Measuring Teachers' Inclusive Education Literacy: A Scale Development Study

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ABSTRACT

Inclusive education aims to create equitable and accessible learning environments where all students, regardless of their abilities, disabilities, or backgrounds, receive quality education and fully engage in the learning process. Teachers play a critical role in ensuring inclusive education, yet there is a lack of comprehensive assessment tools to evaluate their competencies in this field. Addressing this gap, this study aimed to develop and validate the Teacher Inclusive Education Literacy Scale (TIELS) to measure teachers' knowledge, planning skills, instructional practices, and professional development engagement in inclusive education. The scale development process followed a systematic, multi-phase approach, including a comprehensive literature review, expert validation, exploratory factor analysis (EFA), and reliability testing. The study sample consisted of 310 teachers from various educational levels and subject areas. EFA results confirmed a four-factor structure, explaining 66.63% of the total variance, supporting the theoretical foundation of the scale. The factor loadings ranged from 0.50 to 0.87, while item-total correlation values were between 0.47 and 0.71, indicating strong construct validity. Furthermore, Cronbach's Alpha values were 0.96 for the overall scale, with subdimension reliabilities ranging between 0.93 and 0.95, confirming high internal consistency. The findings indicate that TIELS is a valid and reliable instrument for assessing teachers' inclusive education literacy. This study contributes to the field by providing a comprehensive and empirically tested measurement tool applicable in diverse teaching contexts and educational settings.

Keywords:
inclusive education, literacy, inclusive education literacy, scale development, teacher competencies

INTRODUCTION

Education is a fundamental right enshrined in international treaties to which Türkiye is a party, including *Article 26 of the Universal Declaration of Human Rights, Article 28 of the UN Convention on the Rights of the Child, and Article 13 of the International Covenant on Economic, Social, and Cultural Rights* (UNESCO, 2005, 2017). These treaties mandate compulsory and free primary education, obligating signatory states to ensure full participation (Yell & Shriner, 1996). However, legal recognition alone is insufficient; education systems must actively facilitate engagement for all individuals, considering diverse socio-economic, cultural, and personal backgrounds (Mbajiorgu & Mafumo, 2014). This requires flexible and accessible learning environments that accommodate individual differences (Davis et al., 2020). Within this framework, inclusive education emerges as a cornerstone of contemporary policies, promoting equal opportunities and fostering active participation.

The concept of inclusive education views differences among individuals not as barriers but as enriching elements that enhance the quality of education. It necessitates the adaptation of educational processes to accommodate the cognitive, affective, and social needs of all students (Booth & Ainscow, 2002). This approach, which was placed at the core of global education policies through the Salamanca Statement by UNESCO (1994), aims not only to integrate individuals with special needs into mainstream educational settings but also to ensure the full and active participation of students with diverse ethnic, cultural, linguistic, academic, and socio-economic backgrounds. Thus, inclusive education goes beyond making adaptations for specific groups; it requires the entire education system to be inclusive—ranging from curriculum design to instructional methods, from assessment processes to the organization of learning environments (Ainscow et al., 2013).

For inclusive education to be effectively implemented, curricula must be made flexible, individualized instructional strategies must be developed, and dynamic learning environments that facilitate the active participation of all students in the learning process must be established (Florian, 2014). The successful

*This study is derived from an unpublished thesis entitled "Examining the Relationship Between Teachers' Inclusive Education Literacy Levels and Their Perceptions of Responsibility for Inclusive Education ", conducted under the supervision of Prof. Dr. Şaban ÇETİN.

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management of this process by teachers is not solely contingent upon their theoretical knowledge but also upon their ability to diversify pedagogical practices to ensure the meaningful engagement of every student in learning. Furthermore, ensuring that both physical and psychosocial learning environments are accessible to all individuals constitutes a fundamental component of the inclusive education framework (UNESCO, 2003). Inclusive education is not merely a model aimed at enhancing academic achievement; rather, it is an educational philosophy that fosters social cohesion, a sense of belonging, and self-confidence in learners (Thomas, 1997).

Teachers hold a crucial position in ensuring the successful implementation of inclusive education within schools. The extent to which all students, including those from disadvantaged backgrounds, can fully engage in learning and access quality education is closely tied to teachers' expertise, perceptions, and professional skills (Lauermann, 2013). The extent to which teachers internalize the principles of inclusive education, plan their instructional processes accordingly, and implement them effectively in classroom settings constitutes a fundamental determinant in ensuring that education is both accessible and of high quality for all learners (Miller et al., 2022; Sakız, 2022). However, the inclusion of students with diverse needs within the same educational environment necessitates the continuous professional development of teachers. It also requires the development of innovative pedagogical approaches and assessment tools to support their ongoing growth and ability to meet the demands of inclusive classrooms (Ayan-Ceyhan, 2016).

At this point, the concept of literacy provides a significant framework for assessing teachers' competencies in inclusive education. Traditionally, literacy has been understood as the ability to read and comprehend written texts. It now encompasses not only the acquisition of information but also its effective utilization and integration into learning processes (Merchant, 2007; Rowsell & Walsh, 2011). According to UNESCO's (2005) definition, literacy refers to an individual's ability to identify, comprehend, interpret, apply, and develop skills using printed and written materials in various contexts, enabling them to achieve their goals, enhance their potential, and fully participate in society. In several studies, literacy has been conceptualized as possessing knowledge on a particular subject, planning based on this knowledge, applying it in practice, and leveraging technological advancements throughout these processes (Aşıcı, 2009; Fransman, 2005; Güneş, 1997). In summary, contemporary literacy is regarded as a multidimensional competency domain, encompassing individuals' abilities to access, analyze, interpret, and effectively apply information across diverse learning and social contexts.

In line with this transformation, inclusive education literacy can be conceptualized as a comprehensive framework encompassing the knowledge, skills, and practices that teachers must possess to understand the philosophy of inclusive education, plan educational processes in accordance with inclusive principles, and effectively implement these plans in classroom settings**.** From a literacy perspective, the "reading" dimension of inclusive education literacy refers to teachers' ability to acquire knowledge about the fundamental principles, strategies, policies, and practices of inclusive education. The "writing" dimension, on the other hand, involves the practical application of this knowledge within the teaching process. This includes designing instructional methods and materials through an inclusive lens, utilizing alternative assessment methods, and actively engaging in professional development activities to enhance inclusive teaching practices.

Although there are no studies in the literature that focus explicitly on inclusive education literacy, numerous studies examine the knowledge and skills that teachers must possess to ensure effective inclusive education. These studies emphasize the importance of teachers having sufficient expertise in differentiated instructional strategies, pedagogical approaches, and student-centered practices (Ainscow & Goldrick, 2010; Florian, 2009; Forlin & Sin, 2010; Hornby, 2010). Furthermore, they highlight the necessity of designing flexible lesson plans, identifying individual differences, and adapting instructional processes accordingly (Agbenyega, 2011; Ainscow et al., 2012; Florian, Young, & Rouse, 2010). The literature also underscores the need for long-term, practice-oriented, and interactive teacher education programs to enhance teachers' competencies in inclusive education. In this context, supporting continuous professional development enables teachers to adopt inclusive practices and create effective learning environments (Ainscow et al., 2025; Alshahrani & Abu-Alghayth, 2023; Moscato & Pedone, 2024; Donath et al., 2023; Vimala, 2023). Thus, inclusive education literacy is not limited to acquiring knowledge about the goals and practices of inclusive education; rather, it constitutes a dynamic process that involves integrating this knowledge into classroom practice, adopting inclusive approaches in material selection, and structuring learning environments to accommodate

the diverse needs of all students. To ensure the sustainability of this process, regular training and support mechanisms are essential.

Determining teachers' inclusive education literacy is crucial for improving inclusive practices and supporting professional development. As classroom effectiveness is directly linked to teachers' competencies (Finkelstein et al., 2021; Sharma et al., 2012), developing a valid and reliable assessment tool is essential. Such an instrument can identify strengths and areas for improvement, enabling more targeted professional development. Additionally, by providing data-driven insights to policymakers, it can contribute to sustainable improvements in inclusive education policies. A review of the literature reveals that numerous scale development studies have been conducted to assess various aspects of inclusive education, including teachers' attitudes (Antonak & Larrivee, 1995; Dorji et al., 2021; Forlin et al., 2011; Hammond & Ingalls, 2003; Kuyini et al., 2020; Mahat, 2008), self-efficacy perceptions (Kuyini et al., 2020; Yada & Savolainen, 2017), knowledge levels (Agbenyega & Klibthong, 2014), and awareness levels (Kılcan & Şimşek, 2021; Sirem & Çatal, 2023). However, the majority of these scales focus solely on measuring the perceptions of teachers in specific subject areas or educational levels, failing to encompass the perspectives of teachers from various disciplines and educational contexts (Agbenyega & Klibthong, 2014; Sirem & Çatal, 2022; Kuyini et al., 2020). As noted by Sakız et al. (2023), while scales developed for pre-service teachers are relatively common (Forlin et al., 2011; Sharma et al., 2012), studies targeting in-service teachers remain limited. Additionally, some existing scales (Forlin et al., 2011; Hammond & Ingalls, 2003; Hsien et al., 2009; Pearman et al., 1992; Shady et al., 2013) explicitly use terms such as "students with special needs" or "students with disabilities", which may not fully reflect the comprehensive philosophy of inclusive education that encompasses all learners, not just those with disabilities.

Considering the limitations of existing instruments, there is a clear need for a psychometrically robust assessment tool that can holistically evaluate teachers' knowledge, skills, and instructional practices in the context of inclusive education and is applicable across different subject areas and educational levels. Accordingly, this study aims to develop a scale for measuring teachers' inclusive education literacy levels, with rigorous validity and reliability analyses conducted to ensure its psychometric soundness. The developed scale adopts a multidimensional structure, incorporating key components such as knowledge of inclusive education, inclusive planning skills, inclusive instructional practices, and professional development in inclusive education. Testing the scale on a diverse teacher sample allows for a comprehensive evaluation of teachers' literacy levels in inclusive education across various disciplines. Moreover, this study provides a significant scientific contribution to the field by addressing a critical gap in the measurement of inclusive education literacy**.**

METHOD

RESEARCH DESIGN

This study employed a descriptive research design within the survey model, which aims to systematically depict the research subject without any intervention (Cohen et al., 2017; Karasar, 2000). The survey model facilitates a structured examination of the existing conditions within a specific population or sample, enabling the derivation of generalizable insights (Büyüköztürk et al., 2008; Creswell & Creswell, 2017). Widely utilized in educational research, this approach not only allows for a comprehensive understanding of current phenomena but also provides a foundation for future inquiries by generating empirical insights that inform the development of new research questions (Fraenkel et al., 2012).

PARTICIPANTS

The study group comprises 310 teachers from public preschools, primary, middle, and high schools in Türkiye. While no consensus exists on the optimal sample size for factor analysis, it is generally recommended that it should not fall below 100 participants. For pilot-tested instruments, a sample size of at least five times the number of scale items is advised, with some researchers suggesting ten times to enhance psychometric validation (Arrindell & van der Ende, 1985; Kass & Tinsley, 1979). Previous research classifies sample adequacy as follows: 100 (poor), 200 (fair), 300 (good), 500 (very good), and 1000 (excellent) (Comrey & Lee, 1992; Tabachnick & Fidell, 2014). Accordingly, this study determined the sample size to be at least six times the number of scale items and collected data from 310 teachers across 22 subject areas, ensuring diversity and representativeness. Table 1 presents details on participants' demographic information.

Table 1. Demographic Information of Participants

Variables		N	Total
Gender	Female	148	
	Male	162	
Subject Area	Biology	5	310
	Classroom Teaching	61	
	English Language Teaching	30	
	Geography	5	
	History	7	
	Imam Hatip Vocational Courses	3	
	Information Technologies	3	
	Maths	13	
	Music	5	
	Philosophy	3	
	Physical Education	13	
	Physics	5	
	Preschool Teaching	29	
	Primary School Mathematics	22	
	Religious Culture and Ethics	20	
	Science	17	
	Social Studies	15	
	Turkish Language and Literature	7	
	Turkish Language Teaching	22	
	Visual Arts	5	
	Workshop, Lab, Vocational, and Field Courses	5	
School Level	Preschool	29	
	Primary School	98	
	Middle School	106	
	High School	77	

As seen in Table 1, the participants consists of a relatively balanced distribution between female (n = 148) and male (n = 162) participants. In terms of school levels, classroom teachers from primary schools (n = 82) and middle schools (n = 81) constitute the largest groups, while preschool (n = 70) and high school (n = 77) teachers are slightly less represented. Regarding subject areas, classroom teachers (n = 61), English language teachers (n = 30), and preschool teachers (n = 29) make up the majority of the participants. Meanwhile, certain specialized fields such as philosophy (n = 3), information technologies (n = 3), and Imam Hatip vocational courses (n = 3) teaching have relatively lower representation. The diversity in school levels and subject areas strengthens the representativeness of the sample, allowing for a comprehensive assessment of teachers' perspectives on inclusive education across different educational contexts.

SCALE DEVELOPMENT PROCESS

The process of scale development consists of a systematic sequence, beginning with the identification of the construct to be measured and extending to the examination of validity and reliability. While various sources present this process with slight variations, the fundamental stages remain consistent across the literature (DeVellis, 2003; Tezbaşaran, 1997). The key phases of scale development can be outlined as:

1. Defining the construct to be measured,
2. Generating an item pool,
3. Consulting expert opinions,
4. Developing a preliminary version of the scale and conducting a pilot study,
5. Performing item analyses and optimizing the scale,
6. Conducting validity and reliability analyses,
7. Administering the final version of the scale and establishing its final structure.

In this study, the scale development process was conducted in line with these principles, adhering to a scientific and systematic approach. The scale development process began with an extensive literature review to identify existing measurement tools related to inclusive education and literacy, ensuring that the scale captured its multidimensional nature. To further refine the construct, a focus group discussion was conducted

with 20 teachers from various educational levels and subject areas. This qualitative phase explored teachers' understanding of inclusive education, instructional challenges, professional development needs, and instructional and assessment practices. The data were analyzed using content analysis, revealing key themes that guided the development of an initial item pool comprising 70 items, categorized under four core dimensions: inclusive education knowledge, inclusive planning skills, inclusive instructional practices, and professional development in inclusive education.

To ensure linguistic clarity and consistency, three independent linguistics experts from different universities reviewed the scale prior to the expert validation phase, providing feedback on accuracy, clarity, and conceptual coherence. Subsequently, 11 experts evaluated the content validity of the scale. These experts were selected based on specific criteria, including holding a Ph.D. or an equivalent degree in inclusive education, curriculum and instruction, or teacher education, having a minimum of 10 years of experience in teacher education research or practice, and demonstrating prior expertise in scale development or psychometric analysis. Each expert rated the items using a four-point relevance scale (1 = Not relevant, 4 = Highly relevant), and Lawshe's Content Validity Ratio (CVR) was calculated to measure inter-expert agreement. Items with a CVR below 0.78 were revised or removed. As a result, 14 items were eliminated due to low CVR scores, while 8 items were modified for improved clarity.

A pilot study with 30 teachers was conducted to assess item clarity and comprehensibility. Participants rated each item on a five-point clarity scale (1 = Very unclear, 5 = Very clear). Items scoring below 4.0 were revised, and those with a mean score below 2.0 were removed. Consequently, 6 additional items were eliminated, resulting in a final scale comprising 50 items. The finalized scale was structured using a five-point Likert-type rating system, allowing participants to express their level of agreement with each statement. In this system, *strongly agree (5)* indicated full endorsement, *agree to a great extent (4)* reflected substantial agreement, *somewhat agree (3)* represented moderate agreement, *disagree (2)* signified opposition, and *strongly disagree (1)* indicated complete disagreement. This structured format facilitated a systematic analysis of participants' responses, ensuring a quantifiable measure of inclusive education literacy levels.

Following refinement, the scale was administered to a sample of 310 teachers from various school levels and subject areas. The collected data were analyzed using SPSS, where missing values, errors, and inconsistencies were examined. The internal reliability of the scale was assessed using Cronbach's Alpha coefficient, and item-total correlation coefficients were analyzed to determine each item's contribution to the overall construct. To establish construct validity, Exploratory Factor Analysis (EFA) was conducted to identify latent structures. The Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity confirmed the dataset's suitability for factor analysis, with a KMO value within an acceptable range and a statistically significant Bartlett test result. To refine the factor structure, Varimax rotation was applied, leading to the removal of items with low factor loadings or cross-loadings.

The reliability of the scale was further evaluated using Cronbach's Alpha for both the overall scale and its subdimensions. Additionally, item-total correlation coefficients were examined to determine item contributions to internal consistency. To assess item discrimination, an independent samples t-test compared the top 27% and bottom 27% of participants based on total scores. The split-half reliability method was also employed to ensure consistency across sections of the scale. This comprehensive validation process ensured that the scale could effectively identify teachers' competencies and areas for improvement, thereby supporting targeted professional development and contributing to the effective implementation of inclusive education policies.

RESULTS

RESULTS OF EXPLORATORY FACTOR ANALYSIS

To determine whether the dataset is appropriate for factor analysis, the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity were applied. The KMO test evaluates sample adequacy, producing values between 0 and 1. Based on widely accepted standards, a KMO value below 0.50 is deemed insufficient, indicating the need for additional data collection. Values ranging from 0.50 to 0.70 suggest moderate adequacy, while those between 0.70 and 0.80 are considered acceptable. A range of 0.80 to 0.90 is regarded as very good, and values above 0.90 are classified as excellent. Conversely, Bartlett's Test of Sphericity examines whether the variance-covariance matrix aligns with an identity matrix. If the test result is statistically significant, the dataset can be considered spherical and aligned with the assumptions of multivariate normality. However,

the most significant drawback of Bartlett's Test of Sphericity is its sensitivity to sample size, as the likelihood of obtaining a significant result increases with larger sample sizes (Çokluk et al., 2016; Tabachnick & Fidell, 2014). As a result of the Exploratory Factor Analysis, the KMO value was found to be 0.947, and the result of Bartlett's Test of Sphericity was 13,835.454 ($p < .05$). These values fall within the acceptable range specified in the relevant literature.

To determine which items in the item pool should be included in the scale, inter-item correlation values were first examined. In the scale development process, ensuring that inter-item correlation values fall within an appropriate range is crucial. Correlation values below 0.1 are deemed inadequate, as they suggest that the items do not measure the same construct, thereby negatively affecting the reliability and validity of the scale. Correlation values between 0.1 and 0.3 are considered acceptable, indicating that the items measure the same concept, albeit with a weak relationship. Ideally, correlations should range between 0.3 and 0.7, as this indicates that the items strongly represent the same construct. This approach enhances the internal consistency and homogeneity of the scale, ensuring reliable and valid measurements (DeVellis, 2003; Field, 2009; Nunnally & Bernstein, 1994; Kline, 2023; Crocker & Algina, 2006). Based on these findings, it was determined that the inter-item correlation values of all items in the scale exceeded 0.1 ($p < .05$), leading to the decision to retain all items in the scale.

The communalities, which represent the contribution of each item to the total variance, were then examined, revealing that none of the 50 items had a communality value below 0.300. Furthermore, the factor loadings of the items were analyzed. Factor loadings are a critical measure indicating the extent to which an item represents a given factor. In social sciences research, factor loadings are typically evaluated based on specific threshold values. According to widely accepted criteria, factor loadings of 0.30 and above are considered weak, while values of 0.40 and above are generally deemed acceptable. Factor loadings exceeding 0.50 indicate a high level of explanatory power, whereas loadings above 0.70 demonstrate that an item represents the corresponding factor exceptionally well (Tabachnick & Fidell, 2014; Kline, 2023).

During the scale development process, the minimum acceptable factor loading threshold was set at 0.30. Additionally, an item was required to exhibit a difference of at least 0.10 between its loadings on different factors. If the difference between an item's loadings on two factors was less than 0.10, the item was classified as a cross-loading item and subsequently removed from the scale. The analyses identified nine cross-loading items (item5, item20, item23, item25, item27, item30, item31, item42 and item43), which were excluded from the scale. Following the removal of these items, the EFA was re-run, resulting in a KMO value of 0.943, with Bartlett's Test of Sphericity yielding a statistically significant result ($\chi^2 = 11{,}497.729$; $p < .05$). As previously discussed, these values align with the criteria established in the literature. The corrected item-total correlations and factor loadings for the remaining 41 items are presented in Table 2.

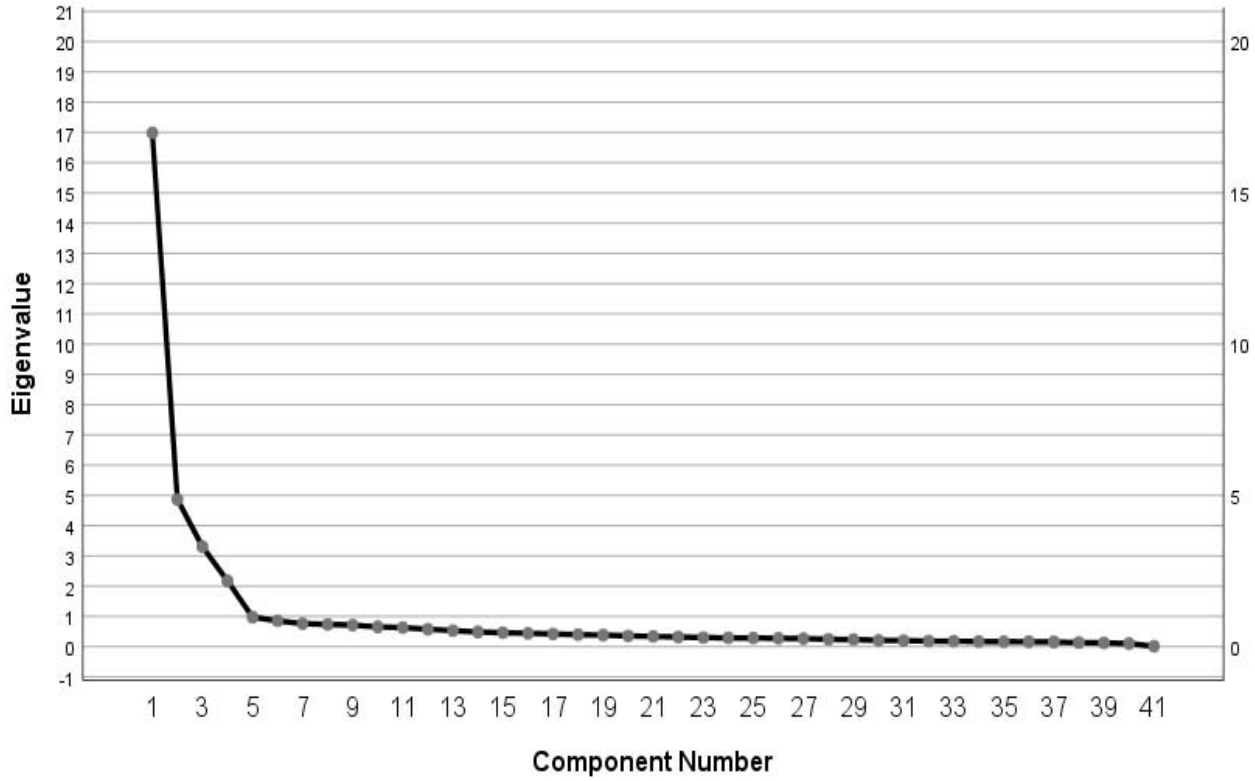
Table 2. Factor Loadings and Item-Total Correlations of Scale

Items	Factor Loading	Item-Total Correlation	Items	Factor Loading	Item-Total Correlation
Item1	0,64	0,66	Item26	0,57	0,62
Item2	0,66	0,66	Item28	0,50	0,53
Item3	0,58	0,60	Item29	0,55	0,54
Item4	0,71	0,71	Item32	0,55	0,65
Item6	0,73	0,58	Item33	0,55	0,63
Item7	0,56	0,47	Item34	0,59	0,62
Item8	0,72	0,66	Item35	0,66	0,66
Item9	0,71	0,65	Item36	0,67	0,66
Item10	0,69	0,66	Item37	0,70	0,60
Item11	0,74	0,69	Item38	0,72	0,68
Item12	0,75	0,69	Item39	0,68	0,69
Item13	0,63	0,67	Item40	0,68	0,69
Item14	0,61	0,61	Item41	0,62	0,66
Item15	0,64	0,61	Item44	0,83	0,69
Item16	0,74	0,63	Item45	0,70	0,69
Item17	0,68	0,60	Item46	0,60	0,65
Item18	0,64	0,56	Item47	0,68	0,71
Item19	0,62	0,67	Item48	0,87	0,62
Item21	0,67	0,67	Item49	0,85	0,60
Item22	0,56	0,55	Item50	0,64	0,69
Item24	0,63	0,59			

As seen in Table 2, all items demonstrate acceptable factor loadings and item-total correlations. The factor loadings range between 0.50 and 0.87, indicating that each item significantly contributes to the underlying construct. Similarly, the item-total correlation values range from 0.47 to 0.71, ensuring internal consistency within the scale. In the literature, it is emphasized that the correlation coefficient between an item and the overall scale should be at least 0.30 (DeVellis, 2003; Nunnally & Bernstein, 1994; Özdamar, 2016). The findings in Table 2 confirm that all items meet this criterion, supporting the reliability and validity of the scale.

To determine whether the 41 items exhibited factorization within themselves, the Varimax rotation method was initially applied, considering the possibility that the extracted factors might not be statistically correlated. Although inclusive education constructs are theoretically interrelated, their statistical independence needed to be assessed first. The analysis revealed significant correlations among the factors, leading to the use of Direct Oblimin rotation to account for these interdependencies. Direct Oblimin is particularly suitable in social and educational research, where constructs often overlap (Fabrigar et al., 1999; Costello & Osborne, 2005). In this study, factors such as inclusive education knowledge, inclusive practices, planning skills, and professional development are conceptually related, making oblique rotation more appropriate. Since educational competencies frequently interact, forcing factors to remain uncorrelated could misrepresent the underlying structure (Field, 2009). Direct Oblimin provides a more accurate and theoretically consistent factor structure while maintaining interpretability (Tabachnick & Fidell, 2014). Thus, its selection was justified both statistically and conceptually, ensuring that the extracted factors accurately reflect the interconnected nature of inclusive education competencies. Following the rotation, the analysis revealed that the scale comprised four distinct sub-dimensions. The Scree Plot, which illustrates the eigenvalues of the factors with values greater than 1, is presented in Figure 1.

Figure 1. Scree Plot of the Scale



In the scree plot, the steep slope indicates that the factors explain a high proportion of variance, while the flattening of the curve suggests diminishing explanatory power. The first factor accounts for the largest variance, whereas subsequent factors contribute progressively less. The "elbow" point, where the curve levels off, marks the optimal number of factors to retain (Cattell, 1966). In this study, the scree plot revealed that after the fourth factor, the curve leveled off, suggesting a four-factor structure. Since the determination of the "elbow" point can be subjective, researchers are advised to use the scree plot alongside other factor retention criteria (Zwick & Velicer, 1986). The rotation process further clarified the distinction between these factors and their associated items. The factors obtained after the rotation process and their explained variance ratios are presented in Table 3.

Table 3. Sub-dimensional Structure and EFA Results of the Scale

Items	Inclusive Education Knowledge	Inclusive Instructional Practices	Inclusive Planning Skills	Professional Development	Factor Eigenvalue	Explained Variance
Item6	0,90					
Item8	0,82					
Item9	0,81					
Item11	0,81					
Item12	0,81					
Item10	0,80				16,98	41,42
Item7	0,80					
Item1	0,75					
Item2	0,72					
Item4	0,71					
Item13	0,69					
Item3	0,68					
Item37		0,90				
Item38		0,77				
Item40		0,76				
Item29		0,75				
Item36		0,75				
Item35		0,75			4,86	11,86
Item34		0,71				
Item41		0,71				
Item39		0,70				
Item28		0,69				
Item33		0,66				
Item32		0,62				
Item16			0,87			
Item17			0,83			
Item24			0,81			
Item18			0,79			
Item15			0,77		3,30	8,05
Item14			0,75			
Item21			0,74			
Item26			0,70			
Item22			0,70			
Item19			0,67			
Item48				0,93		
Item49				0,93		
Item44				0,83		
Item45				0,70	2,16	5,29
Item47				0,66		
Item50				0,64		
Item46				0,63		
Total (%)						66,63

The 41-item, four-dimensional scale explains a total variance of 66.63%, indicating that the scale accounts for 66% of teachers' inclusive education literacy levels. A strong factor structure is associated with a high explained variance ratio, as it reflects the extent to which the identified factors represent the underlying construct. In social sciences, an explained variance ratio between 40% and 60% is generally considered sufficient (Şencan, 2005; Özdamar, 2016; Tavşancıl, 2014). The scale yields a minimum score of 41 and a maximum score of 205, providing a comprehensive range for the assessment of teachers' inclusive education literacy. The factors identified in the scale were named as follows: Inclusive Education Knowledge, Inclusive Planning Skills, Inclusive Teaching Practices, and Professional Development in Inclusive Education.

RESULTS OF RELIABILITY ANALYSIS

After factor analysis, Cronbach's Alpha coefficients were calculated to evaluate the reliability of the overall scale and its subdimensions. The overall reliability coefficient was 0.96, indicating strong internal consistency. Subdimension coefficients were 0.95 for Inclusive Education Knowledge, 0.93 for Inclusive Planning Skills, 0.94 for Inclusive Practices, and 0.94 for Professional Development. The Spearman-Brown coefficient for the two halves of the scale was 0.88, further confirming reliability. Furthermore, to assess the discriminative power of the items, a comparison was conducted between the top and bottom 27% of respondents. This analysis helps determine whether the items effectively differentiate between individuals with higher and lower levels of the measured construct.

Table 4. Independent Samples T-Test for Item Discrimination of Lower 27% – Upper 27% Groups

Factors	Items	Groups	N	X	SS	t	sd	p
Knowledge of Inclusive Education	Item1	Upper %27	84	4,39	0,60	12,828	166	0,000
		Lower %27	84	2,88	0,89			
	Item2	Upper %27	84	3,99	0,76	12,529	166	0,000
		Lower %27	84	2,39	0,87			
	Item3	Upper %27	84	3,83	0,90	11,621	166	0,000
		Lower %27	84	2,25	0,86			
	Item4	Upper %27	84	4,23	0,71	14,454	166	0,000
		Lower %27	84	2,46	0,85			
	Item6	Upper %27	84	4,17	0,70	10,839	166	0,000
		Lower %27	84	2,80	0,91			
	Item7	Upper %27	84	4,31	0,67	7,996	166	0,000
		Lower %27	84	3,24	0,98			
	Item8	Upper %27	84	4,21	0,71	12,428	166	0,000
		Lower %27	84	2,68	0,88			
	Item9	Upper %27	84	4,18	0,69	13,062	166	0,000
		Lower %27	84	2,63	0,83			
	Item10	Upper %27	84	4,43	0,60	12,516	166	0,000
		Lower %27	84	2,93	0,91			
	Item11	Upper %27	84	4,25	0,63	14,900	166	0,000
		Lower %27	84	2,60	0,79			
	Item12	Upper %27	84	4,48	0,64	16,247	166	0,000
		Lower %27	84	2,75	0,72			
	Item13	Upper %27	84	4,21	0,74	13,079	166	0,000
		Lower %27	84	2,65	0,79			
Inclusive Planning Skills	Item14	Upper %27	84	4,39	0,62	11,296	166	0,000
		Lower %27	84	3,19	0,75			
	Item15	Upper %27	84	4,37	0,59	11,440	166	0,000
		Lower %27	84	3,15	0,76			
	Item16	Upper %27	84	4,46	0,56	12,051	166	0,000
		Lower %27	84	3,23	0,75			
	Item17	Upper %27	84	4,40	0,56	11,849	166	0,000
		Lower %27	84	3,21	0,72			
	Item18	Upper %27	84	4,42	0,58	10,343	166	0,000
		Lower %27	84	3,27	0,82			
	Item19	Upper %27	84	4,56	0,56	14,841	166	0,000
		Lower %27	84	3,02	0,76			
	Item21	Upper %27	84	4,49	0,54	13,919	166	0,000
		Lower %27	84	3,15	0,68			
	Item22	Upper %27	84	4,63	0,51	10,673	166	0,000
		Lower %27	84	3,56	0,76			
	Item24	Upper %27	84	4,40	0,64	10,668	166	0,000
		Lower %27	84	3,17	0,84			
	Item26	Upper %27	84	4,70	0,55	10,023	166	0,000
		Lower %27	84	3,54	0,91			

Inclusive Practices	Item28	Upper %27	84	4,80	0,43	10,116	166	0,000
		Lower %27	84	3,81	0,78			
	Item29	Upper %27	84	4,80	0,43	11,333	166	0,000
		Lower %27	84	3,70	0,77			
	Item32	Upper %27	84	4,71	0,50	13,321	166	0,000
		Lower %27	84	3,40	0,74			
	Item33	Upper %27	84	4,67	0,56	13,451	166	0,000
		Lower %27	84	3,30	0,74			
	Item34	Upper %27	84	4,67	0,58	11,960	166	0,000
		Lower %27	84	3,21	0,94			
	Item35	Upper %27	84	4,73	0,47	12,919	166	0,000
		Lower %27	84	3,40	0,80			
	Item36	Upper %27	84	4,67	0,49	13,568	166	0,000
		Lower %27	84	3,33	0,75			
	Item37	Upper %27	84	4,73	0,47	10,977	166	0,000
		Lower %27	84	3,52	0,88			
	Item38	Upper %27	84	4,73	0,44	14,073	166	0,000
		Lower %27	84	3,31	0,80			
	Item39	Upper %27	84	4,73	0,44	13,659	166	0,000
		Lower %27	84	3,30	0,84			
	Item40	Upper %27	84	4,63	0,55	13,584	166	0,000
		Lower %27	84	3,12	0,85			
	Item41	Upper %27	84	4,55	0,56	12,715	166	0,000
		Lower %27	84	3,14	0,83			
Professional Development in Inclusive Education	Item44	Upper %27	84	4,20	0,81	13,093	166	0,000
		Lower %27	84	2,32	0,98			
	Item45	Upper %27	84	4,14	0,86	13,262	166	0,000
		Lower %27	84	2,25	0,98			
	Item46	Upper %27	84	4,35	0,79	11,182	166	0,000
		Lower %27	84	2,77	0,98			
	Item47	Upper %27	84	4,51	0,66	13,744	166	0,000
		Lower %27	84	2,73	0,98			
	Item48	Upper %27	84	3,86	0,92	10,573	166	0,000
		Lower %27	84	2,19	0,98			
	Item49	Upper %27	84	3,77	0,96	10,497	166	0,000
		Lower %27	84	2,20	0,97			
	Item50	Upper %27	84	4,18	0,82	12676	166	0,000
		Lower %27	84	2,43	0,96			
Total		Upper %27	84	180,9167	9,66	34,465	166	0,000
		Lower %27	84	122,2143	12,25			

The t-test analysis comparing the top and bottom 27% groups showed statistically significant differences for all scale items, demonstrating their effectiveness in distinguishing individuals with higher and lower levels of the measured construct. The consistency of these differences confirms that the items accurately capture the intended characteristics and function reliably within the scale. Moreover, the clear distinction between high- and low-performing groups provides strong evidence of the scale's internal consistency and discriminative validity. Additionally, to further assess internal consistency, correlations between the overall scale and its subdimensions were examined. The results of this analysis are presented in Table 5.

Table 5. Correlation Results Between Factors and Total Scores

Sub-dimensions	Number of Items	Factor 1	Factor 2	Factor 3	Factor 4	Total
Factor 1	12	1	0,45**	0,42**	0,51**	0,79**
Factor 2	10		1	0,64**	0,43**	0,77**
Factor 3	12			1	0,56**	0,81**
Factor 4	7				1	0,77**
Total	41					1

As presented in the table, correlation values range from 0.42 to 0.81, indicating strong relationships both among the factors and between each factor and the total scale score. This suggests that the identified factors are not independent but rather components of a unified construct. The findings support the structural integrity of the scale, demonstrating that the subdimensions collectively contribute to measuring the intended concept. These results confirm the scale's reliability in assessing inclusive education literacy, reinforcing its suitability for both research and practical applications (Büyüköztürk, 2014; Erkuş, 2012).

CONCLUSION, DISCUSSION, AND SUGGESTIONS

This study aimed to develop a valid and reliable scale to measure teachers' inclusive education literacy levels. The developed scale consists of four subdimensions: Inclusive Education Knowledge, Inclusive Planning Skills, Inclusive Teaching Practices, and Professional Development in Inclusive Education. Content validity was evaluated based on expert opinions, while construct validity was assessed through Exploratory Factor Analysis (EFA). The EFA results confirmed a four-factor structure, explaining 66% of the total variance. Factor loadings ranged from 0.50 to 0.87, while item-total correlation coefficients were found to be between 0.47 and 0.71.

As part of the reliability analysis, Cronbach's Alpha coefficient was calculated as 0.96 for the overall scale, indicating a high level of internal consistency. The reliability coefficients for the subdimensions were 0.95 for Inclusive Education Knowledge, 0.93 for Inclusive Planning Skills, 0.94 for Inclusive Teaching Practices, and 0.94 for Professional Development in Inclusive Education. These findings confirm that the scale demonstrates strong internal consistency. Furthermore, the item-total correlations were found to be statistically significant ($p < 0.01$), highlighting the scale's discriminative power at both the item and overall scale levels. The scale is structured using a five-point Likert-type rating system, with response options ranging from "Strongly Agree" to "Strongly Disagree". The minimum possible score on the scale is 41, while the maximum score is 205. Overall, the findings indicate that the scale possesses adequate psychometric properties in terms of content validity, construct validity, and reliability. Therefore, this instrument can be effectively used to comprehensively assess teachers' knowledge, planning skills, instructional practices, and professional development efforts related to inclusive education.

A review of existing scale development studies on inclusive education reveals that most instruments primarily focus on measuring teachers' attitudes and perceptions, with relatively fewer scales assessing their instructional competencies. For instance, the scale developed by Sharma et al. (2012) aims to measure teachers' self-efficacy perceptions regarding inclusive education practices and is structured around three fundamental factors: inclusive teaching methods, collaborative instructional practices, and classroom management. However, this scale does not include a dimension assessing teachers' planning skills and fails to evaluate how teachers participate in professional learning processes related to inclusive education. Similarly, the SACIE-R scale, developed by Forlin et al. (2011), measures teachers' attitudes and concerns regarding inclusive education but does not encompass crucial components such as inclusive education knowledge, planning competencies, instructional implementation, and professional development activities. The Inclusive Education Literacy Scale for Teachers, developed in this study, differs from previous instruments by incorporating a more comprehensive assessment framework. This scale evaluates teachers' knowledge levels, planning skills, instructional strategies, and professional development processes in the context of inclusive education. The professional development dimension, in particular, represents a significant contribution, as it examines how teachers enhance their expertise in inclusive education and engage in continuous professional learning. Although professional development is a critical element for the sustainability of inclusive education, previous studies have paid insufficient attention to this aspect (Loreman et al., 2013; Mónico et al., 2020). By addressing this gap, the present study provides a valuable tool for evaluating teachers' professional development needs in inclusive education.

Additionally, this study is one of the few that thoroughly examines teachers' pedagogical planning processes as a means to ensure the sustainability of inclusive education. Teachers' ability to develop inclusive lesson plans, select appropriate instructional materials, and implement effective classroom strategies is a key determinant in ensuring that all students have equitable access to education (Florian & Black-Hawkins, 2011). However, existing scales predominantly focus on teachers' pedagogical awareness, rather than evaluating their practical planning processes (Jordan, Schwartz, & McGhie-Richmond, 2009; Kuyini et al., 2020). In the context of inclusive education, teachers' ability to plan and implement differentiated instructional strategies is

considered one of the fundamental components of effective inclusive practices (Tomlinson, 2014). Therefore, the Inclusive Education Literacy Scale for Teachers plays a crucial role in assessing the extent to which teachers can plan and implement inclusive education strategies, thereby filling a significant gap in the literature.

Inclusive education is recognized as a global priority, yet its implementation varies across cultural and institutional contexts. To enhance the applicability of TIELS in diverse educational settings, future research should examine the scale's validity and reliability across different countries and cultural backgrounds. Conducting cross-cultural validation studies will help identify context-specific challenges and ensure the instrument remains relevant for teachers working in varied socio-educational environments. Additionally, it is recommended that future studies administer the scale to diverse teacher populations, including pre-service teachers, special education teachers, and school administrators, to assess its broader applicability. Conducting multi-group confirmatory factor analysis (CFA) will further determine whether the scale maintains its structural integrity across different cultural and institutional contexts. Furthermore, longitudinal studies could examine the effectiveness of teacher training programs by evaluating how teachers' competencies in inclusive education develop over time.

Beyond validation efforts, future research should consider the perspectives of different stakeholders, such as school administrators, parents, and school staff, to provide a more comprehensive understanding of inclusive education practices. Developing adapted versions of the scale to measure the knowledge, attitudes, and instructional practices of these groups could contribute to a holistic evaluation of inclusive education policies. Additionally, investigating parental awareness of inclusive education, administrators' attitudes toward inclusive policies, and the integration of school staff into inclusive education processes could offer valuable insights for developing and implementing evidence-based inclusive education strategies.

Further research could also explore intervention programs aimed at enhancing teachers' inclusive education competencies. Assessing the effectiveness of such programs using TIELS could provide critical insights into best practices for professional development. By evaluating the impact of targeted training initiatives on teachers' inclusive education literacy, future studies could contribute to the refinement of professional development models, ensuring sustainable and impactful teacher training efforts.

This study contributes to the field of inclusive education by providing a psychometrically sound instrument that comprehensively assesses teachers' competencies in inclusive education literacy. Unlike previous scales, TIELS incorporates a broader range of competencies, covering knowledge, planning, instructional strategies, and professional development. The findings confirm that TIELS possesses strong psychometric properties in terms of content validity, construct validity, and reliability, making it a valuable tool for researchers, teacher educators, and policymakers. By addressing key gaps in the literature, particularly in the areas of instructional planning and professional development, the scale enhances the ability to measure and improve teachers' preparedness for inclusive education.

Future research should prioritize cross-cultural adaptation, longitudinal validation, and stakeholder perspectives to ensure that the scale remains applicable across diverse educational settings. Additionally, intervention studies utilizing TIELS could generate further insights into effective professional development models for enhancing inclusive education competencies. By fostering data-driven teacher training and policy initiatives, the scale has the potential to contribute to the advancement of inclusive education practices, ensuring that all students receive equitable and high-quality learning opportunities.

Declarations

Conflict of Interest

No potential conflicts of interest were disclosed by the author(s) with respect to the research, authorship, or publication of this article.

Ethics Approval

The formal ethics approval was granted by Gazi University Ethics Commission with the approval numbered "E.931339" and dated "24.04.2024".

Funding

No specific grant was given to this research by funding organizations in the public, commercial, or not-for-profit sectors.

Research and Publication Ethics Statement

Hereby, we as the authors consciously assure that for the manuscript "Measuring Teachers' Inclusive Education Literacy: A Scale Development Study" the following is fulfilled:

- This material is the authors' own original work, which has not been previously published elsewhere.
- The paper reflects the authors' own research and analysis in a truthful and complete manner.
- The results are appropriately placed in the context of prior and existing research.
- All sources used are properly disclosed.

Contribution Rates of Authors to the Article

The authors provide equal contribution to this work.

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ÖĞRETMENLERİN KAPSAYICI EĞİTİM OKURYAZARLIĞI ÖLÇEĞİ

1.Kesinlikle katılmıyorum, 2.Katılmıyorum, 3.Kısmen Katılıyorum, 4.Büyük ölçüde katılıyorum, 5.Kesinlikle katılıyorum

Maddeler	1	2	3	4	5
1. Kapsayıcı eğitimin tarihsel gelişimini ve günümüzdeki durumunu takip ediyorum.					
2. Kapsayıcı eğitimin hukuki dayanakları hakkında bilgi sahibiyim.					
3. Kapsayıcı eğitimin gerektirdiği öğretim materyallerinin niteliklerini biliyorum.					
4. Kapsayıcı eğitimin sağlanması için gerekli olan yasal düzenlemeleri inceledim.					
5. Kapsayıcı eğitimin hedefleri ve ilkeleri hakkında bilgi sahibiyim.					
6. Kapsayıcı eğitimin içeriği ve uygulamaya yansımalarını hakkında kapsamlı bir anlayış geliştirdim.					
7. Tüm öğrencilerime uygun kapsayıcı değerlendirmelerin nasıl yapılabileceğini biliyorum.					
8. Kapsayıcı eğitimin temel değerlerinin ve gerekliliklerinin farkındayım.					
9. Kapsayıcı öğretim programlarının niteliklerine dair bilgim var.					
10. Kapsayıcı eğitimin gerektirdiği kapsayıcı-destekleyici teknolojileri etkili bir şekilde kullanma konusunda yetkinim.					
11. Kapsayıcı eğitimin amaçlarına ulaşması için gereken öğretim ortamları hakkında bilgi sahibiyim.					
12. Kapsayıcı eğitim uygulamalarında karşılaşabileceğim zorlukları nasıl aşabileceğimi bilirim.					
13. Öğretimi planlamadan önce tüm öğrencilerimin bireysel ihtiyaçlarını anlamak için ihtiyaç analizi yaparım.					
14. Derslerimi farklılaştırılmış öğretim yöntemleriyle planlarım.					
15. Tüm öğrencilerimin ders materyallerine ve aktivitelere erişebilmesini sağlamak için sınıf ortamını ve mevcut öğretim materyallerini analiz ederim.					
16. Öğrencilerimin ilerlemesini düzenli olarak değerlendirip gerektiğinde öğretim stratejilerimi yeniden düzenlerim.					
17. Öğretim materyallerimi ve etkinliklerimi öğrencilerin ilgi alanlarına ve ihtiyaçlarına göre uyarlarım.					
18. Tüm öğrencilerimin öğrenme ihtiyaçlarına yanıt verebilmek için derslerime bilgi ve iletişim teknolojilerini entegre edecek şekilde planlama yaparım.					
19. Tüm öğrencilerimin sosyal ve duygusal öğrenme becerilerini geliştirmeye yönelik etkinlikler planlarım.					
20. Tüm öğrencilerimin gelişimlerini düzenli olarak izler ve bu verileri öğretimimi uyarlamak için kullanırım.					
21. Tüm öğrencilerimin kabul gördüğü ve kendilerini değerli hissettiği bir sınıf ortamı oluşturmak için gerekli düzenlemeleri yaparım.					
22. Değerlendirme süreçlerini tüm öğrencilerimin bireysel farklılıklarını dikkate alarak planlarım.					
23. Sınıf içinde her bir öğrencime değerli olduğunu hissettiririm.					
24. Her bir öğrencimin aidiyet hissedeceği olumlu bir sınıf atmosferi oluştururum.					
25. Sınıfta hem bireysel çalışmaya hem de grup çalışmasına uygun bir öğrenme ortamı oluştururum.					
26. Derslerimde kullandığım materyalleri tüm öğrencilerimin bireysel farklılıklarını dikkate alarak çeşitlendiririm.					
27. Sınıf içinde uyguladığım etkinlikler ve verdiğim görevlerin seçiminde tüm öğrencilerimin bireysel özelliklerini göz önünde bulundururum.					
28. Tüm öğrencilerimin kalıcı öğrenmelerini sağlamak amacıyla düzenli olarak ders tekrarı yaparım.					

29. Tüm öğrencilerimin öğrendiklerini uygulayabilmesi için çeşitli fırsatlar yaratırım.					
30. Tüm öğrencilerimin aktif katılımını sağlamak için uygun bilgi ve iletişim teknolojilerini kullanırım.					
31. Öğrencilerimin bireysel farklılıklarına uygun çeşitli değerlendirme yöntemlerini kullanırım.					
32. Tüm öğrencilerimin ihtiyaçlarını karşılayabilmek için okul rehber öğretmenleri ve özel eğitim uzmanlarıyla görüşmeler yaparım.					
33. Tüm öğrencilerimi işbirlikçi çalışmaya teşvik ederim.					
34. Öğrencilerime sağladığım desteği onların bireysel özelliklerine göre farklılaştırırım.					
35. Kapsayıcı eğitim hakkında güncel gelişmeleri ve literatürü takip ederim.					
36. Kapsayıcı eğitimle ilgili seminerler, konferanslar, atölyeler ve eğitim programları gibi profesyonel gelişim fırsatlarından yararlanırım.					
37. Okulumdaki öğretmenlerle veya çeşitli dijital araçlar aracılığıyla ulaştığım meslektaşlarımla işbirliği yaparım.					
38. Kapsayıcı eğitimle ilgili deneyimlerimi meslektaşlarımla paylaşırım.					
39. Kapsayıcı eğitimi destekleyen sivil toplum kuruluşları veya diğer örgütlerle işbirliği yaparım.					
40. Kapsayıcı eğitimle ilgili ulusal veya uluslararası projelere katkı sağlarım.					
41. Kendi kapsayıcı öğretim uygulamalarımın değerlendirmesini düzenli bir şekilde yaparak eksiklerimi gideririm.					