



Multicultural Competence Scale for Prospective Teachers: Development, Validation and Measurement Invariance

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ABSTRACT

Purpose: This study reports on the development, validation and measurement invariance of the Multicultural Competency Scale (MCS) for preservice teachers.

Research Methods: Data from 640 pre-service teachers were collected for two studies. After data screening procedures 628 responses were left. The data were divided into two sets for exploratory factor ($n_1=314$) and confirmatory factor analysis ($n_2=314$) using a random split half method in SPSS.

Findings: According to the results of the exploratory factor analysis, a 14-item, three-factor solution came out: awareness, skill and knowledge. Awareness

subscale aims to measure the teacher's awareness of his or her own cultural affiliation. Knowledge subscale attempts to measure the teacher's willingness to learn about diverse cultures. Skill subscale intends to measure the teacher's competence to organize and adapt the educational environment and materials according to the multicultural class. Confirmatory factor analysis indicated that the three-factor oblique model was a good fit to the data. The subscales of the MCS demonstrated adequate internal consistency. Measurement invariance tests revealed that full configural, metric, scalar invariance and partial strict invariance were achieved across gender.

Implications for Research and Practice: Validity and reliability analysis of the scale suggest that the MCS-14 has satisfactory psychometric features. Thus, the MCS can be utilized to diagnose pre-service teachers' multicultural competency and to investigate changes in their strengths and weaknesses in multicultural competency during the training. The MCS enables preservice teachers to self-assess and to recognize their position of multicultural competence. The MCS also allows researchers to predict teachers' future success in diverse classrooms.

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Introduction

The new Millennium witnesses an increasing diversity both locally and globally. This is evident in schools and classrooms well. The changing demographics and the increase in migration have led to the growth of a more diverse student body in school than ever before. Thus, identifying student needs based solely on a majority (dominant) group can no longer suffice. The scholars stress that school policies and practices should evolve in response to this diversity of students (Banks, 2010). In such a global world, prospective teachers will be confronted with students from different backgrounds (Nzai & Feng, 2014). Therefore, teachers need to be equipped to effectively serve pupils from culturally and linguistically different groups (Mysore, Lincoln & Wavering, 2006).

Multiculturalism is defined in various ways. Fowers and Richardson (1996) emphasized that "multiculturalism is a social-intellectual movement that promotes the value of diversity as a core principle and insists that all cultural groups be treated with respect as equals" (p. 609). According to American Psychological Association (APA) "Multiculturalism, in an absolute sense, recognizes the broad scope of dimensions of race, ethnicity, language, sexual orientation, gender, age, disability, class status, education, religious/spiritual orientation, and other cultural dimensions" (APA, 2002, p. 10). Multiculturalism also involves a variety of other personal and cultural characteristics (Tiedt & Tiedt, 2005). Rosado (1997) provided an operational definition as multiculturalism as follows:

Multiculturalism is a system of beliefs and behaviors that recognizes and respects the presence of all diverse groups in an organization or society, acknowledges and values their socio-cultural differences, and encourages and enables their continued contribution within an inclusive cultural context which empowers all within the organization or society (p. 2).

Multicultural education is a democratic touch to teaching and learning aimed to nurture cultural pluralism in culturally diverse societies and in a closely linked world (Bennett, Niggle, & Stage, 1990). Singleton (1996) suggests that multicultural education should be considered beyond any social group and be more inclusive generally including gender, culture, age, and class. Nieto (2000, p.305) describes multicultural education as "a process of comprehensive school reform and basic education for all students. It challenges and rejects racism and other forms of discrimination in schools and society and accepts and affirms the pluralism (ethnic, racial, linguistic, religious, economic, and gender among others) that students, their communities, and teachers reflect" (as cited in Iwai, 2013, p. 186). Parekh (2002) views multicultural education as educational activities geared toward promoting intellectual curiosity, self-reflection, ability to arrive at ideas through independent evaluation of evidence, respect for others, sensitivity to a variety of viewpoints and life styles and elimination of ethnocentrism. Banks (2010) noted:

Multicultural education is at least three things: An idea or concept, an educational reform movement and a process. Multicultural education incorporates the idea that all students-regardless of their gender, and social class, and their ethnic, racial, or cultural characteristics - should have an equal opportunity to learn in school. Another

important idea in multicultural education is that some students, because of these characteristics, have a better chance to learn in schools as they are currently structured than do students who belong to other groups or who have different cultural characteristics (p. 3).

As seen above, there are various definitions of multicultural education. The common aspect of the definitions is that multicultural education is a process and requires covering all individuals. Another point, multiculturalism in education is not limited to ethnic origin, race, religion, nationality, language or social class but also include learning manners, past learning, socio-economic condition, sex/gender, geographic region, physical and mental abilities/disabilities (Cushner, McClelland, & Safford, 2003; Keengwe, 2010). Moreover, the main reasons for the need for multicultural education are stated as follows (see in Sherpa, 2019, pp. 37-39): (i) developing ethnic and cultural literacy, (ii) respect for human beings and human dignity, (iii) globalization of education as skill development, and (iv) new skill, knowledge and training for teachers.

The main target of candidate teachers' multicultural education is to train competent educators capable of understanding the characteristics of the student and have the necessary skills to help each student realize their academic potential (Keengwe, 2010; Walker, Shafer, & Iiams, 2004). Rothschild (2003) argued that "a major role of educators is to equip students not only with an understanding of the dominant culture and its history but also with the knowledge and skills to work effectively with individuals from diverse backgrounds" (as cited in Meaney, Bohler, Kopf, Hernandez, & Scott, 2008, p. 191). Many candidate teachers go to teacher education programs with a limited degree of experience (Valentin, 2006) or never have significant experiences with diverse individuals (Milner & Woolfolk Hoy, 2003). Novice teachers themselves reported that they were not sufficiently prepared to teach various students and in multicultural school settings (Cho & DeCastro-Ambrosetti, 2005; Futrell, Gomez, & Bedden, 2003; Ladson-Billings, 2000; Valli & Rennert-Ariev, 2000). Seeberg and Minick (2012) have stated that the majority of students who are in the teacher training program come from middle-class families who often raise themselves as culturally isolated. It would be unrealistic to assume that prospective teachers with such a profile have multicultural experience and skills until they enter a university. Seeberg and Minick (2012) emphasized that there are some barriers to students gaining direct cross-cultural competence experiences in the campus-based teacher training programs; and they listed these barriers as having "little diversity among students in classes, the short semester timeframe, and the inability of students to participate in study-abroad programs, due to work schedules and lack of resources" (p. 2).

Teachers' opinions about students from diverse communities may affect how they manage their instructional practices (Sadker, Sadker, & Zittleman, 2008; Tschannen-Moran, Woolfolk-Hoy, & Hoy, 1998). Teachers who have negative attitudes and lower expectations toward their diverse pupils often fail to satisfy the academic achievement of the pupils (Burt, Ortlieb, & Cheek, 2009; DeCastro-Ambrosetti, & Cho, 2011; Dee, 2004; Nieto & Bode 2008; Reiter & Davis, 2011; Tse, 2001). On the other hand, "teachers with a strong interest in and feeling for multiculturalism are often more successful in

promoting the academic success of their learners” (Acquah & Commins, 2013, p. 446). In other words, teachers who are accomplished in the classroom are mostly culturally authoritative teachers (Keengwe, 2010). Consequently, multicultural competence is an essential prerequisite for teachers to enable positive student outcomes.

Multicultural Competence and its Dimensions

Multicultural competence is described as the ingenuity to take actions or bring conditions into existence that make as large the best favorable development of individuals (Sue & Sue, 2008). As defined by Pope, Reynolds and Mueller (2004), multicultural competence involves “the awareness, knowledge and skills needed to work with others who are culturally different from self in meaning” (p. 13). Diller and Moule (2005) stated for preservice teachers’ cultural competence “refers to dispositions of being aware of cultural differences, being culturally sensitive and able to respond to these” (p. 5, as cited in Liang & Zhang, 2009). Multicultural competence was determined in three dimensions: Cultural knowledge, awareness, and skills (Pope, Reynolds, & Mueller, 2004; Sue & Sue, 2008).

Multicultural awareness consists of developing a wider and more in-depth grasping of a diverse group (Nzai & Feng, 2014). There are great deals of teacher candidates who have not interacted in diverse populations until the day they entered the multicultural classroom (Clarke & Drudy, 2006). They may suffer from stereotypical conceptions of mainstream culture due to this lack of or limited experience (Acquah & Commins, 2013; Bell, Horn, & Roxas, 2007; Sleeter, 2001). Cultural awareness involves the beliefs, opinions, values and attitudes towards the individual’s own culture; and is concerned with the comprehending of how the cultural experiences of the individual are formed in which habitus (Sue & Sue, 2008). Sue et al. (1982) stated that being aware of one’s own cultural heritage, principles, moral imperatives and prejudices and the extent to which they affect our interactions with different groups is an important factor in developing teachers’ perceptions of multicultural competence (as cited in Vassallo, 2014, p. 2). Vincent, Randall, Cartledge, Tobin, and Swain-Bradway (2011) stated that recognizing one’s own culture could improve one’s comprehension of others’ verbal and nonverbal behaviors (as cited in Nzai & Feng, 2014). According to Garmon (2004), awareness is able to think critically about one’s own beliefs, values and attitudes. Multicultural awareness reveals how we make sense of our experiences and also shapes our perceptions. Cultural awareness is linked to cultural knowledge. Campinha-Bacote (1999) stated cultural awareness implies “know thyself” according to Greek philosophy and “this awareness process must involve examination of one’s own prejudices and biases toward other cultures and in-depth exploration of one’s own cultural background” (p. 204). Campinha-Bacote (1999) posits that given that individuals have a predisposition to ethnocentrism, self-awareness for multicultural growth.

Knowledge on the subject of diversity is a factor that impacts preservice teachers’ competence. Cultural knowledge implies to comprehend the cultural codes, manners, and attitudes (Sue & Sue, 2008) of the diverse students. According to Adams (1995), cultural knowledge includes familiarity with all aspects of cultural features, history,

moral standards, faith frameworks and behavior of members of another ethnic group, as well as the process of collecting information about other cultural groups (as cited in Nzai & Feng, 2014). As defined by Campinha-Bacote (1999), "cultural knowledge is the process of seeking and obtaining a sound educational foundation concerning the various world views of different cultures" (p. 204). Teachers' knowledge about cultural diversity is a robust determinant of learning fortunes and outcomes for diverse students (Gay, 2002). It is important to have information about other cultures that is different from their own culture because it helps to remove people's misconceptions about other cultures (Major & Mangope, 2014).

McGeehan (1982) identified multicultural skill that comprises regulation and implementation of influential multicultural education applications (as cited in Guyton & Wesche, 2005). According to Pope and Reynolds (1997), multicultural skills are defined as the skills individuals use to make effective and meaningful interactions with people with different cultural backgrounds from their own culture. Multicultural skills include the "capability to empathize and genuinely connect with individuals who are culturally different from themselves (...) ability to gain the trust and respect of individuals who are culturally different from themselves" (Pope & Reynolds, 1997, p. 271). Furthermore according to Sherpa (2019), "Teaching and learning materials must be diverse and critically examined for bias. Variety of instructional materials, (...) and learning content must be presented from a variety of perspectives in order to be fit not only that of majority groups but also minority and disadvantaged groups of learners." (p. 37). To improve the quality of education, prospective teachers are expected to have these professional skills. Lack of multicultural skills hinders teachers' performance (Major & Mangope, 2014). Consequently, any measurement of multicultural competence should cover these dimensions.

The most important emphasis of multiculturalism in education is that it is an inclusive process (Rosado, 1997). In the age of cultural pluralism and diversity, the most critical 21st-century skill that future generations should have is global awareness (Stewart, 2007). In such an environment where student diversity is increasing, schools also should reflect these dynamic changes. Teachers should not only try to gain their students' multicultural knowledge and awareness but also promote respect for other cultures. When students are able to make an assessment from diverse cultural perspectives, they can develop their critical-thinking skills and their creativity (Stewart, 2007). Teachers' attitudes, prospects, and actions toward diverse cultures are enormously strong in determining the standard of the education they receive (Gay, 2002). Multiculturalism is the basis for more egalitarian and democratic communities. This is especially crucial in light of social justice and human rights. Hence, given that teachers are a crucial component of any educational system and that their competence is a powerful factor in teaching (Guyton & Wesche, 2005), identifying multicultural competencies of the preservice teachers' is important.

Parekh (2002) asserts that a group of individuals involving two or more cultural groups is multicultural. According to this definition as a land, which hosts a rich variety of cultures and civilizations, Turkey is a multicultural society (Polat & Kilic, 2013). Students participating in the Turkish educational system have diversity in

ethnicity, religion, social class, race, sexual orientation and many other characteristics (see in Kotluk & Kocakaya, 2018). Furthermore, Turkey hosts around four million refugees, including 1.7 million children. Thus, students from these families participate in schools in almost every town around the country. As a result of these demographic circumstances, the teachers all over the world, as well as today's teachers in Turkey, should be prepared to enter these increasingly more diverse learners.

In the literature, a limited number of studies was conducted to evaluate the multicultural teacher competencies in Turkey. Basbay and Kagnici (2011) developed perceptions of multicultural competence scale with three-factor 41-item for university instructors. Their study provided some useful information about university instructors' multicultural competencies, but the target population had different attributes. Acar-Cifci (2016) developed four-dimensional the Critical Multicultural Education Competencies for preschool teachers. Ayaz (2016) developed a uni-dimensional Multiculturalism Perception Scale with 194 teacher candidates. Another scale in the Turkish literature was the uni-dimensional Teachers' Multicultural Education Attitude Scale adapted to Turkish by Yazici, Basol, and Toprak (2009). Yavuz and Anil (2010) developed a uni-dimensional attitude scale towards multicultural education for preservice teachers. Since these scales measure attitude or perceptions, the tools do not enable to distinctly evaluate teachers' multicultural competencies in diverse classrooms.

The present study aims to develop a multidimensional scale based on multicultural competence literature. The validity of any conclusions drawn builds on test results great extent depends upon the use of psychometrically sound instruments. In social and behavioral sciences, test scores are often used to make group comparisons. However, such comparisons are meaningful only when the scores at hand are comparable. The widespread perception in the psychometric literature is that measurement invariance should be added when constructing and validating a new scale (Steinmetz, Schmidt, Tina-Booh, Wieczorek, & Schwartz, 2009). If the measurement invariance is not achieved, a direct comparison of the observed means or latent means cannot be possible (Drasgow & Kanfer, 1985). Therefore, when developing a psychological test, the examination of measurement invariance will provide further support for the validity of the tool.

In the current study, measurement invariance for gender was investigated. Some reasons for examining gender-based measurement invariance can be listed as follows. First, in behavioral sciences, it is common to test whether there is a gender difference between scores. Because of such widespread practice, testing measurement invariance across gender is necessary to maintain that the scores obtained from sub-groups have the same meaning. Second, empirical studies on prospective teachers revealed mixed findings of gender differences concerning the teaching profession. For instance, in their meta-analytic studies, Erdamar, Aytac, Turk, and Arseven (2016) and Atalmis and Kose (2018) concluded that the teacher candidates' attitudes towards the teaching profession were significantly higher in favor of females. However, while the self-efficacy of prospective teachers regarding certain teaching competencies was higher for males in some studies, no gender differences were reported in other studies (see in

Yenice, 2012). Therefore, it is crucial to comprehend the existence of gender inequality or bias. In short, this study holds two main aims. The first aim is to develop a scale measuring multicultural competencies of preservice teachers. The second aim is to examine measurement invariance across gender groups.

Method

Research Design

This is a cross-sectional study. The present study aimed to develop a multicultural competence scale. The following sections describe the research sample, generation of the tool and data analysis.

Research Sample

The participants in this study were the prospective teachers who were studying in the last year of a faculty of education in a university in Turkey. Data from 640 participants were collected from the 2018-2019 academic year. Missing data resulting from partial completion of the survey packet were from the dataset. After this elimination, 628 data were left. Three hundred fifty-eight (57%) of the participants were female and 270 (43%) were male with their age ranging between 21 and 47 years ($M_{age}=26.12$, $Median=24$). Using a random split-half method in SPSS, the data were divided into two sets to conduct exploratory ($n_1=314$) and confirmatory factor analysis ($n_2=314$). One half of the sample was used for exploratory factor analysis (EFA), among them, 192 (61%) were female, and 122 (39%) were male. The other half of the sample was used for confirmatory factor analysis (CFA), among them, 166 (53%) were female, and 148 (47%) were male. Measurement invariance was also examined in the second half of the sample.

Item Generation

This current study was grounded in a multicultural teaching competency model. This model offers three dimensions as follows: (a) awareness, (b) knowledge, and (c) skills. To avoid response contamination while generating the item, it is necessary to prevent the produce redundant or overlapping items (Erkus, 2012). Thus, special care is given to distinguish items that are most likely to capture the trait during the item-writing phase. The author wrote 36 items based on an extensive literature review. Then, three academics reviewed 36 items for clarity, readability, and content appropriateness and concerning representing the dimensions of the items. Changes and arrangements were made on some items in accordance with the feedback from the experts. Twelve voluntary graduate and undergraduate students were requested to complete this first draft of the scale. Eight items were dropped due to ambiguity and 28 items were retained on the preliminary scale. A 5-point Likert-type scale was used for each item to gather responses. The scale is scored by giving a score of 5 for the response "it completely describes me", 4 for the response "it mostly describes me", 3 for the response "it describes me to some degree", 2 for the response "it describes me somewhat" and 1 for the response "it does not describe me at all". The items were written in Turkish. The English version is presented here to clearly illustrate the content of the items in the English language.

Data Analysis

Firstly, the data set was screened concerning data entry and missing values. Since floor and ceiling effects negatively impact measurement properties (Bruce, Fries, Lingala, Hussain, & Krishnan, 2013, p. 2), to check ceiling and floor effects of the items the lowest and highest scores of the participants were evaluated. Floor or ceiling effects are defined as "achieving the worst and best possible scores, respectively" (McHorney & Tarlov, 1995, p. 294). As McHorney and Tarlov (1995) stated if more than 15% of the participants reach the lowest or highest possible score, this indicates that there are floor or ceiling effects. The reliability of the scale was examined by calculating the internal consistency coefficient of Cronbach's alpha for each sub-dimension. Correlations between subscales were examined using Pearson correlation analysis. SPSS22 and LISREL9.2 programs were used for data analysis.

Exploratory factor analysis. Exploratory factor analysis (EFA) was utilized to determine the factor structure of the scale. Although principal component analysis is widely used in exploratory factor analysis, some authors caution that the use of this method in factor extraction may not be suitable for scale development studies (Costello & Osborne, 2005; Fabrigar & Wegener, 2012; Preacher & MacCallum, 2003). Instead, the principal axis factoring (PAF) extraction is recommended (De Winter & Dodou, 2012; Fabrigar & Wegener, 2012; Russell, 2002). Similarly, the factor rotation method is often used with vertical rotation. However, due to the multidimensional structure of the scales used in behavioral sciences and the relationships between the dimensions, it is emphasized that oblique rotation should be used (Costello & Osborne, 2005; Fabrigar & Wegener, 2012; Russell, 2002). Therefore, PAF extraction was performed in the present study. Where rotation is required, the oblique rotation was preferred. In deciding the number of factors, the criterion that the eigenvalue is greater than one was considered. In addition, the scree plot was observed.

Confirmatory factor analysis. Model fit was examined by confirmatory factor analysis (CFA). CFA was carried out using the maximum likelihood estimation method and covariance matrix. The following multiple goodnesses of fit indexes were examined for CFA: Ratio of Chi-square to degrees of freedom (χ^2/df), CFI, GFI, NNFI, RMSEA and SRMR. The limit values are accepted as follows to accept the model data fit as sufficient: $\chi^2/df < 3$, CFI > .90, GFI > .90, NNFI > .90, RMSEA < .08 and SRMR < .08 (Bryne, 2001; Hu & Bentler, 1999; Kline 2011; Russell, 2002).

Measurement invariance. Multiple group confirmatory factor analysis (MG-CFA) was used to test measurement invariance. Many stepwise steps were followed in testing the measurement invariance. This procedure requires a series of sequential constraints to testing measurement invariance across groups (Dimitrov, 2010). After establishing the fit of the model for both male and female datasets, in the next stage, the configural invariance, metric invariance (factor loadings), scalar invariance (intercepts) and strict (error variances) invariance between the groups were conducted (Dimitrov, 2010). Each model was a check against the former model. Chi-square difference test ($\Delta\chi^2$) was used to compare these nested models (Brown, 2006; Dimitrov, 2010; Tabachnick & Fidell, 2001). The presence of a non-significant difference for each model indicates that

the measurement invariance is accepted. Since the chi-square test is sensitive to sample size, it is recommended to use CFI difference values (Δ CFI), which is a more robust indicator in nested model comparisons (Cheung & Rensvold, 2002). To ensure that measurement invariance is achieved, the delta CFI value in each model tested must be higher than -.01 (Cheung & Rensvold, 2002).

In cases where measurement invariance cannot be yielded, partial measurement invariance should be examined. There is no specific level or ratio accepted for partial invariance (Dimitrov, 2010). Although the decision is left to the researchers, it is stated that group comparisons can be made on at least two items with invariance (Byrne, Shavelson, & Muthen, 1989). In partial invariance, a sequential process is followed in which the parameters are released based on the examination of the modification indicators (Elousa & Muniz, 2010).

Findings

Data Screening

Before conducting the analysis data-screening process was performed. Data were examined for correct data entry and missing values. Missing values due to partial completion of the surveys were excluded from this study. The percentage of respondents who achieved the lowest possible score was .3% and the percentage of respondents who achieved the highest possible score was .4%. Thus, values remained well below the standard limits. In short, the ceiling and floor effects were not observed.

Exploratory Factor Analysis

To test the construct validity of the scale, exploratory factor analysis (EFA) was performed on the first sample ($n_1=314$). Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity were applied to determine whether the data obtained from the participants were suitable for factor analysis. The KMO value was .87, which indicated that a sufficient sample size. Bartlett's test of sphericity was also significant ($p<.001$), indicating the factorability of the correlation matrices.

To determine the factor structure of the scale, 314 participants' responses to the scale items were analyzed using principal axis factoring extraction without rotation at first. After screening primary loadings, to reach a simple and explicit structure for the factors (Kiers, 1994), factor analysis was repeated with oblique rotation. As a result of the EFA procedure, the scale items were gathered under three factors concerning eigenvalue criteria. The scree plot test also suggested a three-factor solution visually.

A total of 14 item were deleted because of low communalities (less than .30), low factor cross-loadings (less than |.10| difference) (Tabachnick & Fidell, 2001) and/or loadings (less than .40) (Comrey & Lee, 1992; Nunnally, 1978). Apart from the statistical procedures, the interpretability of both factors and items under each factor was taken into account. After removing these items from the scale, the three-factor structure accounted for 54.7% of the total variance. The eigenvalue of the first factor was 4.74 and that accounted for 33.86% of the variance. There were six items under this factor and labeled as awareness (A1-A6). The eigenvalue of the second factor was 1.86 and

that accounted for 13.32% of the variance. There were five items under this factor and labeled as skill (S1-S5). The eigenvalue of the third factor was 1.05 and that accounted for 7.51% of the variance. There were three items under this factor labeled as knowledge (K1-K3). The rotated EFA factor loadings are presented in Table 1.

Table 1

Factor Loadings of the MCS-14

	Items	EFA Rotated Factor Loadings	CFA		
			Factor loadings	<i>t</i>	S.E.
Awareness	A1 My cultural belonging can make me distant from students in diverse cultures. ^R	.721	.66	12.18	.041
	A2 I can understand the diverse cultural characteristics of students.	.714	.63	11.48	.042
	A3 I can notice if I discriminate against students from diverse cultures.	.652	.67	12.29	.044
	A4 I can critically examine my prejudices towards diverse cultures.	.584	.55	9.67	.048
	A5 I am aware of my prejudices towards diverse cultures.	.573	.68	12.67	.043
	A6 Because of my cultural belonging, I can behave biasedly toward students with diverse cultures. ^R	.568	.53	9.36	.048
Skill	S1 I can arrange the educational environment for students from diverse cultures.	.809	.77	13.95	.061
	S2 I can prepare exam questions for students from diverse cultures.	.733	.61	10.51	.068
	S3 I can adapt teaching materials to students from diverse cultures.	.666	.62	10.74	.070
	S4 I can handle course subjects in accordance with students from diverse cultures.	.632	.57	9.82	.071
	S5 I can build activities to reduce students' prejudices towards cultural differences.	.584	.58	10.03	.061
Knowledge	K1 I care about students' beliefs, values and traditions from diverse cultures.	.745	.80	14.72	.043
	K2 I know that students with different cultural characteristics should be treated sensitively.	.690	.61	10.70	.057
	K3 I find it necessary to have knowledge about the communication styles of students from different cultures.	.612	.58	10.17	.056

^RRevised item

Confirmatory Factor Analysis

As a result of exploratory factor analysis, a 14-item three-factor solution was obtained. Then, a confirmatory factor analysis (CFA) was performed to investigate the factor stability of the three-factor solution of the scale on a separate sample ($n_2=314$). The fit indexes for the first-order three-factor structure with 14 items were found as follows: $\chi^2(74)=145.78$, $\chi^2/df=1.97$, GFI=.94, CFI=.97, NNFI=.97, RMSEA=.056 (90% lower-upper confidence interval .042-.069), SRMS=.05. In addition, the second-order CFA was evaluated. The fit indexes for the second-order three-factor structure with 14 items were: $\chi^2(74)=143.72$, $\chi^2/df=1.94$, GFI=.94, CFI=.94, NNFI=.93, RMSEA=.055 (90% lower-upper confidence interval .041-.068), SRMS=.048. When these values were evaluated, it was concluded that the CFA fit indices for the first-order and the second-order three-factor structure were within acceptable limits. Factor loadings in CFA were found significant at .05 level based on the *t*-test. The modifications indexes were examined but not detected any information about the model misspecification. In the light of these findings, it was concluded that the model data fit for the three-factor solution of the scale was quite well.

Inter-correlations among Subscales and Reliability

Correlation coefficients among the subscales were calculated separately. The correlation coefficients between the awareness and skill subscale scores was found as .37 ($p<.001$). The correlation coefficients between the awareness and knowledge subscale scores was found as .62 ($p<.001$). The correlation coefficients between the skill and knowledge subscale scores was found as .34 ($p<.001$). Internal consistency with Cronbach's alpha coefficients was calculated for each subscale to determine reliability. Internal consistency was .79 for the awareness subscale, .76 for the skill subscale and .68 for the knowledge subscale.

Measurement Invariance across Gender

Measurement invariance was assessed with the data from the second half of the sample. To examine the measurement invariance according to gender, firstly CFA was performed separately in female and male groups. The three-factor oblique model was used as a baseline model. The multiple goodness-of-fit indexes indicated an adequate model fit for the male and female groups (see Table 2). Concerning the findings, it was found that the model fit was yielded sufficiently for the female groups ($\chi^2/df=2.09<3$; CFI=.95; RMSEA=.078) as well as the male groups ($\chi^2/df=1.44<3$; CFI=.96; RMSEA=.058). In this section second-order CFAs for gender groups were also investigated. Concerning the findings, the second-order three-factor oblique models yielded sufficiently for the female groups ($\chi^2/df=2.15<3$; CFI=.92; RMSEA=.079) as well as the male groups ($\chi^2/df=1.56<3$; CFI=.93; RMSEA=.055). It was noticed that both the first-order and the second-order model fits were slightly better in males than in females.

Table 2*Goodness-of-fit Indexes for the Baseline Model across Gender*

Group	Model	χ^2	df	p	χ^2/df	CFI	NNFI	GFI	RMSEA
									[90% C.I.]
Female	1 st order	154.94	74	.000	2.09	.95	.94	.90	.078 [.061-.078]
	2 nd order	159.64	74	.000	2.15	.92	.91	.91	.079 [.063-.091]
Male	1 st order	106.83	74	.007	1.44	.96	.95	.91	.058 [.031-.081]
	2 nd order	115.73	74	.001	1.56	.93	.92	.90	.055 [.041-.068]

After the baseline model was met, the next step was to establish configural invariance. Although conducting individual CFAs in each group (baseline models) can test configural invariance, it is still necessary to run this step in multiple group confirmatory factor analysis (Milfont & Fischer, 2010). As can be seen in Table 3, Model A provided adequate fits to the data, indicating configural invariance was established ($\chi^2/df=1.85<3$; CFI=.95; RMSEA=.070). These findings stated that the factorial structure of the construct is equal across gender. Meeting the configural invariance requirement is a prerequisite for continuing the measurement invariance test. Next, measurement invariance was examined with forward steps. Findings of the fit indexes related to measurement invariance are presented in Table 3. Findings for Model B, Model C and Model D indicated that the chi-square and *df* ratios of all models were below 3, CFI and NNFI values were above .90 and RMSEA values were below .08. These results showed that model data fits were achieved for each model. However, this is not sufficient for examining measurement invariance. A series of nested models with constraints needed to be compared stepwise.

Table 3*Fit Indexes and Testing Measurement Invariance across Gender*

Model	χ^2	df	χ^2/df	CFI	NNFI	RMSEA	$\Delta\chi^2$	Δdf	p	ΔCFI
A	275.41	149	1.85	.95	.94	.070	-	-	-	-
B	290.82	160	1.87	.95	.94	.069	15.41	11	.164	0.0
C	301.12	165	1.82	.95	.94	.068	10.3	5	.067	0.0
D	369.09	179	2.06	.93	.93	.079	67.97	14	.00*	-.02

The next step was to test the metric invariance model (Model B), which constraints the equality of factor loadings between groups. In the comparison of nested models, chi-square difference test and delta CFI values were examined. The chi-square difference between Model B and Model A was not statistically significant $\Delta\chi^2(11)=15.41$, $p>.05$ and $\Delta CFI >-.01$ thus indicating metric invariance was achieved. These findings showed that factor loadings could be accepted as equal across gender groups. In the subsequent step, the chi-square difference between Model C and Model B was not statistically significant [$\Delta\chi^2(5)=10.3$, $p>.05$] and $\Delta CFI >-.01$. Thus, scalar invariance was achieved. Scalar invariance means that intercepts, as well as factor loadings, were invariant across the gender groups.

After establishing scalar invariance, strict invariance was investigated. The chi-square difference between Model D and Model C was statistically significant ($\Delta\chi^2(14)=67.97, p<.05$) and $\Delta CFI<-.01$, which unfortunately indicated strict invariance could not be achieved. Since full strict invariance was not in place, it could not be assumed that error variances were equal in gender groups. Partial strict invariance was examined to determine which item or item groups had different error variances.

Partial Strict Measurement Invariance

In the previous section, it was found that MCS demonstrates configural invariance, metric invariance and scalar invariance. However, strict invariance has not been achieved. To determine which item or groups of items spoiled the strict invariance, firstly the error terms in the scalar model were examined. Multiple-group CFA error variances in the scalar model can be seen in Table 4.

Table 4

Standardized Factor Loadings and Error Variances MGCFA

Items	Standardized factor loadings in the configural model		Error variances in the scalar model	
	Female	Male	Female	Male
A1	.68	.66	.33	.29
A2	.64	.61	.28	.45
A3	.70	.61	.36	.36
A4	.68	.47	.28	.75
A5	.74	.69	.31	.39
A6	.57	.63	.52	.52
S1	.70	.80	.44	.70
S2	.65	.55	.68	1.18
S3	.67	.48	.74	1.09
S4	.54	.66	1.07	.92
S5	.58	.60	.65	.82
K1	.79	.82	.21	.26
K2	.60	.58	.67	.62
K3	.64	.53	.52	.79

Following the recommendation to free one parameter at a time (Dimitrov, 2010), starting with the one with the item having the largest difference between error terms, Model D was modified by freeing the error variance for item S2. This modified Model D was compared with the Model C, but the chi-square difference between modified Model D and Model C was statistically significant ($\Delta\chi^2(13)=59.06, p<.05$) and $\Delta CFI<-.01$ (Table 5). This finding indicated that there was not enough improvement in the model fit. Then the error variances S2 and A4 were released together. However, there was still no improvement in model fit. Finally, after freeing the error variances of S2, A4 and S3, partial strict measurement invariance was attained (see Table 5). Thus,

equal error variances across gender were found except for these specific three items (S2, A4, S3).

Table 5

Partial Strict Invariance Models after Freeing Error Variances

Model	χ^2	df	CFI	NNFI	RMSEA	$\Delta\chi^2$	Δdf	p	ΔCFI
Error var. S2 free	360.18	178	.93	.93	.078	59.06	13	.000	-.02
Error var. S2, A4 free	328.72	177	.94	.94	.071	27.6	12	.006	-.01
Error var. S2, A4, S3 free	320.70	176	.95	.94	.069	19.58	11	.052	.00

Discussion

The first purpose of this study was to develop a scale assessing preservice teachers' multicultural competence. The second purpose of this study was to evaluate measurement invariance of the MCS-14 across gender. In parallel with the initial conceptualization, exploratory factor analysis results were able to support a structure related to multicultural teaching competence. Findings from exploratory factor analysis conducted in the first sample indicated that the MCS scores have three distinct factors that were named awareness, skill and knowledge. Thus, in the light of the literature, the three-factor structure was supported. The awareness subscale consisted of 6 items, accounted for 33.86% of the total variance. The skill subscale consisted of 5 items, accounted for 13.32% of the total variance. The knowledge subscale consisted of 3 items, accounted for 7.51% of the total variance. All items accounted for 54.7% of the total variance. Then, both the first-order and the second-order CFAs were conducted to examine the fit of the three-factor oblique model on a separate sample. Multiple fit statistics showed that model data fit was achieved for both the first-order and the second-order CFAs. Based on the findings obtained in the second-order CFA, it can be concluded that a total score can be obtained and be meaningful for the multicultural competence scale. According to Pearson correlations, inter-correlations of the subscales were positive low to mid and significant. These findings indicated that each subscale was related to the others, but still sufficiently different from each other. In other words, although each subscale belongs to a common core, each represents a separate dimension.

The Cronbach's alpha values were .79 for awareness, .76 for skill and .68 for knowledge. Although .70 is considered an acceptable value for Cronbach's alpha, it "tends to underestimate the internal consistency of scales consisting of fewer than ten items" (Herman, 2015, p. 8). Cronbach's stated that a high alpha value was 'desirable', but he emphasized that the main matter was the interpretability of the scores - and this was usually possible without the necessity for very high alpha values (as cited in Taber, 2018, p. 1288). It was also stated "there is no universal minimally acceptable reliability value. An acceptable reliability value depends on the type of application..." (Bonett & Wright, 2015, p. 4). In the literature, it is also seen that the acceptable lower boundary of the Cronbach's alpha value for exploration research is .60 (e.g., Cohen,

Manion & Morrison, 2007; Hair, Black, Babin & Anderson, 2010). As a result, these reliabilities demonstrated acceptable internal consistency relative to the number of items included in each sub-scale. In the light of these findings, the three-factor MCS-14 has been observed to have appropriate psychometric properties.

Since scores obtained from any scale are often used for group comparisons, measurement invariance across gender was examined in the current study. A single-group CFA was conducted for male and female to establish a baseline model as a prerequisite to test measurement invariance. After achieving the baseline model fit for each group, measurement invariance tests were employed. Multiple group CFA tests suggested that the three-factor MCS-14 scores revealed configural, metric and scalar invariance across gender.

Meeting the configural invariance indicates the same number of factors and the same pattern of a factor in each group. Evidence for configural invariance indicated oblique three-factor model was similar across the gender groups. Metric invariance refers to equal factor loadings across groups, it means that any difference in one unit of latent variable results in the same differences of the observed indicator variables in all groups (Rudnev et al., 2018). The presence of metric invariance implied that the factor loadings of the items were matching across the gender groups. In other words, the construct has the same meaning across gender. Especially, the conceptualization of the multicultural competence construct is alike in male and female, as appraised with the MCS. The presence of scalar invariance indicated the same intercepts across gender. Under scalar measurement invariance, the comparison of factor means between groups is allowed (Dimitrov, 2010). Based on these results, it can be stated that the three-factor model matches among the groups. This indicates that the same structure and also the same measurement model in both male and female. That is, the findings of scalar invariance across gender indicated that meaningful latent mean structures comparisons could be made across gender for the MCS-14 test scores. Briefly, constructs have similar meanings.

Although proof of scalar (strong) measurement invariance is the only thing necessary to make expressive comparisons between latent means between groups (Widaman & Reise, 1997), this current study also investigated strict invariance. Based on the delta CFI test, the full strict invariance was not met. On the other hand, the remaining fit indices, such as χ^2/df , CFI, NNFI and RMSEA, pointed out the presence of strict invariance across gender. This case may be related to the issue of practical versus statistical significance that often arises in psychology research (Blankson & McArdle, 2015). When the error (residual) variances in gender groups were assessed, it was thought that the values in difference might not be sufficient to explain meaningful true differences in the construct.

Strict invariance can detect potential obstruction of strong invariance due to the item-specific systematic effect (Wu, Li, & Zumbo, 2007). Thus, partial strict measurement invariance was investigated. Partial strict measurement invariance was obtained by freeing error variances of the three items: S2, A4, and S3. Thus, error variances of these three items were responsible for departure from full strict

measurement invariance. Error variances of S2, S3 and A4 items were higher for male relative to female. Therefore, it is concluded that invariance of item uniquenesses was obtained for all items but the three.

Conclusion, Limitations and Recommendations

The MCS is a self-report instrument that measures perceived multicultural education competence by preservice teachers. The MCS is a tri-factor scale, including 14 items with a 5-point rating scale - "it completely describes me" (5) to "it does not describe me at all" (1). A1 and A6 are reverse-scored items. Based on the findings achieved in the second level CFA, it is possible to express a total score can be obtained regarding the MCS. However, since the tri-factor formation will reflect the multifaceted nature of the scale, the author recommends using the scores from the subscales separately. Considering the total score basis, the range of points that can be obtained from the scale varies between 14 and 70. The high score obtained from the scale shows that the perceived multicultural education competence by preservice teachers is at a high level, and a low score shows that it is at a low level.

The three subscales provided a multi-dimensional assessment of a preservice teacher' multicultural education competence: the awareness subscale aims to measure the teacher's awareness of their own cultural affiliation. The knowledge subscale aims to measure the teacher's willingness to learn about diverse cultures. The skill subscale aims to measure the teacher's competence to organize and adapt to the educational environment and/or materials according to the multicultural class. The validity and reliability of the scale indicated that the MCS-14 has satisfactory psychometric features. This study also supports the use of the MCS-14 in its current configural, metric, scalar and partial strict invariance across gender. Thus the factor loadings, item intercepts and latent means can be compared across gender groups. In addition, it can be stated that due to the achieving item uniquenesses, equivalence of the scale precisions exists except for the three items (S2, A4, S3).

The present study has some limitations. First, the data of this current study were collected by a convenience sample, but random sampling makes it possible to generalize. Second, the data depend on self-report, so the results are limited to the responses of the participants. Data from the MCS and data from interviews and observations can provide more insight to determine a teacher's multicultural competency. Third, although the psychometric properties of the MCS are sufficient, there still remains room for improvement. More psychometric evidence, including test-retest reliability, criterion validity, and predictive validity, is needed to improve the validity of inferences from MCS. Forth, measurement invariance was evaluated according to gender. However, other variables were not examined. Therefore, future studies need to investigate measurement invariance on several variables such as age, department, background experiences, family characteristics, and learning environment.

Despite the limitations, the present study has some implications. The MCS is short and an easily applicable tool. The multidimensional nature of the scale can provide richness and depth to information acquired. Inferences made based upon the MCS-

14's scores are valid, as long as the instrument is used properly. The MCS can be utilized to diagnose pre-service teachers' multicultural competency and determine changes in their strengths and weaknesses in multicultural competency during the training. The MCS enables preservice teachers to self-assess to recognize their position of multicultural competence. Researchers or academics can use the scale to make needs assessments and curriculum planning to identify and monitor the level of educational professional development and performance related to multicultural competence. The MCS also allows researchers to predict teachers' future success in diverse classrooms. Information to be obtained from the MCS may broaden our understanding of multicultural competence of preservice teachers in an increasingly diverse society.

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Öğretmen Adayları İçin Çok Kültürlü Yeterlilik Ölçeği: Geliştirilmesi, Geçerliliği ve Ölçme Değişmezliği

Atıf:

Erdem, D. (2020). Multicultural competence scale for prospective teachers: Development, validation and measurement invariance. *Eurasian Journal of Educational Research*, 87, 1-28. DOI: 10.14689/ejer.2020.87.1

Özet

Problem Durumu: Yeni milenyum hem yerel hem de küresel düzeyde artan bir çeşitliliğe tanık olmaktadır. Ülke demografilerindeki değişimler ve göçteki artışlara bağlı olarak okullardaki öğrenci çeşitliliği de artmaktadır. Bu nedenle, araştırmacılar, okul politikalarının ve uygulamalarının bu öğrenci çeşitliliğini karşılayabilecek şekilde gelişmesi gerektiğini vurgulamaktadır (Banks, 2010). Böylesi bir küresel dünyada farklı geçmişlerden ve kültürel alt yapılardan gelen öğrencilerle karşı karşıya kalacak öğretmen adaylarının nitelikli bir eğitime sahip olmaları gerekmektedir (Nzai ve Feng, 2014). Bir diğer ifadeyle, öğretmenlerin kültürel ve dilsel olarak farklı gruplardan gelen öğrencilere etkili bir şekilde hizmet etmeleri için hazırlıklı olmaları gerekir (Mysore, Lincoln ve Wavering, 2016).

Rosado (1997), çok kültürlülüğü bir toplumdaki tüm farklı grupların varlığını tanıyan ve saygı duyan, sosyo-kültürel farklılıklarını kabul edip değer veren, bunun yanı sıra varlıklarını sürdürmelerini teşvik eden ve sağlayan bir inanç ve davranış

sistemi olarak tanımlamaktadır. Parekh (2002) ise daha geniş bir bakış açısıyla çok kültürlü eğitimi, kendini yansıtmaya, kanıtların bağımsız olarak değerlendirilmesiyle fikirlere ulaşma becerisi, başkalarına saygı duymak, çeşitli bakış açılarına ve yaşam tarzlarına duyarlı olmayı içeren ve entelektüel merakı destekleyen eğitim faaliyetleri olarak görmektedir. Eğitimde çok kültürlülüğün temel amacı, öğrencinin özelliklerini anlayabilen ve her öğrencinin akademik potansiyelini gerçekleştirmesine yardımcı olmak için gerekli becerilere sahip yetkin eğitimciler yetiştirmektir (Keengwe, 2010; Walker, Shafer ve Iiams, 2004). Ancak öğretmen adaylarının birçoğu öğretmen eğitimi programlarına çok sınırlı deneyimlerle girdiklerini belirtmişlerdir (Valentin, 2006). Yapılan araştırmalarda aday öğretmenler, farklı kültürlere mensup öğrencilere ve çok kültürlü okul ortamlarında eğitim vermeye yeterince hazır olmadıklarını bildirmişlerdir (Cho ve DeCastro-Ambrosetti, 2005; Futrell, Gomez ve Bedden, 2003; Ladson-Billings, 2000; Valli ve Rennert-Ariev, 2000).

Parekh (2002), iki veya daha fazla kültürel grubu içeren bir grubu çok kültürlü olarak tanımlar. Nitekim zengin kültür ve uygarlıklara ev sahipliği yapan bir ülke olan Türkiye de çok kültürlü bir toplum olarak kabul edilir (Polat ve Kılıç, 2013). Türk eğitim sistemine katılan öğrenciler etnik köken, din, sosyal sınıf, ırk, cinsel yönelim ve birçok özellik bakımından çeşitlilik göstermektedir (Kotluk ve Kocakaya, 2018). Ayrıca, bugün Türkiye, 1.7 milyon çocuğun da dahil olduğu 4 milyon civarında mülteciye ev sahipliği yapmaktadır. Bu mevcut demografik durumun bir sonucu olarak, tüm dünyadaki öğretmenlerin yanı sıra Türkiye'deki öğretmenlerin de farklı kültürel aidiyetleri olan öğrenciler karşısında donanımlı olmaları gerekmektedir.

Araştırmanın Amacı: Bu çalışmanın amacı, öğretmen adaylarının çok kültürlü yetkinliklerini ölçen bir ölçek geliştirmektir. Sosyal bilimler ve davranış bilimlerinde test puanları genellikle grup karşılaştırmaları yapmak için kullanılır. Ancak, bu tür karşılaştırmalar yalnızca eldeki puanlar karşılaştırılabilir olduğunda geçerli olur. Bu nedenle, bu çalışmada cinsiyet grupları arasında ölçme değişmezliğinin incelenmesi de gerekli görülmüştür.

Araştırmanın Yöntemi: Ölçeğin faktör yapısını belirlemek için açımlayıcı faktör analizi (AFA) uygulanmıştır. Model veri uyumu doğrulayıcı faktör analizi (DFA) ile incelenmiştir. DFA, maksimum olabilirlik kestirim yöntemi ve kovaryans matrisi kullanılarak yürütülmüştür. Ölçme değişmezliği ise çoklu grup doğrulayıcı faktör analiziyle test edilmiştir.

Araştırmanın Bulguları: Açımlayıcı faktör analizi işlemi sonucunda ölçek maddelerinin özdeğeri bir'den büyük üç faktör altında toplandığı gözlemlenmiştir. Faktör yük değerleri .40'ın altında olan ve binişiklik gösteren maddeler ölçekten çıkarılmıştır. Bu koşullardaki 14 madde ölçekten çıkarıldığında ortaya çıkan üç faktörlü yapı, toplam varyansın %54.7'sini açıklamaktadır. Birinci faktörün (Farkındalık) özdeğeri 4.74 ve açıkladığı varyans %33.86'dır. Bu faktör altında altı madde yer almıştır. İkinci faktörün (Beceri) özdeğeri 1.86 ve açıkladığı varyans %13.32 olarak belirlenmiştir. Bu faktör altında beş madde yer almıştır. Üçüncü faktörün (Bilgi) özdeğeri 1.05 ve açıkladığı varyans %7.51'dir. Bu faktör altında üç madde yer almıştır.

Açımlayıcı faktör analizinde ortaya çıkan yapının doğrulanıp doğrulanmadığı farklı bir örneklem üzerinde DFA ile sınanmıştır. Analiz sonucunda 14 maddelik birinci-düzyer üç faktörlü yapı için ortaya çıkan uyum istatistikleri $\chi^2(74)=143.72$, $\chi^2/sd=1.97$, GFI=.94, CFI=.97, NFI=.95, NNFI=.97, RMSEA=.056 [%90 güven aralığı .042-.069] ve SRMS=.05; ikinci-düzyer üç faktörlü yapı için ortaya çıkan uyum istatistikleri ise $\chi^2(74)=143.72$, $\chi^2/sd=1.94$, GFI=.94, CFI=.94, NNFI=.93, RMSEA=.055 [%90 güven aralığı.041-.068] ve SRMS=.048 olarak bulunmuştur. Bu ölçüler değerlendirildiğinde üç faktörlü yapı için DFA uyum indekslerinin kabul edilebilir sınırlar dahilinde olduğu sonucuna varılmıştır. Bu bulgular doğrultusunda, ölçeğin 14 maddelik üç faktörlü yapısına ilişkin model veri uyumunun oldukça iyi düzeyde olduğu çıkarımı yapılmıştır.

Güvenirliliği belirlemek için her bir alt ölçek için Cronbach alfa katsayıları hesaplanmıştır. Farkındalık alt ölçeğinde altı madde yer almaktadır ve alfa değeri .79'dur. Beceri alt ölçeğinde beş madde bulunmaktadır ve alfa değeri .76'dır. Bilgi alt ölçeğinde üç madde yer almaktadır ve alfa değeri .68'dir. Alt ölçeklerdeki madde sayıları dikkate alındığında iç tutarlılığın yeterli olduğu ifade edilebilir.

Cinsiyete göre ölçme değişmezliğini incelemek için öncelikle kız ve erkek gruplarında ayrı ayrı DFA yapılmıştır. Bulgular incelendiğinde her iki katılımcı grubu için de model uyumunun yeterli düzeyde olduğu ortaya çıkmıştır. Ölçme değişmezliği incelenirken iç içe geçmiş ve kısıtlama içeren bir dizi model aşamalı olarak test edilmiştir. İç içe geçmiş modeller sınanırken ilk aşamada yapısal (configural) değişmezlik modeli test edilir. Uyum değerleri incelendiğinde yapısal değişmezliğin cinsiyet gruplarında sağlandığı görülmektedir ($\chi^2/sd=1.85 < 3$; CFI=.95; RMSEA=.070). Bu sonuç, hem üç faktörlü yapının hem de bu faktörler altındaki maddelerin kız ve de erkek grubunda aynı şekilde geçerli olduğunu ifade etmektedir. Bundan sonraki aşama ise, faktör yüklerinin gruplar arasında eşitliğini sınırlayan metrik değişmezlik modelini test etmektir. İç içe geçmiş modelleri karşılaştırmada ki-kare fark testi ve delta CFI değerleri incelenmiştir. Metrik modelde ki-kare fark testinin manidar olmaması ve ΔCFI değerinin -.01'den büyük olması metrik değişmezliğin sağlandığını; diğer bir ifadeyle cinsiyet grupları arasında faktör yüklerinin eşit kabul edilebileceğini göstermiştir. Diğer aşamada, faktör kovaryanslarının gruplar arasındaki eşitliği skalar değişmezlik modeliyle sınanmıştır. Skalar modelde ki-kare fark testinin manidar olmaması ve ΔCFI değerinin -.01'den büyük olması skalar değişmezliğin sağlandığını göstermiştir. Skalar değişmezlik, faktör yüklerinin yanı sıra kesim noktalarının gruplarda değişmez olduğunu ifade etmektedir. Son olarak da, katı (strict) değişmezlik modeli incelenmiştir. Katı modelde ki-kare fark testinin manidar olması ve ΔCFI (-.02) değerinin ise -.01'den küçük olması katı değişmezliğin sağlanmadığını; bir diğer ifadeyle cinsiyet gruplarında hata varyanslarının eşit olmadığını belirtmektedir. Hangi madde veya madde gruplarının hata varyanslarının farklı olduğunu tespit edebilmek için kısmi değişmezlik incelenmiştir. Katı değişmezliğin hangi madde veya madde gruplarından ötürü sağlanmadığını belirlemek için öncelikle skalar modelde ortaya çıkan hata terimleri incelenmiştir. Cinsiyet gruplarında hata terimleri arasındaki farkın en büyük olduğu maddeler belirlenmiş, sonrasında bu maddelerin hata varyansları tek tek serbest bırakılarak model uyumu incelenmiştir. Nihayetinde sırasıyla Beceri alt

ölçeğinde 2. madde, Farkındalık alt ölçeğinde 4. madde ve yine Beceri alt ölçeğinde 3. maddeye ilişkin hata varyansları serbest bırakıldığında ($\Delta CFI=0.0$) kısmı katı değişmezlik sağlanmıştır.

Araştırmanın Sonuçları ve Öneriler: Sonuç olarak, çok kültürlü yeterlilik ölçeği, öğretmen adaylarının çok kültürlü eğitime yönelik yeterliklerini ölçmeyi amaçlayan 5'li Likert tipinde 14 maddelik bir öz değerlendirme aracıdır. Tepki dereceleri "Beni hiç tanımlamıyor (1)", "Beni biraz tanımlıyor (2)", "Beni orta düzeyde tanımlıyor (3)", "Beni oldukça tanımlıyor (4)" ve "Beni tamamen tanımlıyor (5)" şeklinde düzenlenmiştir. Araç üç alt ölçekten oluşmaktadır. Farkındalık alt ölçeği, öğretmenin kendi kültürel bağlantıları hakkındaki farkındalığını ölçmeyi amaçlamaktadır. Bilgi alt ölçeği, öğretmenin farklı kültürler hakkında bilgi edinmeye yönelik isteklilik durumunu belirlemeyi amaçlar. Beceri alt ölçeği ise, öğretmenin eğitim ortamını ve materyalleri çok kültürlü sınıfa göre düzenleme ve uyarlama yetkinliğini ölçmeyi amaçlar. Farkındalık alt ölçeğinde birinci ve altıncı maddelerde ters puanlama yapılması gerekmektedir. Her bir alt ölçekten elde edilen yüksek puan ilgili alandaki yeterliğin yüksek olduğunu göstermektedir. Geçerlik ve güvenilirlik değerleri ölçeğin yeterli psikometrik özelliklere sahip olduğunu göstermiştir. İkinci-düzy DFA sonuçları ölçekten toplam puan alınabileceğine işaret etmektedir. Ancak yazar, ölçeğin çok boyutlu yapısından dolayı her bir alt ölçek puanlarının ayrı ayrı kullanılmasını önermektedir. Bu çalışma aynı zamanda cinsiyete göre yapılacak karşılaştırmalarda yapısal, metrik, skaler ve kısmi katı değişmezliğin sağlandığını desteklemektedir. İleride yapılacak araştırmalarda ölçeğin farklı gruplarda değişmezlik gösterip göstermediği incelenebilir.

Anahtar Sözcükler: Çok kültürlülük, ölçek geliştirme, ölçme değişmezliği, kısmı katı değişmezlik.

EK

Çok Kültürlü Yeterlilik Ölçeği

Alt ölçek	Maddeler
Farkındalık	<p>Kültürel aidiyetim, farklı kültürlerdeki öğrencilere mesafeli olmama neden olur. (1)</p> <p>Öğrencilerin sahip olduğu farklı kültürel özellikleri anlayabilirim.</p> <p>Farklı kültürlerden gelen öğrencilere ayrımcılık yapıp yapmadığımı fark edebilirim.</p> <p>Farklı kültürlerle yönelik önyargılarımı eleştirel bir bakış açısıyla irdeleyebilirim.</p> <p>Farklı kültürlerle yönelik önyargılarımın farkındayım.</p> <p>Kültürel aidiyetimden ötürü farklı kültürlerle sahip öğrencilere yanlı davranabilirim. (2)</p>
Beceri	<p>Eğitim ortamını farklı kültürlerden gelen öğrencilere uygun olarak düzenleyebilirim.</p> <p>Sınav sorularını farklı kültürlerden gelen öğrencilere uygun olarak hazırlayabilirim.</p> <p>Öğretim materyallerini farklı kültürlerden gelen öğrencilere uygun olarak uyarlayabilirim.</p> <p>Kazanımları, farklı kültürlerden gelen öğrencilere uygun olarak işleyebilirim.</p> <p>Öğrencilerin kültürel farklılıklara yönelik önyargılarını azaltmak için etkinlikler yapılandırabilirim.</p>
Bilgi	<p>Farklı kültürlerden gelen öğrencilerin düşünce sistemleri, değer ve gelenekleri hakkında bilgi sahibi olmayı önemserim.</p> <p>Farklı kültürel özelliklere sahip öğrencilere duyarlı davranılması gerektiğini bilirim.</p> <p>Farklı kültürlerden gelen öğrencilerin iletişim stilleri hakkında bilgi sahibi olmayı gerekli bulurum.</p>