence. This finding aligns with Pangayom et al. (2024), who highlight the teacher's role in encouraging peer support and positive interaction, and Septianingsih et al. (2024), who emphasize the importance of facilitating meaningful social relationships among students. When such interactions are effectively fostered, students tend to replace negative perceptions of peers with disabilities with more positive and empathetic attitudes (Lin et al., 2025). These findings are consistent with classroom observations conducted in inclusive junior high schools in Surabaya.

Beyond support, inclusive instructional pedagogy represents another essential pedagogical dimension. It concerns how teachers design and implement learning processes that accommodate diverse abilities within the classroom. Marlina, Kusumastuti, and Ediyanto (2023) argue that inclusive teaching must honor and respect the diversity of all learners, making student-centered and adaptive teaching indispensable. The indicator "I implement differentiated instruction for students with special needs in my class" emerged as the strongest representation of this dimension. This finding echoes Kusuma (2025), who asserts that the ability to implement inclusive instruction is crucial, particularly for special education teachers working in mainstream schools. Similarly, Wang and Tian (2023) emphasize that differentiated instruction is a powerful strategy for addressing diverse learning abilities within inclusive settings.

In addition to pedagogical competence, collaborative social competence is also a fundamental domain for special education teachers. This competence reflects a teacher's ability to collaborate effectively with parents, colleagues, and other stakeholders. Vantieghem et al. (2023) identify meaningful collaboration with both parents and colleagues as one of the essential competencies for inclusive educators. The indicator "Parents of students with special needs feel comfortable discussing their child's

progress at school" obtained the highest loading in this domain, underscoring the importance of strong school–parent partnerships. Such collaboration has been widely recognized as a key component of effective inclusive education (Koskela & Sinkkonen, 2025; Šukys et al., 2015; Afolabi et al., 2013).

Parental involvement in individualized education programs (IEPs) enhances the teacher's ability to make informed decisions and support optimal student development (Adams et al., 2016; Lee et al., 2008; Reed, Osborne, & Waddington, 2012). However, the indicator "The Individualized Education Program (IEP) for students with special needs at my school is developed in collaboration with the Special Education Teacher" showed the lowest factor loading, suggesting that formal collaboration in IEP development still requires improvement. Field observations confirmed that, in many schools, IEPs are primarily prepared by special education teachers or guidance and counselor teachers. Fonte and Barton-Arwood (2017) highlight that collaboration between general and special education teachers is essential to minimize barriers and improve learning outcomes for students with special needs. Through such collaboration, IEPs can be more effectively implemented in classroom settings.

The third domain, professional competence, refers to the teacher's expertise in understanding the characteristics of students with special needs and applying appropriate instructional strategies. This competence emerged as the strongest overall dimension in describing the essential skills required by special education teachers. Mavuso (2022) notes that special education teachers must be capable of responding to the wide range of abilities exhibited by their students—recognizing individual differences, conducting appropriate assessments, selecting suitable curricula, and implementing varied teaching strategies (Mavuso, 2022; Zwane & Malale, 2018; Lake, 2010; Donohue & Bornman, 2014).

In this study, the indicators "I am able to use instructional media appropriate to the characteristics of students with special needs" and "I am able to apply instructional strategies that support their learning abilities" were the most representative of this competence. Teachers who

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can identify suitable media and strategies help students with special needs feel included, valued, and able to participate meaningfully in classroom activities (CAST, 2020; Chambers, 2020).

In summary, pedagogical, social, and professional competencies—especially those emphasizing inclusive practices, collaboration, and adaptive instruction—are crucial for special education teachers working in mainstream schools (Bukvić, 2014; Liswandari, 2024). These competencies equip teachers to plan, organize, and implement inclusive education effectively in alignment with students' diverse needs (Mogonea & Popescu, 2019; Liswandari, 2024).

Beyond identifying these domains, the study also found significant variations in mean scores based on teaching experience and educational background. Teachers with less than two years of experience recorded the lowest mean in adaptive instructional professional competence, while those with more than ten years demonstrated the highest mean. This finding is consistent with Nimante and Kokare (2022), who explain that experienced teachers in inclusive settings tend to possess more refined and context-specific competencies due to prolonged exposure to diverse classroom challenges. Furthermore, teachers with formal academic backgrounds in special education (PLB) scored significantly higher in the same dimension, reaffirming that professional training and knowledge of inclusive education enhance the ability to identify learner characteristics and apply effective strategies.

Interestingly, collaborative social competence recorded the highest mean scores across all experience and educational background categories. Novice teachers—those with less than two years of experience—scored the highest in this domain, consistent with Khairuddin and Foggett (2016), who found that novice teachers tend to collaborate more actively with colleagues as part of their learning and professional adaptation process. Collaboration is not only essential for experienced practitioners but also a strategic avenue for professional growth among early-career teachers. As Tworek (2023) asserts, collaboration is one of the most powerful

mechanisms for developing professional competencies and promoting equitable learning opportunities in inclusive classrooms.

D. Conclusion

Basically, there are three core competencies that special education teachers need to possess, namely pedagogical, social, and professional competencies. Pedagogical competence was further divided into two subdimensions: inclusive support and inclusive learning. Teachers are expected to create a safe and equitable classroom environment and apply differentiated instruction that meets the needs of students with special needs. Collaborative social competence highlights the importance of communication and teamwork between teachers and parents in planning and delivering appropriate educational services for students with special needs. Instructional-adaptive professional competence demonstrated the highest reliability among the three dimensions. This domain includes the ability to identify student characteristics, develop effective instructional strategies, conduct assessments, and utilize appropriate learning media. The study also revealed differences in competency levels based on educational background and teaching experience. Teachers with a background in special education and those with more than ten years of teaching experience exhibited higher competency levels across all dimensions.

These findings underscore the importance of strengthening pedagogical, social, and professional competencies among special education teachers. The results may inform the development of competency-based training modules tailored to the Indonesian context. Such improvement can be achieved through targeted training programs, competency-based recruitment, and curriculum development to support the effective implementation of inclusive education. This study has several limitations. The sample size was relatively small and limited to the East Java region, which restricts the generalizability of the findings to other areas. Future research is recommended to include broader geographic

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coverage and adopt triangulation methods—such as classroom observation and interviews—to enhance the validity of the results. Furthermore, developing competency models that reflect local contexts and are grounded in actual classroom practices may contribute to improving inclusive education practices in Indonesia.

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