

Adaptation of Character and Values as Global Citizens Assessment Questionnaire Into Turkish: Validity and Reliability Study

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Abstract

The purpose of this study was to generate a Turkish version of the Character and Values as Global Citizens Assessment (CVGCA) questionnaire originally developed by Lee, Yoo, Choi, Kim, Krajcik, Herman and Zeidler (2013). The CVGCA questionnaire composed of three structural characteristics -ecological worldview, social and moral compassion, and socioscientific accountability. The Turkish version of the scale was administered to 241 junior and senior pre-service science teachers. Exploratory factor analysis (EFA) was conducted and produced a four factor structure for the Turkish version of the CVGCA questionnaire that included: sustainable development, empathetic concerns, moral and ethical sensitivity, and willingness to act. In order to check the factor structure explored by EFA, the CFA analysis was followed. CFA analysis confirmed the four factor structures found in EFA analysis. This study provided a valid and reliable Turkish version of CVGCA questionnaire for future studies.

Keywords: *Socioscientific issues, Character education, Value Education, Global citizenship*

Dünya Vatandaşlığı İçin Karakter ve Değerler Ölçeğinin Türkçe'ye Uyarlanması: Geçerlik ve Güvenirlik Çalışması

Öz

Bu çalışmanın amacı Lee, Yoo, Choi, Kim, Krajcik, Herman ve Zeidler (2013) tarafından geliştirilen Dünya Vatandaşlığı İçin Karakter ve Değerler Ölçeği'nin (DVKDÖ)Türkçe uyarlaması geçerlik ve güvenilirlik araştırmasını yapmaktır. Ölçek üç yapısal karakteristiğe sahiptir; ekolojik dünya görüşü, toplumsal ve ahlaki merhamet, ve sosyobilimsel hesap verebilirlik. Ölçek fen bilgisi öğretmenliği programında öğrenim görmekte olan 241 adet üçüncü ve dördüncü sınıf öğrencisine uygulanmıştır. Açımlayıcı faktör analizi sonucuna göre ölçek sürdürülebilir kalkınma, empatik endişeler, ahlaki ve etik duyarlılık, harekete geçme isteği olmak üzere dört alt boyuttan oluşmaktadır. Açımlayıcı faktör analizinde ortaya çıkan boyutları test etmek için doğrulayıcı faktör analizi yapılmıştır.

Doğrulayıcı faktör analizi sonuçlarının da dört boyutu desteklediği (faktör analiz sonuçları 1 den 4 e sırası ile: 0.70, 0.70, 0.45, ve 0.53) görülmüştür. Bu çalışma literatüre Dünya vatandaşlığı için karakter ve değerler ölçeğinin geçerli ve güvenilir bir uyarlama örneği sunmaktadır.

Anahtar Sözcükler: *Sosyobilimsel konular, karakter eğitimi, Değerler Eğitimi, Dünya Vatandaşlığı*

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Summary

Introduction

The rapid development in science and the emergence of new technologies pose a range of pressing challenges to citizenship by making issues in the world more interconnected and competitive. Thus, informed and responsible citizens are needed to cope with these issues. Handling these issues by overcoming the challenges will require all citizens to have a better understanding of the transformative connection between science and technology (Moedas, 2015). Citizenship is a set of practices that includes cultural, economic, symbolic practices as well as civil, political and social rights, and duties that define an individual's membership in an organized society (Isin and Wood, 1999). Due to its broad outcome, citizenship has become a fundamental element of science education (Roth, 2003). Democratic societies require an engaged and responsible citizenry contributing at all levels of society (European commission, 2015) with a view of science and technology as a socially embedded enterprise (Bijker and Hughes, 2012). Guided by this vision, democratic education provide students with a chance to have choice in their learning, employ practices like self-directing learning, shared decision making, and to be a part of educational planning. It also helps to develop well informed citizens who will work toward creating democratic societies. In this sense, science courses can be an opportunity to achieve the vision of a democratic education in view of the fact that researchers in science education believe that science is a socially embedded issue. There is an utmost importance to give rise to the call for educating future citizens who can understand the environmental, societal, ethical and moral implications of scientific activity. The Socioscientific issue (SSI) based framework builds on interconnections between science and society with explicit deliberation of moral and ethical dimensions that compel students to consider multiple perspectives and lines of reasoning while examining scientific evidence related to those problems. Socioscientific issues are ill structured and open-ended problems for which solutions are complex and uncertain (Zeidler and Nichols, 2009). The

confluence of sociocultural influences such as ecojustice, environmental knowledge systems, emotive considerations applied to concerns about moral and ethical issues in scientific contexts is recognized as critical area of inquiry in science education (Mueller and Tippins, 2010). Similarly, Hodson (2003) argues that the central aim of science education should be "to equip students with the capacity and commitment to take appropriate, responsible and effective action on matters of social, economic, environmental and moral-ethical concerns (p.653).

Moreover, moral and ethical dimensions of science education contribute to character and values of individuals (Lee, Chang, Choi, Kim and Zeidler, 2012), which are major elements in citizenship education and also scientific literacy (Lee et. al., 2013; Zeidler and Keefer, 2003). Scientific literacy is defined as the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity (National Research Council [NRC], 1996). Recent research gives a rising advocacy of global concerns in science education and emphasizes that character and values are the essential driving forces that serve as general guides or points of reference for individuals to support decision-making and to act responsibly about global SSIs (Choi, Lee, Shin, Kim, and Krajcik, 2011; Lee et al., 2012). Thus it is important to know how and to what extent do alternative approaches (such as SSI based frameworks) contribute to students' character and value as global citizens.

From a sociocultural perspective, the overarching goals of science education are to enroll the public in discussions on relevant scientific issues (NRC, 2012), to understand the effects of scientific and technological developments in their everyday lives (Osborne and Dillon, 2008) and to teach them how to reflect on moral and ethical issues (Zeidler and Keefer, 2003). The previous literature illustrates the importance of heading to the call for educating students who can understand the environmental, societal, ethical and moral

implications of scientific activity and will be capable of understanding SSI, know their rights and duties and know how to take action as active citizens. The need for assessing these issues has emerged in international literature (Berkowitz and Simpson, 2003; Lee et al, 2012; Lee et al. 2013). Lee et al., (2012) constructed pedagogical framework for teaching science issues related to character and values for global citizens in conjunction with developing the character and values as global citizens assessment (CVGCA) questionnaire to measure the changes of character and values via the implementation of a modest SSI program. There is also need for Turkish researchers to use such scales in Turkish context.

The world needs young people who are culturally sophisticated and ethical human beings - productive individuals who will contribute to the societies in which they live. Education is one effective pathway to develop students with a global perspective. Global citizenship education has gradually spread around the world beginning with the late 1960's (Davies and Pike, 2008). Global citizenship education also emerged as a cross-curricular theme in the Turkish educational system (Keyman and İcduygu, 2005). Turkish educators are paying more attention to students' character and values (Thornberg and Oguz, 2013; Karatay, 2011). The fundamental principles of Turkish national education are universality and equality, the needs of the individual and society, orientation, educational right, equality of opportunity and possibility, democracy education, scientific education, and education in all places (Ministry of Education [ME], 2005). Thus; due to the importance of character and value education across the international as well as national literature, the CVGCA questionnaire was thought to be useful for Turkish educators who wish to advance the importance of global citizenship education. Hambleton and Patsula (1998) stated that scale adaptation is more rapid and less costly than actual scale development, and researchers may find adaptation of scales more reliable for their studies. Thus, in present study, the CVGCA questionnaire was translated and adapted into Turkish rather than developing a similar scale.

Methodology

Sample

A total of 241 junior and senior pre-service science teachers enrolled in the Department of Elementary Science Education of three different universities, which are Yuzuncu Yil University, Middle East Technical University, Kirikkale University, constituted the sample of the study. These universities were chosen on the basis of the convenience to the researchers (Frankel and Wallen, 2006), which are located in eastern and central regions of Turkey. The pre- service teachers were enrolled in grades 3 (n=135) and 4 (n=106). The participants' age ranged from 20 to 30 years old.

Data collection tool

Character and Values as Global Citizens Assessment Questionnaire

The character and values as global citizens assessment questionnaire consists of 20 items, under three dimensions namely; ecological worldview, social and moral compassion and socioscientific accountability. CVGCA questionnaire is a 5-Likert-type instrument (i.e., 1-never disagree, 5-always) consists of 20 items. The original scale was applied to 132 ninth-grade students. The developers of the scale designed a systematic SSI unit focused on genetic modification (GM) technology and implemented them with a focus on facilitating the natural formation of students' character and values as global citizens. Students participated in the SSI program on GM technology over 3-4 weeks in total. The scale was administered it to the participants before and after the SSI program. As well as the CVGCA questionnaire, researchers conducted semi-structured interviews with a randomly selected sample of 24 participants. Throughout the qualitative data analysis, they used seven-factor model as a conceptual framework to categorize the effects of the SSI program on the students' character and values. Details about the factors and alpha reliability values found by Lee et al. (2013) were provided in Table 1.

Procedure

During the adaptation procedure, we used Hambleton's (2005) suggestions as a guide to our work.

Table 1. Details about the factors, descriptions, and items

Conceptual component	Factor	Number of items under the factor	Alpha Values	Description	Example items
Ecological Worldview	Interconnectedness (I)	1,2,3	0.65	Shared beliefs that all human beings are embedded in and interconnected with nature	I believe scientific and technological
	Sustainable Development (S)	4,5,6	0.50		development (ex: Genetic Modification) can disrupt the balance in nature.
Social and Moral Compassion	Moral and Ethical Sensitivity (M)	7,8	0.42	Empathy and respect for other human beings and living creatures	I believe social issues (ex: Stability of GMO food,
	Perspective taken (P)	9,10	0.63		embryo cloning and dignity of human life) caused by
	Empathetic concern (E)	11,12,13	0.64		development in life science can raise ethical concerns and conflicts.
Socioscientific accountability	Feeling of responsibility (R)	14,15,16	0.64	Feelings of accountability and personal responsibility manifested within stakeholders as they engage with global SSI	I believe a small action I take will be able to
	Willingness to act (W)	17,18,19,20	0.69		contribute to resolving social issues in genetic technology (ex: Stability of GMO food, embryo cloning and dignity of human life)

Adaptation includes all the activities from deciding whether or not a test could measure the same construct in a different language and culture, to selecting translators, to deciding on appropriate accommodations to be made in the preparing a test for use in a second language, to adapting the test and checking its equivalence in the adapted form. (Hambleton, 2005, p.4)

The scale translation and adaptation were conducted in three phases: scale translation, language identification (with statistical application), and adaptation. The procedure started with accepting permission from Lee and her colleagues. First, the items were translated into Turkish independently by the

authors who are bilingual science educators with Ph.D. degrees from an elementary science education doctoral program. Second, the independent translation was followed by a joint comparison of the items which let the researchers to revise some items. Third, back-translation was done by an expert, who had not seen the original English questionnaire in English literature. The consistency between the two versions (original and back translated) was checked. Then, the translated version of the items was checked by a Turkish language expert for terminology and grammar issues. Following this process we allowed seven preservice teachers to evaluate the instrument in terms of language, clarity, meaning

and suitability. Fifth, in order to check the linguistic appropriateness, Turkish form and English form was applied to 30 preservice teachers, who speak two languages, with one week break. The correlation between Turkish and English forms was calculated. Then, pilot study was conducted with 60 preservice teachers in order to check the reliability analysis and item total statistics. Finally, the authors examined the items again and formed the final version of the instrument. After the translation and adaptation process, the CVGCA scale was photocopied and administered to the preservice science teachers from three different universities.

Data Analysis

Before conducting the analysis, the data was checked (measure for outliers is Mahalanobis distance at $p < .001$ Tabachnick and Fidell, 2007, p.99) and validated that there was no outliers. The shape of the scatter-plot diagrams was also analyzed for homoscedasticity and this assumption was also validated. Linguistic appropriateness was checked by comparing the scores of original version and translated version, pilot study provided data to check the reliability analysis, finally, structural equation modeling was used to test the factor structure of the scale.

Findings

First, we applied the both version of the scale to the 30 preservice teachers with one week break and compared the original form (English version) and translated form (Turkish version) results to check the linguistic appropriateness. The relationship between Turkish form and English form was investigated using Pearson moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was a strong, positive correlation between two forms, $r = .78$, $n = 30$, $p < .000$, with both versions are associated with.

Second, we conducted pilot study ($n = 60$) to check the translated version of the scale is reliable. Ideally, a Cronbach alpha coefficient of a scale should be above .70 (DeVellis, 2003). In the current study, this value was found .832, which is reliable. Third, the Kaiser-Meyer-Olkin measure of sampling adequacy was .821, above the recommended value of .70, and Bartlett's test of sphericity was significant ($\chi^2(190) = 974,69$ $p < .00$). Given these overall indicators, factor analysis was conducted with all 20 items.

The dimensions obtained by Lee et al.,

Table 2. Factor loadings from principal component factor analysis

	Factor Loadings			
	1	2	3	4
Sustainable Development				
Item 5	,772	,108	,047	-,029
Item 4	,722	,097	,083	,019
Item 3	,699	,102	,046	,099
Item 6	,611	,198	,092	,178
Willingness to Act				
Item 19	-,006	,796	,131	,172
Item 18	,121	,768	,096	,000
Item 16	,220	,751	,045	,123
Item 17	,285	,613	,229	-,087
Empathetic Concerns				
Item 13	,179	,056	,748	,087
Item 14	-,149	,210	,658	-,025
Item 11	,390	,124	,577	,002
Moral and Ethical Sensitivity				
Item 7	,081	,022	,069	,817
Item 8	,084	,124	-,020	,804
Eingeinvalue	3.582	1.528	1.327	1.065
% of Variances	27.552	11.757	10.207	8,190

(2013) were tested in Turkish data through confirmatory factor analysis (CFA). However, the dimensions found in Lee et al., (2013) study were not confirmed through CFA. Therefore, the factor structure reflected in the data was obtained first through the exploratory factor analysis (EFA) and the obtained factor structure was tested through CFA for the translated and adapted version of the CVGCA questionnaire.

Factor analysis was conducted by using principal component analysis followed by orthogonal varimax rotation to simplify and clarify the data structure. With orthogonal varimax rotation and restriction of the factor number to 4, "principal factoring extraction" generated four factors that account for 57.7% of the variance. Factor analysis revealed four factor structures in the data. Factors were named according to dimension used by Lee et al. (2013). Variances associated with factors and their eigenvalues are presented in Table 2.

The factor loadings, all of which are above the critical value of .50, found at the end of the multi-group CFA, ranged from .57 to .81 within the four-factor structure. The construct validity was also controlled by convergent and discriminant validity. The convergent validity, which estimates the degree to which items of a theoretical construct relate to each other, was tested. If the items of a construct load strongly together, this is an indicator of high convergent validity (Ullman, 2007). In our analysis, Factor 1 was named "Sustainable Development" which reflects the ecological worldview conceptual component. Factor 2 was named "Willingness to Act" which reflects the socioscientific accountability conceptual component. Factor 3 was named as "Empathetic Concerns" and Factor 4 was named as "Moral and Ethical Sensitivity." These final two factors reflect the social and moral compassion component. Inter item reliabilities for items that compose each factor (1 to 4) were found as 0.70, 0.70, 0.45, and 0.53 respectively. Lee et al. (2013) has found the range of reliabilities in their studies between .42 and .69.

As a result of our factor analysis, we observed that Item 1, Item 2, Item 9, Item 10, Item 12, Item 15, and Item 20 were not loaded any factor successfully. We could not observe inter-connectedness, perspective-

taking, and feeling of responsibility factors in this study. Item 3, which was loaded in the inter-connectedness factor in the original questionnaire, was loaded under the sustainable development factor in this study. Item 14, which was loaded under feeling of responsibility factor in the original questionnaire, was loaded empathetic concerns factor in this study. Item 16, which was loaded under feeling of responsibility factor in the original questionnaire, was loaded willingness to act factor in this study.

Construct Validity

After factor analysis, CFA was conducted to see how well the factors extracted through EFA fit the model. The model obtained from the CFA analysis was given in below Figure 2.

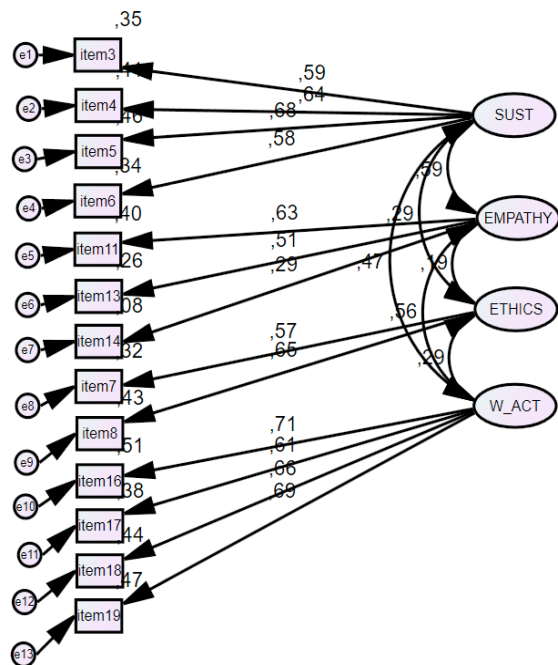


Figure 2. Four Factor Model derived from CFA analysis. SUST: Sustainable Development, EMPATHY: Empathetic Concern, ETHICS: Moral and Ethical Sensitivity, W_ACT: Willingness to Act.

To sum, the adapted version of CVGCA consists of 13 item and four factors.

Goodness-of-Fit indices were satisfactory for four factors model to claim an adequate model. None of the items were removed from the model.

Discussion

Our guiding inference in this study was how character and values play an essential

Table 3. Structural Equational Modeling Fit Indices

	Fit indices	Acceptable fit indices
¹ Satisfactory Goodness-of-Fit indices	$X^2/df = 1.44,$	$0 \leq X^2/df \leq 2$
² Goodness-of-Fit Index (GFI)	.95	$.95 \leq GFI \leq 1.00$
³ Adjusted Goodness-of-Fit Index (AGFI)	.92	$.90 \leq AGFI \leq 1.00$
⁴ Root Mean Square Residual (RMR)	0.03	$.00 \leq RMR \leq .05$

¹(Kline, 2011), ²(Baumgartner and Homburg, 1996), ³(Schermelleh-Enger and Moosbrugger, 2003), ⁴ (Browne and Cudeck, 1993)

mediating role as driving forces that lead individuals to personally connect with global SSI.

Sustainable development refers to knowing the ways of living in co-existence with other living things in nature. As demonstrated in our model, this factor loaded under the ecological worldview dimension and was explored by items 4, 5 and 6 in the original scale whereas it was explored by items 3,4,5 and 6 in Turkish version. This means our students are aware of the effects of their actions on nature and on other living creatures while calculating the profits and loss and have ecological consciousness.

Empathetic concern and moral and ethical sensitivity are the sub-dimensions of social and moral compassion factor in our model. Empathetic concern refers to an ability to understand the experiences and feeling of others (Davis, 1980) while the latter refers to having an understanding of moral and ethical aspects of scientific and technological development. The items 11-13-7-8 were almost the same with the original scale. The only differences belonged to item 12, as this item was not loaded in our model. Our findings suggest that students are sensitive to moral and ethical aspect of scientific and technological developments, open to diverse perspectives surrounding the ethical issues and empathetic to underprivileged people.

Willingness to act refers to a personal conviction to actively address and resolve SSI, which is a powerful predictor of actualizing sociopolitical actions throughout life (Boyes Skamp, Stanistreet, 2009). This factor loaded under the socioscientific accountability dimension in our model as it was the same in the original scale. This means that our students are aware of the ways they may take actions at a personal level and feel responsible to help

resolving the ill-structured issues as citizens.

The interconnectedness factor, which is one of the sub-dimensions of ecological worldview component, was explored by item 1, 2, and 3 in the original scale. These items focused on the impacts of scientific and technological development on nature and the results of human manipulations to change nature, and were not loaded under any factor but item 3. Item 3 was loaded under sustainable development, which is also a sub-dimensions of ecological worldview, factor in our model. The students participating in this study recognized their interconnectedness with the natural world and acknowledged an environmental perspective relative to sustainable development. Therefore, having item 3 with under sustainable development factor was acceptable for us. Item 1 and 2 were focused on the genetic modifications and its impact on environment. The reason for not having these items in the factor structure may have been due to a lack of knowledge about genetic modifications.

The perspective taking factor was explored by item 9 and 10 in the original scale however these items were not loaded under any factor in our model. Students do not think that it is important to consider the diverse opinions and perspectives of those involved, when deciding which sides to take on caused by work done in scientific fields.

Finally, feelings of responsibility, which was explored by item 14, 15 and 16 in the original scale, was not explored in Turkish version. Item 14 loaded under emphatic concern factor whereas item 16 loaded under willingness to act but item 15 was not loaded under any factor. When we closely examined the nature of item 14 and 16, we saw that these items mentioned "taking actions." Because of this reason, it is acceptable to have these items

under the “willingness to act” factor.

This study proposes several implications for teachers and researchers. SSI has been discussed as the appropriate framework to develop students’ character and value as global citizens. As discussed in numerous studies (Fowler, Zeidler, and Sadler, 2009; Mueller and Zeidler, 2010) the issues should be broached at a personal level so they become personally relevant and meaningful to students, and to expand the scope and meaning of the issues as to reflect societal

and global perspectives. Students should participate in discourse of the issues and feel free to express their feelings. The CVGCA questionnaire was developed to assess the effectiveness of such kind of implementations and the translated and adapted Turkish version will enable researchers to use the questionnaire for examining relationships between the students’ ecological worldview, socioscientific accountability and social-moral compassion, as well as for making international comparisons with diverse participants.

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Giriş

Bilimdeki hızlı gelişme ve yeni teknolojilerin ortaya çıkışı, dünyadaki sorunları daha birbirine bağlı ve rekabetçi hale getirmektedir. Bu nedenle yeni Dünya düzenine uyum sağlayabilen ve meydana gelen hızlı değişimi takip edebilen, bu konularda bilgilendirilmiş ve sorumluluk sahibi vatandaşlara ihtiyaç duyulmaktadır. Bu ihtiyacın giderilmesinin bir yolu da tüm vatandaşların bilim ile teknoloji arasındaki dönüştürücü bağlantıyı daha iyi anlamasını sağlayacak öğrenme ortamları sağlanmasıdır. Fen eğitiminin genel hedefleri sosyokültürel açıdan incelendiğinde bilim ve teknolojideki gelişmelerin günlük yaşantılarına etkilerini görebilen bu gelişmeleri etik ve ahlaki açıdan değerlendirebilen, toplum yaşamına olumlu ve olumsuz etkilerini objektif olarak tartışabilen birey yetiştirmeye yönelik kazanımlar görülmektedir. Fen derslerinin bilim ve teknolojideki hızlı ilerlemenin toplum yaşantısı üzerine etkilerinin tarafsız olarak ele alındığı, etik ve ahlaki açıdan değerlendirildiği öğrenme-öğretme ortamları içerisinde aktarılması gerektiği önerilmektedir. Önemli sayıda araştırmacı bilimsel faaliyetin çevresel, toplumsal, etik ve ahlaki etkilerini anlayabilen ve Sosyobilimsel konuları anlayabilecek, haklarını ve görevlerini bilen ve aktif olarak harekete geçmeyi bilen öğrencileri eğitmenin önemine vurgu yapmaktadır.

Yöntem

Örneklem

Çalışmanın örneklemini Doğu Anadolu ve İç Anadolu bölgesinde bulunan üç ayrı üniversitede fen bilgisi öğretmenliği anabilimdalı'nda öğrenim görmekte olan

241 adet 3. Sınıf ve 4.sınıf öğrencisinden oluşmaktadır.

Veri toplama araçları

Veri toplama aracı olarak Lee, Yoo, Choi, Kim, Krajcik, Herman ve Zeidler (2013) tarafından geliştirilen 20 maddeden oluşan 5 li likert tipi Dünya vatandaşlığı için karakter ve değerler ölçeği (character and values as global citizens assessment questionnaire) kullanılmıştır.

İşlem

Ölçeğin Türkçe 'ye uyarlanma süreci Lee ve ark. (2013) izin alınarak başlamıştır. Gerekli izin alındıktan sonra İngilizce ve Türkçe bilen fen eğitimi alanında doktorasını tamamlamış iki uzman tarafından ayrı ayrı Türkçe 'ye çevrilmiştir. Daha sonra çevrilen formlar karşılaştırılmış ve gerekli düzenlemeler yapılmıştır. Elde edilen Türkçe form İngilizce bilen dil uzmanına verilerek İngilizce diline geri çevirisi yaptırılmıştır. Geri çevirisi yapılan form ile orijinal formlar karşılaştırılmış olup iki formun tutarlı olduğu anlaşıldıktan sonra çevrilen form Türkçe dil uzmanına gösterilmiştir. Türkçe gramer yapısına uymayan kısımlar yeniden düzenlenerek ölçek 7 öğretmen adayına dil, anlam ve açıklık bakımından değerlendirmeleri için uygulanmıştır. Öğretmen adayları formun açık ve anlaşılır olduğunu onaylayınca dil uygunluğunu istatistiksel olarak kıyaslamak için 30 öğretmen adayına bir hafta ara ile Türkçe ve İngilizce form uygulanmıştır. Öğretmen adaylarının iki forma verdikleri cevaplar analiz edilip, puanların tutarlı olduğu anlaşılınca ölçeğin güvenilirliğini ölçmek amaçlı pilot çalışma yapılmıştır. Pilot çalışma

sonrası son şekli verilen ölçek çoğaltılarak 241 öğretmen adayına uygulanmış ve sonuçlar faktör analizi yapılarak yorumlanmıştır.

Verilerin analizi

Verilerin analizi IBM-SPSS istatistik (V 22.0) ve IBM SPSS Amos (V 22.0) kullanılarak yapılmıştır. Yapı geçerliği için ilk olarak ölçeğin Türkçe uyarlamasında yer alan maddelerin ayırt edicilik düzeyleri için madde analizi ile her maddenin kendi faktörü için düzeltilmiş madde-toplam pearson çarpım moment korelasyon değerleri hesaplanmıştır. Ölçeğin yapı geçerliği yapısal eşitlik modeli ile doğrulayıcı faktör analizi yapılarak test edilmiştir. Ölçeğin iç tutarlılığını belirlemek için Cronbach's Alpha katsayıları hesaplanmıştır.

Bulgular

Türkçe'ye uyarlaması yapılan ölçeğin dil uygunluğunu karşılaştırmak amacıyla orijinal ve uyarlanmış ölçeğe verilen cevaplar pearson moment korelasyon katsayısı bakılarak karşılaştırılmıştır. İki dili de bilen 30 öğretmen adayının ölçeklere verdiği cevaplar tutarlı $r=.78$, $n=30$, $p<.000$, bulunmuştur.

DeVellis (2003)' e göre ölçek adaptasyonu çalışmalarında Cronbach alpha değeri .7 den büyük olması gerekmektedir. Bu çalışmada pilot uygulama sonucunda Cronbach alpha değeri .832 bulunmuş olup, bu değer önerilen değer üzerinde olduğu için ölçek güvenilir bulunmuştur. Değişkenler arası korelasyonun yeterli olup olmadığı Barlet testi ile bakılmış olup ($2(190) = 974,69$ $p < .00$) geçerli sonuçlar elde edilmiştir.

Son olarak faktör analizi yapılmış olup ölçeğin dört alt boyuttan oluştuğu bulgusuna varılmıştır; sürdürülebilir kalkınma, empatik endişeler, ahlaki ve etik duyarlılık, harekete geçme isteği. Açıklayıcı faktör analizinde ortaya çıkan boyutları test etmek için doğrulayıcı faktör analizi yapılmıştır. Doğrulayıcı faktör analizi sonuçlarının da dört

boyutu desteklediği görülmüştür.

Tartışma

Bu çalışma, öğretmenler ve araştırmacılar için çeşitli etkiler önermektedir. Sosyobilimsel konular, öğrencilerin niteliklerini ve değerlerini küresel vatandaş olarak geliştirmek için uygun çerçeve olarak tartışılmıştır. Sayısız çalışmada tartışıldığı gibi, toplumsal ve küresel perspektifleri yansıtmak için. konular öğrencilere kişisel olarak anlamlı ve anlamlı hale gelmek için kişisel bir seviyeye getirilmeli ve konuların kapsamını ve anlamını genişletmelidir. Öğrenciler konuların söylemine katıldıkları ve duygularını ifade etmekte özgür oldukları ortamlarda daha kalıcı öğrenmeler edinirler. CVGCA anket formu, bu tür uygulamaların etkinliğini değerlendirmek amacıyla geliştirildi ve çevrilmiş ve uyarlanmış Türkçe versiyon, araştırmacıların anketi, öğrencilerin ekolojik dünya görüşü, sosyobilimsel hesap verebilirlik ve sosyal-ahlaki merhamet arasındaki ilişkileri incelemek için kullanmalarına olanak tanımıştır. Farklı katılımcılar ile uluslararası karşılaştırmalar yapabilmek için ölçeğin farklı dillere uyarlanması faydalı olacağı düşünülmektedir.