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E-ISSN: 2147 - 1037

Beliefs about Integration of Environmental Education into the Early Years: Scale Development

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DOI:.....

Makale Bilgileri

Yükleme:17/02/2017 Düzeltme:30/10/2017 Kabul:30/11/2017

Özet

Bu çalışmanın amacı okul öncesi öğretmen adaylarının çevre eğitiminin okul öncesi eğitime entegre edilmesine yönelik inançlarını belirlemek amacıyla geçerli ve güvenilir bir ölçek geliştirmektir. Öğretmen Adaylarının Çevre Eğitiminin Okul Öncesi Eğitimle Bütünleştirilmesine Yönelik İnançları ölçeğinin 332 okul öncesi öğretmen adayının katılımıyla pilot çalışması yapılmış ve 18 maddeden oluşan bu ölçek üç faktörden oluşmuştur: Gelişim-Öğrenme (α=.87), Çevresel sonuçlar (α=.92) ve Öğrenme ortamı (α=.74). Daha sonra 3. ve 4. sınıfa devam eden 470 öğretmen adayı ile (K=441 and E=29) ana çalışma gerçekleştirilmiş ve doğrulayıcı faktör analizi bulguları elde edilen faktör yapısının uygun olduğunu desteklemiştir. Elde edilen bulgular ışığında Öğretmen Adaylarının Çevre Eğitiminin Okul Öncesi Eğitimle Bütünleştirilmesine Yönelik İnançları ölçeğinin geçerli ve güvenilir sonuçlar verdiğini ve gelecekte öğretmen adaylarının bu konu ile ilgili inançlarını belirlemeye yönelik planlanabilecek çalışmalarda kullanımının uygun olduğu ortaya konulmuştur. Gelecekte yapılacak çalışmalarda araştırmacılara boylamsal çalışmalar planlayarak okul öncesi öğretmenlerinin çevre eğitiminin erken çocukluk eğitimine entegrasyonu ile ilgili inanç düzeylerinin farklı demografik değişkenler ile incelemeleri önerilebilir.

Anahtar Kelimeler: Çevre eğitimi, İnançlar, Okul öncesi öğretmen adayları, Ölçek geliştirme

Sorumlu Yazar: Zişan Güner-Alpaslan, Res. Asst, Middle East Technical University, Bu çalışmanın 1. yazarı Zişan Güner-Alpaslan makalenin yayına hazırlanma sürecinde elim bir trafik kazasında hayatını kaybetmiştir. Makale 2.ve 3. yazarlar tarafından onun anısına hazırlanmıştır.

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Paper presented at European Early Childhood Education Research Association (EECERA) Conference, (2012).

Introduction

Environmental education is necessary for all education levels, since it assists learners in achieving various environmental outcomes including the awareness of the natural environment and its varied problems, essential knowledge, skills, and positive attitudes to conserve the environment and improve its quality (Knapp, 2000; United Nations Educational, Scientific, and Cultural Organization [UNESCO], 1978). Therefore, the review and reconsideration of ongoing educational policies and practices has been suggested for a more sustainable world, which will guarantee a high quality of life for everyone living now and for future generations (UNESCO, 2002, 2005). To achieve the above-mentioned outcomes of environmental education, the idea of integrating environmental education into all education degrees from early to later years was first raised by the Tbilisi conference report (UNESCO, 1978). Since then, there has been an ongoing emphasis on this integration (The North American Association for Environmental Education [NAAEE], 2010; Palmer, 1998; Wilson, 2010) since it is a catalyst and plays complementary roles across the shared philosophical paradigms and practices in early childhood education and environmental education (Davis, 1999; Zurek Torquati and Acar, 2013). Both environmental education and early childhood education have common theoretical backgrounds and educational implications (Wilson, 1993). They both advocate child-centered approaches, in which children can learn through active exploration, senses, and collaboration, and communication with others. Early years education aims to maximize children's whole development, which can be achieved through various indoor and outdoor activities provided by environmental education. Therefore, the integration of environmental education into early childhood education through meeting children's developmental needs as well as their needs to interact with the natural environment (Wilson, 1996) is necessary to achieve the goals and outcomes of not only environmental education but also early childhood education (Davis, 1998, 1999; Wilson, 1993, 2010). Moreover, it was reported that philosophical background and implementations of environmental education in early years is affected by early childhood education. For this reason, environmental education for young children is considered from a holistic, integrated point of view in order to bring up children as environmentally conscious and sensitive citizens (Environment Protection Authority EPA, 2003).

The majority of studies have underlined the significance of integrating environmental education into early childhood education due to its multidisciplinary nature (Tilbury, 1994; Cutter-Mackenzie and Edwards, 2013) and for other particular reasons explained below (e.g. Cutter-MacKenzie and Edwards, 2013; Wilson, 1994, 1995, 2010). First, children's interaction with the natural environment is directly related to their healthy development and learning (NAAEE, 2010; Sebba, 1991; Wilson, 1994, 2010). In relation to this integration, studies particularly remark on its benefits for

children's healthy physical development in offering opportunities for them to master their own bodies and movements and to enhance their motor abilities (Fjørtoft, 2001, 2004). Furthermore, the cognitive skills and functioning are increased through the provision of experiences that focus on improving children's concentration, problem solving, planning, organizing, and decision making abilities (Burdette and Whitaker, 2005; Louv, 2005; Wells, 2000), and Wells and Evans (2003) comment on the integration of environmental education in terms of the development of psychological well-being by virtue of fostering social interaction and supporting among peers as well as increasing self-worth. This integration offers hands-on experiences such as the active exploration of the environment (e.g. observing the environment, describing, classifying, and comparing the objects within the environment) and engagement with the natural environment (e.g. climbing trees and growing plants) which supports children's cognitive and physical development as well as improving their language resulting from the interaction and sharing of their experiences with others (Chawla, 1998; Hungerford andVolk, 1990; NAAEE, 2010; Torquati, Gabriel, Jones-Branch and Leeper-Miller, 2010; Wilson, 2010). Children's socio-emotional development is also supported through the development of respect and empathy for others and appreciating the wonders of the environment (Wilson, 1993). Throughout these learning experiences, children have opportunities to explore the environment via 'observation, experimentation, data collection, prediction, analysis, and reporting discoveries' (Torquati et al., 2010, p. 98), which are among the essential elements of effective learning for young children (Bell, 2010; Essa, 2003).

The second reason for supporting this integration concerns its environmental outcomes which include the development of an environmental understanding (Elliot, 2010; Wilson, 1995), values (Owens, 2005; Samuellson and Kaga, 2008), skills (Davis, 1998) positive attitudes (Davis, 1999; Ewert, Place and Sibthorp, 2005; Wilson, 1993), and appropriate behaviors to enhance the well-being of the environment (Basile and White, 2000; Chawla and Cushing, 2007; Wilson, 1995). According to Wilson (1995), childhood is a critical period for developing an 'appreciation of the natural environment' and 'respect and caring for the world of nature' (p. 11). Similarly, Basile (2000) underlined the importance of early years as the beginning period for children's environmental learning and development of environmental attitudes. Early years are also considered to support inner curiosities and interests of children in the environment (Wilson, 1993). If children's curiosity about the environment is adequately satisfied, they begin to appreciate, respect and value the integrity of the environment. Therefore, the acquisition of an understanding about the environment, skills, and values is important for young children to become life-long learners and transform all these outcomes into environmentally responsible behaviors (Basile and White, 2000).

Regarding the ways of the integration of environmental education into early childhood education, Palmer's model of environmental education is valid for all educational degrees (Palmer, 1998). The other one is Wilson's suggestions and guideline for this integration (Wilson, 2010). Palmer (1998) proposed an integrated environmental education model based on three interrelated factors namely education *about*, *in* or *through*, and *for* the environment. Education about the environment is related to students' acquisition of environmental knowledge, concepts and understanding to enable them to criticize and evaluate the current situation of the planet Earth. Education in or through the environment provides first-hand experience of the environment to promote the acquisition of environmental knowledge, understanding and skills that are essential to become an explorer of the environment. The final dimension, education for the environment concerns learners' exploration of the interrelationship between human and environment as well as their roles in protecting the natural environment and sustaining its well-being. Through the systematic implication of this model, learners can gain environmental outcomes (e.g. environmental awareness, knowledge, skills, values, attitudes, and behaviors) to protect and contribute to the quality of the environment.

Wilson (2010) clarified some ways for the integration of environmental education into early childhood education. The first way is to enable children to experience in the natural environment such as planting, watering the flowers and feeding the pets in the school yard with their peers. The second way is to make children active during these kinds of experiences through organizing learning environment which facilitates children's constructing their learning on their own. At this point, she stated some factors which could influence children's learning. One of these factors is children's enjoyment or having fun from these experiences because as children have fun from the experiences they engage, their learning becomes more effective and long-lasting. Another factor is activating all the senses of children during their learning. As children use their five senses during their experiences, their learning is also fostered. The third way is to organize field trips to the natural environment so that children learn the environment through first hand experiences and foster their sense of wonder about the aesthetic and the goodness of the environment. The last one is about the integration of environmental education into indoor environment by suggesting the use of nature-related materials (e.g., pine cone, stones, and leaves) and nature-related children literature.

Considering both Palmer's model of environmental education (Palmer 1998) and Wilson's guideline (Wilson, 2010) for the integration of environmental education into early childhood education, this kind of integration is essential for improving children's gaining environmental understanding, sensitivity, values, positive attitudes towards the environment, and pro-environmental behaviors as well as fostering their whole development and learning. This integration could also be effectively practiced by early childhood teachers through following children's interests,

wonderings and prior learning about the environment, organizing a learning environment which is responsive to children's actively construction of their own learning, exploration of what they wonder about within the help of using their diverse senses (e.g., touching leaves, planting, smelling ground smell after rain, observing movements of ants in the school garden), creating an atmosphere where children freely share their feelings, ideas and solutions about the varied environmental topics such as climate change and water consumption, lastly incorporating environmental education into early childhood education ranging from children's daily routines, different activities (e.g., science, mathematics, drama, music, and art) to teaching materials in the classroom.

Despite the contributions related to the implementation of such recommendations in the literature, the quality of this integration mostly depends on early childhood teachers as the practitioners of environmental education. Early childhood teachers are responsible for children's learning *about* the environment and gaining experience *in/through* the environment (NAAEE, 2010), and their education *for* the conservation of the environment (Engdahl and Ärlemalm-Hagsér, 2008). Early childhood teachers have various roles to instigate effective environmental education. First, early childhood teachers should provide opportunities for children to experience the outdoor environment to promote children's curiosity, active exploration and learning. Secondly, it is suggested that they allow children to spend time in the natural environment and use the scaffolding strategy to support children's learning about the natural environment. Lastly, they show an individual interest in the environment and be a role model for children in conserving and improving the quality of the environment (Maynard and Waters, 2007; Wilson, 1996; Zurek et al., 2013). All these roles are also in full agreement with the description provided by UNESCO-UNEP (1990) for environmentally educated teachers. According to this description, teachers should know what to teach, how to teach, how to organize and use the natural environment as a learning space, and how to assess and evaluate all the learning and teaching process. Therefore, for successful environmental education practices in the early years, early childhood teachers should acquire these roles and competencies.

Teacher beliefs

Despite the increased emphasis on providing environmental education opportunities for young children, some weaknesses have been reported in environmental education practices of early childhood teachers, which indicate a gap between theory and practice (e.g. Cutter-MacKenzie and Edwards, 2013; Davis, 1999; Grace and Sharp, 2000; Robertson and Krugly-Smolska, 1997; Tan and Pedretti, 2010; Yuen Yi Lo, 2010). For example, lack of time, instructional materials, and professional support can cause this gap in environmental education (Yuen Yi Lo, 2010). In addition to these factors, teacher beliefs have been identified by researchers as the main concern due to their impact on teaching practices (Charlesworth, Hart, Burts and Hernandez, 1991; Johnson and Hall, 2007; Kagan, 1992;

Nespor, 1987; Olgan, Güner Alpaslan and Öztekin, 2014; Pajares, 1992). Various researchers have pointed out that a person's beliefs are constructed from multiple perspectives including teacher thinking (Clark and Peterson, 1986; Nespor, 1987), what a person thinks and acts (as cited in Pajares, 1992), a person's statement about the truthiness of an object regardless of its accuracy in reality (Atwater, 1994), and implicit assumptions (Kagan, 1992). However, all these authors agree on the interrelatedness between belief and action. There is 'a strong relationship between teachers' educational beliefs and their planning, instructional decisions, and classroom practices (Pajares, 1992, p. 326). In addition to teachers' educational beliefs, their content-specific beliefs, which refer to a teacher's assumptions about appropriate pedagogical strategies to support students' learning in a certain learning domain, also shape their educational practices (Kagan, 1992). In other words, pre-service or in-service teachers' content-specific beliefs may influence all aspects of their teaching practices and thus their students' learning (Johnson and Hall, 2007). Yet, the correlation between belief and practice does not always guarantee a direct influence of teacher beliefs on their educational practice due to contextual factors such as constraints and opportunities embedded in the school system (Ernst, 1988). The importance of exploring pre-service teachers' beliefs before they start practicing has been well-documented due to their possible influence on teaching practices (Bryan, 2012; Clark and Peterson, 1986; Pajares, 1992; Plevyak Bendixen-Noe, Henderson, Roth and Wilke, 2001). The analysis of pre-service teachers' beliefs is important since it provides feedback and opportunity for teacher educators to consider and change their beliefs. This process is a challenging and necessary ongoing task (Clark and Peterson, 1986; Kagan, 1992). The challenge in changing teachers' beliefs and their practices mostly occurs due to the ignorance of their concurrent beliefs (Ryan, 2004); therefore, there is a need to explore pre-service teachers' beliefs before they graduate from the teacher education program. The determination of pre-service teachers' beliefs about integration of environmental education into early childhood education is important, since it would give feedback for the evaluation of the effectiveness of pre-service teacher training programs, their curricula and the practices in preparing future teachers. The findings of the present study provide valuable insights into development of policy for the better integration of environmental education into pre-service education levels.

Previous studies on teachers' beliefs and environmental education

Studies in the literature have stressed the key role of pre-service teacher education programs in shaping prospective teachers' beliefs related to their further environmental education practices (Bengtson, 2010; Dziubek, 1984; Monroe, 1996; Plevyak et al., 2001). For instance, the case study conducted by Monroe (1996) with environmental educators underlined the important role of pre-service teacher training in shaping beliefs regarding environmental education as well as further

teaching practices by providing teacher candidates with content knowledge about the environment and environmental problems, and giving them the opportunity to be involved in a project-based learning environment. Similarly, Begum (2012) reported, in her case study with a secondary school science teacher, that teacher's environmental education practices are influenced by factors such as beliefs regarding environmental education and lack of content and pedagogical knowledge concerning environmental education teaching. Therefore, Begum emphasized the importance of exploring the related beliefs and creating awareness among pre-service teachers about their beliefs during undergraduate programs.

In terms of environmental education research in early childhood, there are limited number of studies that investigated pre-service early childhood teachers' beliefs (Ernst and Tornabene, 2012; Moseley, Desjean-Perrotta and Utley, 2010; Torquati, Cutler, Gilkerson and Sarver, 2013). Among these, two studies are especially worth to mention since the authors highlighted importance of beliefs and their possible contribution to children's development and learning (Ernst and Tornabene, 2012; Torquati et al., 2013). One of them is conducted by Ernst and Tornabene (2012) and the study results showed that pre-service teachers believed in the significance of nature experiences for children's holistic development, learning and environmental appreciation in spite of perceived barriers such as safety concerns in outdoor settings. The second study, which was conducted by Torquati et al. (2013), revealed that pre-service and in-service early childhood teachers perceived science and environmental education as the least important for young children's development and learning when compared to other curricular domains such as language and literacy.

When it comes to the studies conducted in Turkey, it's seen that early childhood environmental education has been investigated by several studies in the national context (Akçay, 2006; Cengizoğlu, 2013; Erten, 2005; Gülay and Ekici, 2010; Kahriman-Öztürk, Olgan, and Tuncer, 2012; Kandır, Yurt, and Cevher-Kalburan, 2012; Ogelman, 2012; Taşkın and Şahin, 2008). The majority of these studies aimed to examine preschool children's environmental attitudes (Kahriman-Öztürk, Olgan, and Tuncer, 2012), environmental perceptions (Taşkın and Şahin, 2008), perceptions of human-environment relationship (Cengizoğlu, 2013), and their knowledge and awareness regarding the soil (Ogelman, 2012). There are also a few studies, which examined the place of environmental education in the early childhood education program in Turkey (Akçay, 2006; Gülay and Ekici, 2010). Yet, the number of studies conducted with pre-service early childhood teachers is limited (Erten, 2005; Kandır et al., 2012) and no study is conducted to investigate teachers' beliefs about integration of environmental education into the early years.

Moreover, in the literature on early childhood environmental education research, there is a lack of instruments to measure teacher beliefs about environmental education (Ernst, 2014; Flogaitis,

Daskolia and Agelidou, 2005; Ernst and Tornabene, 2012; Torquati et al., 2013). Flogaitis et al. (2005) used open and close-ended questions to measure early childhood teachers' conceptions about environmental education as well as their beliefs about its content and pedagogy (e.g. 'How do you define environmental education?' and 'What should the content of environmental education be?'). Other studies mostly focused on teachers' beliefs about outdoor settings, in particular, the use of outdoors as a learning environment and its contributions to children development, the frequency of using outdoors and barriers to using outdoor environments (Ernst and Tornabene, 2012; Ernst, 2014). Moreover, Torquati et al. (2013) developed a survey to measure pre-service and in-service early childhood teachers' beliefs about the significance of children's experiences and learning in different curricular areas (e.g. environmental education, science, art and literacy) and their confidence in conducting such curricular activities. In addition, the authors used open-ended questions to elaborate teachers' ideas about environmental education (e.g. 'what kinds of experiences in and about nature can effectively support children's development and learning?'and 'Identify 1-5 concepts about nature that preschool aged children are capable of understanding'). However, these studies did not provide additional evidence on the validity and reliability of the scales. Furthermore, Torquati et al. (2013) specifically indicated that there is a need for further validation of the scale developed in their study. Moreover, although the above-mentioned studies provide invaluable information for early childhood environmental education researchers, teacher educators, and early childhood teachers, some only reflect the beliefs of a limited number of participants due to the small sample size.

The review of the literature indicates the need for a comprehensive scale to reach more pre-service early childhood teachers and reflect their beliefs about the integration of environmental education into early childhood education for three major reasons. The primary reason is that pre-service teachers' beliefs can influence their learning experiences in teacher training programs (Calderhead and Robson, 1991). The second reason is related to the nature of beliefs being resistant to change (Clark and Peterson, 1986; Kagan, 1992). In other words, changing an individual's existing beliefs takes time and requires considerable effort on the part of teacher educators. The last reason concerns the possible influence of teacher beliefs on their teaching practices (Kagan, 1992; Pajares, 1992). Pre-service teachers can transform their beliefs into future practices including their learning and teaching approaches (Richardson, 2003). The impact of teacher beliefs on educational practices must be considered since it may influence children's learning experiences (Johnson and Hall, 2007) and reduce the teacher's contributions to the integration of environmental education into early childhood education (Davis, 1998; Knapp, 2000; Wilson, 2010). Based on these premises, the aim of this study was to develop a valid and reliable instrument to reveal pre-service early childhood teachers' beliefs

about the integration of environmental education into early childhood education before they begin their teaching careers.

Method

Participants

In the current study, two independent samples were obtained using convenience sampling, which allowed for easy access to the participants. One sample was used to investigate the underlying constructs of the scale on the Beliefs about the Integration of Environmental Education into Early Childhood Education (BIEE). The first sample (pilot study) consisted of 332 pre-service early childhood teachers (199 juniors and 133 seniors) attending two different state universities in the Aegean region of Turkey. Of these 332 participants, 299 (90.1%) were female and 33 (9.9%) were male. The second sample (the main study) composed of 470 pre-service early childhood teachers (256 juniors and 214 seniors) enrolled in five different state universities in the Central Anatolian region of Turkey. In the second sample, 441 participants (93.8%) were female and 29 (6.2%) were male. Moreover, the current study focused on the exploration of pre-service early childhood teachers who took part in the Science Education course given in the third year of the teacher education programs in early childhood education. In addition, for pre-service early childhood teachers, this is the only compulsory course that aims to teach the significance of early childhood science and nature education (Council of Higher Education [CHE], 2007). Therefore, junior and senior pre-service early childhood teachers were chosen since they could understand the items in the BIEE scale based on their prior background knowledge, skills and learning experience from the Science Education course. Furthermore, it was assumed that pre-service early childhood teachers might have developed beliefs about the integration of environmental education into early childhood education through observations in their school years (Lortie, 1975).

Item development procedure

The BIEE scale was developed in three major steps. First, an in-depth review of the literature was conducted to reveal previous studies about teacher beliefs (Pajares, 1992), teacher beliefs regarding environmental education (Ernst and Tornabene, 2012; Flogaitis et al., 2005; Forbes and Zint, 2010; Plevyak et al., 2001; Torquati et al., 2013), and recommendations for the integration of environmental education into early childhood education (Cutter-MacKenzie and Edwards, 2013; NAAEE, 2010; Wilson, 1993, 1994, 1996, 2010). Secondly, based on this review, an initial pool including 56 items was created to reveal teachers' content-specific (in terms of the importance and contribution of environmental education to children, and appropriate pedagogical strategies and materials), and contextual beliefs concerning the related constraints and opportunities (such as

perceived time, school support, materials, parent involvement, and efforts required for such integration). Both positive and negative items were included in the scale to minimize the influence of positive statements on pre-service teachers' responses. In the last step, the item pool was reviewed by an expert panel of three lecturers with PhD degrees in environmental education and early childhood education for the content validity of the BIEE scale. According to these experts, a substantial number of items in the scale were appropriate for measuring pre-service teachers' belief construct concerning environmental education. Also, the agreements of the experts on the items were transformed into numerical by using interrater reliability formula of Miles and Huberman's (1994) (reliability = number of agreements / (total number of agreements + disagreements). The agreement rate was found to be as .91. At the end, a five-point Likert scale ranging from 'strongly disagree' to 'strongly agree' was obtained.

Data collection procedure

Prior to data collection, the required permissions were obtained both from the Human Subjects Ethic Committee of the Middle East Technical University and early childhood teacher education programs in the chosen universities. The BIEE scale was administered to junior and senior pre-service early childhood teachers in their own classroom setting with the permission of their instructor. Before administering the instrument, the purpose of the study and the importance of voluntariness and confidentiality of the participants were emphasized by the first author of the study. The participants had the right to refuse to participate or to withdraw from the study anytime. The administration of the scale took nearly 10-15 minutes.

Pilot testing and data analysis

For the verification of the construct validity, the initial BIEE scale was administered to 332 pre-service early childhood teachers attending two different state universities in the Aegean region of Turkey. Before performing an exploratory factor analysis, the assumptions concerning the sample size, factorability of the correlation matrix, outliers among cases, and linearity were checked. For the factorability of the correlation matrix assumption, the correlation matrix was examined and Kaiser-Meyer-Olkin measure of sampling adequacy and Barlett's test of Sphericity were performed. The correlation coefficients for many pairs of items were equal to or higher than .3. Barlett's test of Sphericity was found to be statistically significant, (χ^2=3120.561; p=.000), and the-Kaiser-Meyer-Olkin measure of sampling adequacy was found to be .92, which is interpreted as an optimal value regarding the appropriateness of the data for this factor analysis (Hutcheson and Sofraniou, 1999). Concerning the linearity assumption, there was no need to check this assumption since the sample

size was adequately high (Pallant, 2007) and the data did not indicate any outliers. Therefore, all the assumptions of analyses were met.

The following criteria were used to determine the number of factors in the scale: (a) eigenvalues greater than or equal to 1 (Kaiser, 1960); (b) the existence of clear cut points in the scree plot (Field, 2009); (c) a minimum of three items per factor with salient loadings (Pallant, 2007); (d) factor loadings greater than or equal to .40 (Field, 2009; Ford, MacCallum and Tait, 1986; Gorsuch, 1983); (e) either no or few item crossloadings for the best fit to the data (Costello and Osborne, 2005), and (f) appropriateness with the results from the literature on teachers' beliefs regarding environmental education (e.g. Ernst, 2014; Flogaitis, Daskolia and Agelidou, 2005). The exploratory factor analyses revealed three factor structures with initial eigenvalues greater than 1 and the scree plot represented three clear cuts. Inter-item and sub-scales correlations are indicated in Table 1 and Table 2, respectively.

Table 3 presents the item loadings for each factor in the BIEE scale for with item means and standard deviations. The final version of the BIEE scale consists of 18 items that can be aggregated into the following three factors: Factor 1, 'Development-Learning', measures pre-service early childhood teachers' beliefs regarding the contributions of the integration of environmental education into early childhood education for children's whole development and learning (6 items, α=.87). Factor 2, 'Environmental Outcomes', assesses pre-service teachers' beliefs regarding the contributions of such integration to children's achievement of environmental outcomes such as environmental knowledge, skills, attitudes, and behaviors (7 items, α=.92). Finally, Factor 3, 'Learning Environment', reflects pre-service teachers' beliefs about contextual factors such as the use of nature-related materials and organization of the schoolyard as a learning space or the requirements of achieving such an integration (5 items, α=.74). Concerning pre-service teachers' beliefs about integrating environmental education into early childhood education, the mean scores were high. On a 5-point scale, these high mean scores imply that the participants have availing beliefs about integrating environmental education into early childhood education. In other words, the participants believed in the contributions of environmental education to children's whole development and learning, acquisition of environmental outcomes, and necessity of organizing a responsive learning environment.

As a final step, confirmatory factor analysis was conducted to test the three-factor structure of the BIEE scale using the LISREL 8.8 program. The fit of the model to the data was evaluated based on the goodness of fit indices namely the ratio of chi-square to degrees of freedom ($\chi 2/df$) as 5.0 and the minimum value for it as 2.0, normed fit index (NFI) .95 or higher, comparative fit indices (CFI) .95 or higher, the root mean square error of approximation (RMSEA) as a value equal to or less than .08, and the standardized root mean square residual (SRMR) as less than .05.

Table 1. *Inter-item correlation*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1																		
2	,641																	
3	,581	,618																
4	,577	,598	,634															
5	,443	,440	,492	,503														
6	,418	,468	,515	,541	,610													
7	,395	,346	,422	,454	,453	,492												
8	,422	,395	,456	,482	,353	,410	,565											
9	,453	,407	,360	,504	,342	,371	,584	,670										
10	,404	,367	,401	,470	,357	,370	,488	,541	,612									
11	,413	,416	,386	,486	,432	,398	,552	,539	,583	,676								
12	,408	,384	,335	,442	,380	,385	,488	,581	,612	,552	,594							
13	,423	,378	,385	,478	,348	,378	,555	,573	,637	,572	,549	,657						
14	,434	,410	,396	,409	,390	,437	,347	,388	,359	,387	,369	,349	,334					
15	,338	,368	,319	,432	,314	,393	,355	,401	,384	,302	,297	,313	,313	,527				
16	,296	,352	,340	,399	,288	,312	,324	,355	,393	,372	,340	,386	,316	,439	,502			
17	,368	,313	,375	,417	,392	,312	,415	,449	,437	,371	,401	,396	,371	,381	,485	,447		
18	,335	,290	,345	,393	,391	,294	,496	,367	,454	,346	,430	,371	,413	,333	,433	,377	,622	

Table 2. *Inter-subscale correlations*

	DEVELOPMENT-LEARNING	ENVIRONMENTAL OUTCOMES	LEARNING ENVIRONMENT
DEVELOPMENT-LEARNING	1		
ENVIRONMENTAL OUTCOMES	,648**	1	
LEARNING ENVIRONMENT	,617**	,618**	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 3. *Means and standard deviations of the BIEE scale items and the exploratory structure of the BIEE factors (N=332)*

Factors and Items	Mean	SD	Exploratory analyses			
			Factor Loadings			Variance explained
			F1	F2	F3	
Development-Learning (F1)						41.1
Facilitates children's learning in other subject areas	4.33	.765	.811	-	-	
Enhances children's critical thinking skills	4.23	.755	.804	-	-	
Increases children's motivation for learning	4.36	.673	.788	-	-	
Facilitates children's lifelong learning	4.22	.761	.755	-	-	
Improves children's problem solving skills	4.35	.668	.749	-	-	
Supports children's whole development	4.19	.709	.665	-	.249	
Environmental Outcomes (F2)						11.7
Facilitates children's understanding of the relationship between human and the environment	4.57	.575	-	-.886	-	
Encourages children to adopt pro-environmental behaviors	4.63	.560	-	-.880	-	
Improves children's curiosity and interest in the environment and environment-related topics	4.61	.574	-	-.849	-	
Encourages children to play an active role in protecting and improving the environment	4.60	.575	-	-.828	-	
Helps children develop respect for the integrity of the natural environment	4.52	.648	-	-.822	-	
Facilitates children's understanding of environmental concepts	4.57	.585	.143	-.793	-	
Helps children develop environmental awareness and sensitivity	4.62	.527	.220	-.520	.178	
Learning Environment (F3)						8.7
Sustainability needs to be considered in the selection of learning materials	4.31	.643	-	-	.805	
It is essential to use various learning materials and equipment	4.53	.568	-	-	.783	
There should be a democratic learning environment	4.44	.570	-	-	.768	
It is essential to use nature-related materials	4.74	.464	-	-.133	.539	
The schoolyard should be used as a learning environment	4.48	.522	.166	-	.514	

Note: (1) Means and standard deviations are based on a 5-point Likert scale ranging from strongly disagree to strongly agree; (2) Extraction Method: Principal Component Analysis. Rotation Method: Direct Oblimin

Results

A confirmatory factor analysis was used to test the construct validity of a three-factor structure of the BIEE scale by obtaining data from 470 pre-service early childhood teachers in Ankara province. Based on the recommendations for fit indices in the literature, the results of the confirmatory factor analysis indicated a well fit with the obtained data and the factor structure of the scale (χ^2/df =3.7, RMSEA=.07, GFI=.89, SRMR=.04; NFI=.97, CFI=.98). As shown in Figure 1, all the item pairs provided significant contributions to the factor structure with estimations ranging from .41 to .49 for Environmental Outcomes, from .44 to .52 for Development-Learning, and from .38 to .43 for the Learning Environment factor. Moreover, the three factors of the BIEE scale were found highly correlated with each other varying between .72 and .75. Furthermore, the Cronbach alpha values were calculated to confirm the internal consistency of the factors and found to be .87 for Development-Learning, .90 for Environmental Outcomes and .79 for the Learning Environment factor. In addition, all items in the structure provided correlations above .40, which indicates that they were all distinctive in measuring participants' above-mentioned beliefs.

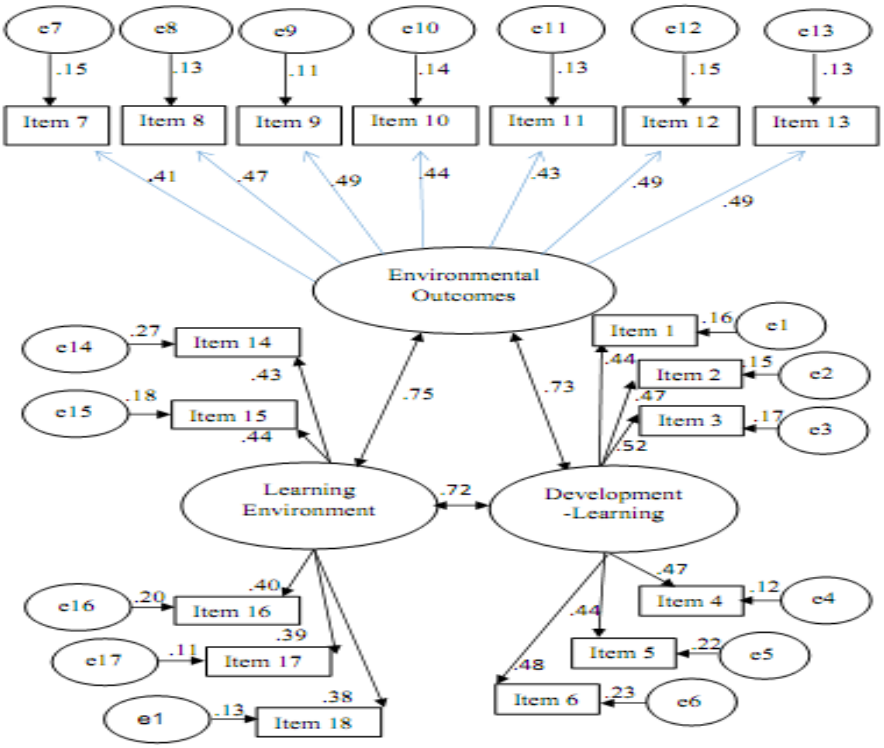

Figure 1. The specified model of the factorial structure of the BIEE scale

Descriptive analyses revealed an overall mean score of 4.49 with a standard deviation value of .39. For the factors, the scores for pre-service early childhood teachers' beliefs were found to be 4.4 for Development-Learning (SD=.48), 4.54 for both Environmental Outcomes (SD=.45) and Learning Environment (SD=.45). This implies that considering the sub-dimensions of the scale, pre-service

teachers hold positive beliefs about the integration of environmental education into early childhood education. In other words, pre-service teachers believed in the contributions of this integration to children's healthy development and learning as well as acquisition of environmental outcomes such as pro-environmental attitudes. Lastly, the participants also believed that certain requirements should be laid down for the reorganization of the learning environment to incorporate nature-related materials and schoolyard in the learning environment.

Discussion and Implications

The ever-increasing evidence in early childhood education research underlines the need to integrate environmental education into early childhood education for the well-being of both children and the natural environment (Elliot, 2010; NAAEE, 2010; Wilson, 2010). Although previous studies focused on teacher beliefs regarding environmental education and the use of natural environment in early childhood education (Ernst, 2014; Flogaitis et al., 2005; Torquati et al., 2013), they have some limitations such as not reporting on the validity and reliability of the instruments and investigating only a small number of samples. Moreover, despite the recommendations in the relevant literature for the exploration of pre-service teachers' related beliefs, there is currently no instrument that specifically aims to assess pre-service early childhood teachers' beliefs regarding the integration of environmental education into early childhood education (Moseley, Reinke and Bookout, 2002; Moseley and Utley, 2008; Plevyak et al., 2001). Therefore, this study developed and validated the BIEE scale to measure Turkish pre-service early childhood teachers' beliefs about the integration of environmental education into early childhood education.

The factors of the BIEE scale developed in this study were consistent with those found in the literature in terms of including items about; the contributions of environmental education to; the development of knowledge, skills and attitudes (e.g. 'respecting all living things', 'understanding the connections between seasons and life cycles', 'appreciating diversity', 'development of environmental appreciation', and 'environmental education is necessary for the development of environmental awareness'); children's whole development and learning (e.g. the questions about the significance of experience in nature for children's physical, cognitive, socio-emotional development as well as their healthy being), and the learning environment experience that will support children's whole development and learning (e.g. 'bringing nature indoors', 'using nature related materials', 'observing and asking questions' and 'being and playing outside') (Ernst and Tornabene, 2012; Flogaitis et al., 2005; Torquati et al., 2013).

The findings of the current study were also in agreement with those of previous research on early childhood environmental education in terms of pre-service early childhood teachers' positive

beliefs concerning the benefits of integrating environmental education into early childhood education for children's whole development and learning and achieving desired environmental outcomes (e.g. Ernst, 2014; Ernst and Tornabene, 2012; Flogaitis et al., 2005). Moreover, beliefs of the pre-service early childhood teachers in the current study concerning the contextual requirements to achieve such an integration were substantially similar to those held by pre-service and in-service early childhood teachers in previous studies (in terms of using nature-related materials and beliefs regarding the experience with nature in early childhood settings) (Ernst and Tornabene, 2012; Torquati et al., 2013). Despite the general consistency with the existing literature, the results of the current study were not agreement with those obtained by Torquati et al. (2013), who reported that early childhood environmental education were rated by pre-service and in-service early childhood teachers as the least important curricular domain for children's whole development and learning compared to other curricular subjects. This difference can be attributed to the content and practice in pre-service teacher training programs relevant to environmental education. As in other countries, in Turkey even though environment education is provided as part of the Science Education course (Lin, 2002; Mastrilli, 2005; Miles et al., 2006), the theoretical and practical aspects of this course may depend on the instructor's interest and preferences (Olgan, 2015). On the other hand, the results of the current study show that Turkish pre-service early childhood teachers held positive beliefs regarding the outcomes of the integration of environmental education into early childhood education. This may be related to their content knowledge about child development in early years as well as the awareness of the significance of early childhood environmental education they may have developed during their undergraduate courses on child development and science education (CHE, 2007).

The overall results of this study show that the BIEE scale can be used as a valid and reliable instrument to measure pre-service early childhood teachers' beliefs about the integration of environmental education into early childhood education. The determination of their beliefs will offer an opportunity for teacher training programs to be active in positively developing the existing beliefs of pre-service early childhood teachers. To this end, it has been recommended in the literature to provide pre-service teachers with opportunities to reflect upon their beliefs and to observe and experience teaching practices in schools during their undergraduate education and include environmental education content in pre-service teacher training programs (Plevyak et al., 2001; Richardson, 2003). Furthermore, Ernst and Tornabene (2012) specifically recommended providing firsthand experience for pre-service early childhood teachers in the natural environment as an element of teacher training programs to support their related beliefs. As a consequence, based on the link between beliefs and teaching practices, the likelihood of pre-service early childhood teachers' beliefs

being reflected in their future environmental education practices becomes possible (Pajares, 1992; Kagan, 1992; Richardson, 2003).

Although this study contributes to early childhood environmental education with the development of a new scale that specifically measures pre-service early childhood teachers' beliefs about the integration of environmental education into early childhood education, the generalizability of the results was constrained due to the sample being limited to pre-service early childhood teachers in Ankara. Therefore, further validation is essential with a larger number of pre-service early childhood teachers. In the current study the participants' responses were collected by using self-reported scale. For that reason, the findings of the study may be influenced by social desirability trait when they responded items in the scale. For further studies potential biasing effects of social desirability should be considered. This scale can also be used with in-service early childhood teachers to investigate the construction and development of their beliefs over a longitudinal period. Moreover, it is possible to explore the participants' beliefs in terms of demographic variables such as gender and teaching experience. Furthermore, combining qualitative and quantitative methods will create an opportunity to explore not only beliefs but also the influential factors on the construction of these beliefs and related practices. Lastly, presenting information about pre-service and in-service early childhood teachers' related beliefs can help guide teacher educators in redesigning and improving the content and impact on the way instructors implement the pre-service and in-service training of early childhood teachers.

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Çevre Eğitiminin Erken Çocukluk Eğitimine Integrasyonu ile ilgili İnançlar: Ölçek Geliştirme*

Giriş

Ulusal alan yazın incelendiğinde okul öncesi öğretmen adaylarının çevre eğitiminin okul öncesi eğitime entegre edilmesi hakkındaki inançlarını belirlemeye yönelik geçerli ve güvenilir bir ölçeğin olmadığı görülmektedir. Öğretmen adaylarının konu ile ilgili inançlarının belirlenmesi üç temel nedenden dolayı önemlidir. Öncelikle öğretmen adaylarının inançlarının onların öğrenme deneyimleri üzerinde önemli bir etkisi olmasıdır (Calderhead ve Robson, 1991). Ayrıca, kişilerin inançlarının değişiminin zor olduğu düşünüldüğünde ve bu inaçların öğretmen adaylarının mesleklerine başladıklarında eğitim ve öğretim uygulamalarını doğrudan etkilemesi nedeniyle öğretmen eğitimcilerinin bu konuda ciddi önlemler almasını gerektirir (Clark ve Peterson, 1986; Kagan, 1992; Pajares, 1992). Bu çaba önemlidir çünkü öğretmen adaylarının gelecekte kendi sınıflarındaki çevre eğitimi ile ilgili yapacakları uygulamaları sınıflarındaki çocukların öğrenme deneyimlerini doğrudan etkileyecek (Johnson ve Hall, 2007) ve onların çevreye karşı sahip olacakları tutum, inanç ve çevre dostu davranışlarında önemli bir etkiye sahip olacaktır.

Yukarıda belirtilen nedenler dikkate alındığında öğretmen adaylarının çevre eğitiminin okul öncesi eğitime entegre edilmesi ile ilgili inançlarının belirlenmesi önemlidir. Bu doğrultuda bu çalışmada okul öncesi öğretmen adaylarının çevre eğitiminin okul öncesi eğitime entegre edilmesine yönelik inançlarını belirlemek amacıyla geçerli ve güvenilir bir ölçek geliştirmesi hedeflenmiştir.

Yöntem

Öğretmen Adaylarının Çevre Eğitiminin Okul Öncesi Eğitimle Bütünleştirilmesine Yönelik İnançları ölçeği üç ana aşamada geliştirilmiştir. İlk olarak, öğretmen inançların belirlenmesi amacıyla alan yazın incelenerek çevre eğitimi ile ilgili öğretmen inançları ve çevre eğitimin erken çocukluk eğitimine entegrasyonu ile ilgili araştırmalar konu ile ilgili daha detaylı bilgi edinilmek üzere incelenmiştir. Bu inceleme sonunda madde havuzu oluşturulmuştur. Oluşturulan bu madde havuzu çevre eğitimi ve erken çocukluk eğitimi alanlarında uzman akademisyenlerden oluşan uzman grup tarafından ölçeğinin içerik geçerliliğinin sağlanması amacıyla incelenmiş ve öğretmenlerin çevre eğitimi ile ilgili inanç yapılarını ölçmek için uygun bulunmuştur. Çalışmanın devamında öğretmen adaylarının devam etmekte olduğu ilgili üniversitelerden gerekli resmi izinler alınmış ve bu üniversitelerin okul öncesi öğretmenliği bölümlerinde okuyan 3. ve 4. sınıf öğretmen adayından (N=470) veriler toplanmıştır. Ana çalışmanın veri toplama sürecinde ölçeğin doldurulması ortalama 10-15 dakika arasında sürmüştür.

Bulgular

Öğretmen Adaylarının Çevre Eğitiminin Okul Öncesi Eğitimle Bütünleştirilmesine Yönelik İnançları ölçeğinin pilot çalışması 332 okul öncesi öğretmen adayının katılımıyla yapılmış ve 18 maddeden oluşan bu ölçek üç faktörden oluşmuştur: Gelişim-Öğrenme (α=.87, 6 madde), Çevresel sonuçlar (α=.92, 7 madde) ve Öğrenme ortamı (α=.74, 5 madde) (Tablo 3).

Daha sonra 470 öğretmen adayıyla ana çalışma gerçekleştirilmiş ve LISREL 8.8 programı kullanılarak doğrulayıcı faktör analizi yapılmış ve bulguları elde edilen faktör yapısının uygun olduğunu desteklemiştir (χ^2/df =3.7, RMSEA=.07, GFI=.89, SRMR=.04; NFI=.97, CFI=.98). Ayrıca, betimleyici analizler öğretmen adaylarının çevre eğitiminin okul öncesi eğitimle bütünleştirilmesine yönelik inançlarının ortalama puanı 4.49 (SD=.39) olarak belirlenmiştir. Ölçeğin faktörlerinin ortalamaları ayrı ayrı incelendiğinde ise faktör ortalamaları Gelişim-Öğrenme için 4.4 (SD=.48), çevresel sonuçlar (SD=.45) ve Öğrenme Ortamı (SD=.45) için ise 4.54 bulunmuştur. Diğer bir deyişle, öğretmen adayları çevre eğitiminin okul öncesi eğitimle bütünleştirilmesine yönelik olumlu inançlara sahiptirler ve bu entegrasyonun çocukların gelişimine ve öğrenmelerine olumlu katkılar sağlamasının yanında doğa dostu davranış sergilemelerinde de önemli yere sahip olduğuna inanmaktadırlar. Ayrıca, katılımcılar eğitim ortamlarının düzenlenmesinde doğal materyallerin kullanılmasının ve okul bahçelerinin de öğrenme ortamlarına dâhil edilmesinin gerekliliğine inanmaktadırlar.

Tartışma ve Sonuç

Elde edilen bulgular ışığında Öğretmen Adaylarının Çevre Eğitiminin Okul Öncesi Eğitimle Bütünleştirilmesine Yönelik İnançları ölçeğinin geçerli ve güvenilir sonuçlar verdiği ve gelecekte öğretmen adaylarının bu konu ile ilgili inançlarını belirlemeye yönelik planlanabilecek çalışmalarda kullanımının uygun olduğu sonucuna ulaşılmıştır.

Mevcut çalışmanın bulguları, öğretmen adaylarının, erken çocukluk dönemi çevre eğitimi ile ilgili önceki araştırma sonuçlarıyla paralel şekilde, çevre eğitiminin çocukların gelişim ve öğrenimi için erken çocukluk eğitimine entegrasyonunun faydaları ile ilgili olumlu inançları olduğunu göstermiştir (Ernst, 2014; Ernst ve Tornabene, 2012; Flogaitis ve diğerleri, 2005). Mevcut çalışmada alan yazın ile benzer bulgular edinilmesine rağmen, bu çalışmanın sonuçları, Torquati ve ark. (2013) tarafından yürütülen ve öğretmen adaylarının ve halen çalışmakta olan öğretmenlerin görüşlerini inceleyen çalışmanın bulgularıyla uyumlu değildir. Bahsi geçen çalışmada katılımcılar erken çocukluk döneminde çevre eğitiminin diğer müfredat konuları ile karşılaştırıldığında çocukların tüm gelişim ve öğrenimlerinde en az öneme sahip konu olarak belirtmişlerdir. Bu farklılık, çevre eğitimi ile ilgili okul öncesi öğretmen yetiştirme programlarında verilen içerik ve uygulamalarla ilişkili olabilir. Diğer ülkelerde olduğu gibi (Lin, 2002; Mastrilli, 2005; Miles ve ark., 2006), Türkiye'de de çevre eğitimi fen

eğitimi dersinin bir parçası olarak verilmesine rağmen, bu dersin teorik ve pratik uygulamaları eğitmenin ilgi ve tercihlerine bağlı olabilir (Olgan, 2015). Öte yandan, mevcut çalışmanın bulguları katılımcıların çevre eğitiminin erken çocukluk eğitimine entegrasyonunun sonuçları ile ilgili olumlu inançları olduğunu göstermiştir. Bu bulgu mevcut çalışmaya katılan öğretmen adaylarının çocuk gelişimi alanındaki teorik bilgilerinin yanı sıra onların erken çocuklukta çevre eğitiminin önemi hakkındaki farkındalıkları ile ilişkilendirilebilir.

Tablo 3: *Öğretmen adaylarının çevre eğitiminin okul öncesi eğitimle bütünleştirilmesine yönelik inançları ölçeği*

Gelişim-Öğrenme
Çocukların diğer konu alanlarını (matematik, fen gibi) öğrenmesini kolaylaştırıcı bir rol oynar
Çocukların eleştirel düşünme becerilerini geliştirir
Çocukların öğrenmeye yönelik motivasyonlarını destekler
Çocukların yaşam boyu öğrenmelerini kolaylaştırır
Çocukların problem çözme becerilerini geliştirir
Çocukların bütünsel (fiziksel, dil, bilişsel, sosyal-duygusal) gelişimlerini destekler
Çevresel sonuçlar
Çocukların insan ve doğa etkileşimini algılamasını kolaylaştırır
Çocukların olumlu çevresel davranışlar edinmelerini sağlar
Çocukların çevre ve çevreyle ilgili konulara olan ilgi ve merakını artırır
Çocukların çevreyi koruma ve geliştirmeye yönelik aktif rol oynamalarına yardımcı olur
Çocukların doğanın bütünlüğüne saygı duymalarını sağlar
Çocukların doğadaki döngü, çeşitlilik, mevsimler, doğal kaynakların önemi gibi kavramları algılamasını kolaylaştırır
Çocukların çevresel farkındalık ve duyarlılık kazanmasına yardımcı olur
Öğrenme ortamı
Materyal seçiminde sürdürülebilirlik konusunu göz önünde bulundurmak gerekir
Farklı öğrenme materyalleri, araç ve gereçleri kullanmak gerekir
Çocukların çevresel değerler edinebileceği, farklı görüşlere yer verilen demokratik bir öğrenme ortamı oluşturmak gerekir
Doğayla ilgili materyaller (çam kozası, taş, yaprak gibi) kullanılmalıdır
Okul bahçesini öğrenme ortamı haline getirmek gerekir

Bu çalışma okul öncesi öğretmenlerinin çevre eğitiminin erken çocukluk eğitimine entegrasyonu ile ilgili inançlarını belirlemek amacıyla geliştirilmiş yeni bir ölçektir ve bulgular verilerin toplandığı

örneklem ile sınırlı olduğu ve geneli yansıtmadığı dikkate alınmalıdır. Araştırmacılara boylamsal çalışmalar planlayarak okul öncesi öğretmenlerinin çevre eğitiminin erken çocukluk eğitimine entegrasyonu ile ilgili inanç düzeylerinin farklı demografik değişkenler ile incelemeleri önerilebilir. Ayrıca, gelecekte yapılacak çalışmalarda nitel ve nicel araştırma yöntemleri birleştirilerek katılımcıların yalnızca inançları değil, aynı zamanda bu inançları ve ilgili uygulamalarını etkileyen faktörler incelenebilir.