

The effect of outdoor learning activities on the development of preschool children

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Learning ought to be supported by both in class activities and outdoor activities contributing to structuring knowledge. Outdoor activities allow children to actively participate and to learn by doing. Learning requires a lot of work and activities. These activities, which provide primary experiences, help children to change theoretical knowledge into practice, record it in the long-term memory, and create solutions to problems they encounter in daily life, based on what they have learned. Children, especially preschoolers, can record things into their long-term memory in learning environments which stimulate all the senses. Based on these ideas, this study was directed towards revealing effects of outdoor activities on cognitive, motor, linguistic and social-emotional development of preschool children. Thirty-five preschool children living in disadvantaged districts in İzmir, Turkey, and not being able to get education, were offered ten-week preschool education involving outdoor activities. This research was designed according to one group pre-test and post-test model. The results show that outdoor activities improved cognitive, linguistic, social-emotional and motor skills of preschool children.

Keywords: early childhood education; outdoor education; preschool program

Introduction

The term outdoor education has been in use for much longer than 20 years. It refers to integration of theoretical knowledge with practice in nature and outdoor environments (Bartunek, Brügge, Fenoughty, Fowler, Hensler, Higgins, Laschinski, Löhrmann, Neißl, Neuman, Nicol, Seyfried & Szczepanski, 2002; Elliott & Davis, 2008). Learning does not always occur in a classroom environment; it may be achieved in such places as museums, zoos, botanical gardens, aqua parks, playgrounds, forests and rivers (Türkmen, 2010).

The idea that education should be given in nature dates back to Aristotle and Plato. Years later, philosophers and scientists (including Rousseau, Locke, Schelling, Froebel, Basedow and Pestalozzi) have emphasised that children should frequently be given an opportunity to be in nature. Research shows that “direct, ongoing experiences of nature in relatively familiar settings remains a vital source for children’s physical, emotional, and intellectual development” (Kellert, 2005:81). Proximity and daily exposure to natural settings increase children’s ability to focus and enhances cognitive abilities (Wells, 2000).

Outdoor education allows children to have a wide perspective about things, because there is a wide world surrounding them outside (Öztürk, 2009). Interaction with nature is of great importance for child development and outdoor play spaces support this interaction (Rivkin, 1990). However, children growing up in an artificial environment do not possess enough sensitivity to nature (Herrington & Studtmann, 1998) and an active life for these children is curtailed (Boldeman, Dal & Wester, 2004). Outdoor play spaces and activities conducted in these areas can enable children to make effective use of time both physically and mentally if the activities are designed in accordance with their age, development, interests and needs (Towell, 2005).

During early childhood, children acquire fundamental concepts through active involvement with the environment. Science content can be introduced effectively into naturalistic, informal, or structured learning experiences (Lind, 1998). Places other than classrooms are activity based, integrative and stimulating learning environments that provide children with emotional experiences and chances for working freely. Even if they are small, they allow children to notice things belonging to nature more easily, restructure their emotions, gain information at their own speed, try different learning styles and offer learning opportunities different from those in classrooms. Outdoor spaces help children to develop skills related to the scientific research process like making inferences, measuring and observing. In addition, objects encountered there for the first time trigger learning new words. Stone and Faulkner (2014) found that spending time outdoors increased physical activity, reduced immobility and prevented excessive weight gain. Therefore, it is necessary that children be in contact with nature i.e. animals, plants and soil, and that outdoor places be integrated into education (Bilton, 2010; Godbey, 2009; Gülay, 2011; Maller, Townsend, Pryor, Brown & St Leger, 2006; Melber & Abraham, 1999; Ouvry, 2003; Öztürk, 2009; Studer, 1998; Talay, Aslan & Belkayalı, 2010; White & Stoecklin, 1998; Yayla Ceylan & Ülker, 2014). It has been reported in the literature that education programmes incorporating outdoor activities and starting in early childhood improve cognitive, social-emotional and physical-motor skills, awareness, ability to determine cause-effect relationships, observation skills, creative thinking skills, concentration and imagination (Adhemar, 2000; Fjørtoft, 2001; Herrington & Studtmann, 1998; Kirkby, 1989; White & Stoecklin, 1998).

Research Focus

Preschool is a period during which children have their first experiences of school (Yoleri, 2014). Research has shown that early childhood is a critical period when a child builds up basic competencies and self-concepts that

influence their later developmental process (Chi, Kim & Kim, 2016). The quality of education and opportunities to be offered at this critical period is important. Learning environments provided for preschool children should improve them in terms of aspects of development and motivate them to explore.

Outdoor environments are important in that they provide children with opportunities to get to know themselves and their environment through their senses (Ouvry, 2003). They improve children's skills for sharing their knowledge, expressing their feelings and making their own decisions without asking for help, which make them more successful in their lives. They also offer learning environments for experiments, discoveries and research. Children learn freely and have fun in a healthy environment, incorporating nature and stimulating all the senses. Using learning material without any teacher restrictions can increase creativity and understanding in preschool children (Studer, 1998). They discover themselves and their abilities while playing freely (Ouvry, 2003). Linguistic abilities, cognitive skills including inference, planning, observation, recognition and making decisions and motor skills including coordination, endurance and balance become better as a result of interactions with nature. In addition, antisocial behaviours decrease and cooperation, solidarity, agreement and conflict solving skills are enhanced (Burdette & Whitaker, 2005).

Gair (1997) listed six features of an outdoor education programme:

1. Education occurs outdoor. It does not have to be offered in a classroom.
2. Participants get directly involved in activities.
3. Real objects are used. Activities are implemented by using real objects and the senses.
4. Instead of memorising available knowledge, relations between objects or events are discovered and described.
5. Learning through practice and experience activates more than one sense.
6. Since the environment of an outdoor education programme is different from that of an enclosed classroom, children find outdoor activities interesting and fun.

Outdoor education is not without plans or programmes. As in all education programmes, it has a content with a meaningful, reasonable framework. In other words, outdoor education allows school programmes to be offered in different environments and with appropriate education opportunities. It creates many opportunities for motor development. In addition, outdoor education contributes to improvement of time management and social relationships, motivation for success, leadership and development of emotional control (Carrier, 2004; Miller, 2008; Murdock, 2007). It is clear that outdoor education supports personal and social development, helps children understand

scientific concepts more easily, and leads to an increase in physical activities.

Few studies about outdoor education for preschool children have been conducted in Turkey. Alat, Akgümüş and Cavali (2012) performed a study to determine opinions, attitudes and practices of preschool teachers about outdoor education. They collected data from 25 preschool teachers working at schools of the Turkish Ministry of Education, and found that although the teachers had a positive attitude towards outdoor education, they did not spend enough time on outdoor activities due to poor physical conditions, insufficient security precautions at school campuses, crowded classrooms, their worries about likelihood of children becoming ill outdoors, and the negative reactions of parents.

Çelik (2012) conducted a study to determine the quality of outdoor play spaces of nine preschools in İzmit, Turkey. They reported that outdoor spaces were not used effectively, and were not suitable for children to play in, where the physical arrangements of these spaces were neglected.

Several other studies from Turkey have revealed that physical arrangements and green areas of schools are insufficient for children's needs, which has a negative effect on education. They have also shown that outdoor space arrangements of preschools are neglected and are not effectively used (Başar, 2000; Çelik, 2012; Karatekin & Çetinkaya, 2013; Volkan Aksu & Demirel, 2011).

It has been reported in the literature that outdoor learning environments provide students with a chance of gaining direct experiences and contribute to making connections between what they learn and daily life (Ertaş, Şen & Parmasızoğlu, 2011). Studies in the US show that schools that use outdoor classrooms and other forms of nature-based experiential education show significant student gains in social studies, science, languages, arts and mathematics (Cooper, 2015). Observing what is learned outdoors and in nature quickens the acquisition and retrieval of knowledge in the long-term.

Several studies have been performed about the benefits of outdoor activities on preschool children's development and learning. However, results of the related research have not been implemented in early childhood settings. Investigating outdoor environment as well as outdoor activities is not so widespread among the researchers from the field of early childhood education in Turkey (Yılmaz, 2016). In this research, the effects of preschool outdoor learning activities on the development of preschool children were studied. The guiding research question was: "what is the effect of preschool outdoor education

activities on the development of preschool children?"

Method

This research had a quasi-experimental design and one-group with a pre-test and a post-test model. This model is based on both pre-test and post-test measurements (Karasar, 2000). The children participating in the study attended outdoor activities prepared by the researchers in accordance with gains and indicators found in the Preschool Program of the Ministry of Education. Researchers prepared a ten weeks' preschool education programme containing 90 outdoor activities aiming to improve children's cognitive, motor, linguistic, social and emotional development. The children, aged five years, participated in these activities for five days a week for ten weeks. The preschool teachers applied the outdoor activities. The researchers provided the preschool teachers with one-week training about philosophy and methods of outdoor education and the activities prepared for the outdoor education programme. Before and after the ten-week education programme, the researchers used an observation form to evaluate cognitive, linguistic, social-emotional and motor development. This research lasted for 12 weeks in the 2015–2016 academic year's fall semester.

Study Group

The study was conducted with a total of 35 children who were not attending any preschools and came from families with low socio-economic status in towns (Bayındır, Beydağ, Kiraz) of İzmir, Turkey. Children were aged over five years and had not received preschool education before. They were chosen randomly from the towns where the study was conducted. The study group consisted of 19 girls and 16 boys, aged 58–66 months old.

Instrument and Procedures

Preschool education programmes implemented in schools of the Turkish Ministry of Education since 2013 are directed towards developing cognitive, linguistic, motor, self-care and social-emotional skills in children. The programmes have predetermined indicators of these skills (MEB, 2013). The observation form developed by the researchers and used in this study was based on the above-mentioned skills and their indicators. Presence of each skill was assigned the score one and absence of each skill was assigned the score zero in all the children (See Appendix A for examples).

This study was performed to contribute to education of preschool children living in districts of İzmir with low socio-economic status and unable to attend kindergartens. Therefore, a motor vehicle was equipped with appropriate preschool educational tools and was changed into a learning environment for preschool education activities.

Children received ten-week-education for four hours daily for five days a week. Most of the educational activities were conducted outdoors, but education was offered in the vehicle when the weather conditions were not suitable.

All the activities used in this study were based on the preschool education programme of the Turkish Ministry of Education and created to be implemented outdoors. The Turkish preschool education programme is directed towards acquisition of target behaviour that preschool children have to gain. The activities enabling these children to acquire necessary behaviour and to achieve indicators were implemented in the study. For example, gain seven requires categorisation of objects and things according to their features. Its indicator is classification of objects according to their color, size, length, texture, smell and amount. In order to attain this goal, the outdoor activity given below was applied.

Creation of a nature album

Children collected stones, flowers, leaves and wooden sticks from the nature. They categorised collected objects into groups. They were asked how many of a certain type of objects they had gathered, and which object had the highest number. They categorised flowers into those with a smell and those without a smell. Surfaces of leaves and flowers were examined and were categorised into those with smooth or rough surface. Flowers were also classified depending on their color. All objects examined and classified were attached to a notebook, and a nature album was created depending on children's preferences" (See Appendix B for other examples of activities).

Data Analysis

The observation form was filled in for each child by two observers to determine to what extent target skills were acquired. The form was completed both before and after the outdoor education. The researchers marked zero, corresponding to "cannot do" or one corresponding to "can do" concerning each skill for all children and effects of the outdoor education programme offered on cognitive, linguistic, motor and social-emotional development of children were examined based on the scores obtained by the children.

Measurement errors may result from inter-observer differences. To achieve consistency between observers and to avoid such errors, scores assigned by observers should be close to each other (Ellez, 2009). In this study, the Kappa coefficient was calculated to determine whether the observers' evaluations were consistent and it was found to be 0.86. The Kappa coefficient of a ≥ 0.8 shows great consistency. In fact, in Kappa consistency analysis, Kappa coefficient ranges from zero to one. The coefficients 0.93–1.00 refer to excellent con-

sistency, 0.81–0.92 very good consistency, 0.61–0.80 good consistency, 0.41–0.60 moderate consistency, 0.21–0.40 less than moderate consistency and 0.01–0.20 weak consistency (Boyacıoğlu & Güneri, 2006).

Data were examined to determine whether they had a normal distribution. Since they were not normally distributed, a non-parametric test Wilcoxon signed-ranked test was used to determine differences between the pre-test and the post-test scores. Scores for each field of development were analyzed with SPSS 15.0. $p < 0.001$ was considered as significant.

Results

Results of the analysis of data obtained from the observation forms by using Wilcoxon signed-ranked test are presented for each developmental area below.

Differences between the cognitive scores for the pre-test and the scores for the post-test are presented in Table 1.

The difference between the pre-test scores and

the post-test scores for cognitive skills was statistically significant ($p < .001$). The children's cognitive skills significantly enhanced after the 10-week outdoor education.

Table 2 reveals differences between the scores for linguistic skills in the pre-test and those in the post-test.

As shown in Table 2, there was a significant difference between the pre-test scores and the post-test scores for linguistic skills ($p < .001$). The children's linguistic skills significantly improved after the outdoor education programme.

Differences between pre-test scores and post-test scores for social-emotional skills are presented in Table 3.

The difference between the pre-test scores and the post-test scores for social-emotional skills was also statistically significant. The children had significantly better social-emotional skills after the outdoor education programme was implemented.

Table 4 outlines differences between the pre-test scores and the post-test scores for motor development.

Table 1 Differences between pre-test scores and post-test scores for cognitive skills

Scores	Ranks	<i>N</i>	Mean Rank	Sum of Rank	<i>z</i>	<i>p</i>
Post-test Scores	Negative	0	.00	.00		
Pre-test Scores	Positive	35	18.00	630.00	-5.162	.000 _a
	Equal	0				
	Total	35				

Note. _a = $p < 0.001$.

Table 2 Differences between pre-test scores and post-test scores for linguistic skills

Scores	Ranks	<i>N</i>	Mean Rank	Sum of Rank	<i>z</i>	<i>p</i>
Post-test Scores	Negative	0	.00	.00		
Pre-test Scores	Positive	34	17.50	595.00	-5.094	.000 _a
	Equal	1				
	Total	35				

Note. _a = $p < 0.001$.

Table 3 Differences between pre-test scores and post-test scores for social-emotional skills

Scores	Ranks	<i>N</i>	Mean Rank	Sum of Rank	<i>z</i>	<i>p</i>
Post-test Scores	Negative	0	.00	.00		
Pre-test Scores	Positive	23	12.00	276.00	-4.235	.000 _a
	Equal	12				
	Total	35				

Note. _a = $p < 0.001$.

Table 4 Differences between pre-test scores and post-test scores for motor skills

Scores	Ranks	<i>N</i>	Mean Rank	Sum of Rank	<i>z</i>	<i>p</i>
Post-test Scores	Negative	0	.00	.00		
Pre-test Scores	Positive	31	16.00	496.00	-4.872	.000 _a
	Equal	4				
	Total	35				

Note. _a = $p < 0.001$.

The scores for psycho-motor skills significantly differed between the pre-test and the post-test ($p < .001$). The children acquired significantly improved motor skills following the outdoor learning activities.

Discussion

This research was carried out to reveal the effects of using outdoor environments in education on the development of preschoolers. Developmental levels of the children were evaluated in terms of cognitive, linguistic, social-emotional and motor skills,

which are required to improve in the *Turkish education program*. The pre-test and the post-test results for these skills were compared. The children were found to have significantly enhanced cognitive, linguistic, social-emotional and motor skills, considered as target aspects of development in Preschool Education Programme of the Turkish Ministry of Education, after a ten-week outdoor education programme.

There is also evidence in the literature that outdoor education activities are effective in preschool education. Fjørtoft and Sageie (2000) proposed that outdoor education contributed to modern linguistic development and was effective in development of social skills and creativity. Szczepanski (2002) reported that outdoor education increased understanding and motivation in preschoolers. This type of education helps children to structure what they have learned and prevents gaps between what they have learned and real objects (Jarman, 2008).

Änggård (2010) carried out a study in a Swedish preschool to reveal how nature was utilised in terms of daily activities. The researcher visited the school as a participant observer and obtained video observations, photographs, field notes and data from the staff and children. The results of the study showed that nature was a classroom, where children learned about nature, a home where children ate, slept, played and socialised, and a fascinating place where children learned about forests and animals.

In addition, outdoor education activities have been shown to contribute to mathematics, reading-writing, listening and critical thinking skills (Bartosh, 2003). Ouvry (2003) and Rivkin (2000) highlighted that outdoor environment develops children's observation skills by letting them follow whatever goes on in the surroundings including behavior of animals, change in weather conditions, or progress of construction. It has also been revealed that being outdoor decreases stress and supports emotional and social development in children (Ginsburg, 2007; Kuo & Taylor, 2004; Weinstein, Przybylski & Ryan, 2009).

Quigley, Pongsanon and Akerson (2011) found that outdoor education was effective in improvement of literacy skills and perception of the nature of science in preschool and primary school children.

Dowdell, Gray and Malone (2011) showed in their experimental study that nature and natural environments had a positive effect not only on play but also on the social behaviour of children. They stated that such environments encouraged children to play imaginary games, helped children to have a positive relationship with both their peers and teachers and provided children with a different learning environment. Similarly, Greenfield (2004) reported that environments other than classrooms

offered children educational opportunities appropriate for taking risks through games and activities.

Children's physical activity is motivated by diverse outdoor environments (Boldemann, Blenow, Dal, Mårtensson, Raustorp, Yuen & Wester, 2006) and the preschool outdoor is a determinant of preschool physical activity (Cardon, Van Cauwenberghe, Labarque, Haerens & De Bourdeaudhuij, 2008). Children who play outside in natural areas also show a statistically significant improvement in motor fitness with better coordination, balance, and agility (Fjørtoft, 2001). Davies (1996) has indicated that outdoor activities offer children a natural chance to do exercise by using both fine and general motor coordination, and mostly require being active within the environment. Similarly, Fjørtoft and Sageie (2000) have stated that the environment including natural elements provides many opportunities for children to develop their motor skills, such as coordination. The present study also showed that a ten-week-outdoor education programme caused a considerable improvement in motor development of the children.

Civelek (2016) investigated the effects of outdoor activities on scientific process skills of preschool children in an experimental study as a master of science dissertation. The researcher showed positive effects of a ten-week outdoor activities on the children's scientific process skills, which is consistent with the results of the present study.

Bogner and Wiseman (2004) also reported that an outdoor education programme enhanced the knowledge of children and provided an opportunity to have direct experiences with the nature.

In a study on teachers' opinions about outdoor education activities by Tatar and Bağrıyanık (2012), most of the teachers were found to prefer these activities, since they allow children to learn by practicing and experiencing. The researchers proposed that the activities had a remarkable effect on enhancement of willingness and curiosity in children and recommended that teachers should use outdoor education activities more frequently and more effectively.

Consistent with the literature, the present study revealed that utilisation of outdoor environments, allows children to learn through practice and experience, and to directly interact with what they learn. Teachers should help children to attain skills necessary to reach knowledge instead of direct presentation of knowledge so that they become the individuals they are required to be in today's world. Towards this aim, they should create educational environments in which children can satisfy their curiosity, express their opinions freely and establish cause-effect relationships. However, education at school is based on the idea that learning occurs in a classroom and focuses on in-class activities. That is, designing outdoor environ-

ments is neglected, and using outdoor environments for educational purposes is disregarded (Celep & Bacanak, 2013; Kaptan & Korkmaz, 1999; Khan & Islam, 2014; Talay et al., 2010; Tan & Temiz, 2003; Uğraş, Uğraş & Çil, 2013). However, an educational process should not be restricted to classroom environments and education offered outdoors is of great importance for children.

Yılmaz (2016) examined the preschool education programme of the Turkish Ministry of Education in terms of outdoor environments and outdoor activities and found that the programme placed little importance on features of these environments and activities likely to be performed there for a child's development and education. The researcher noted that although the programme required that there should be creative material in children's play areas, and provided examples of some creative material, there were merely some general statements proffered about outdoor environments and activities.

Preschool education proves to be a critical period for cognitive development, school readiness and achievement, linguistic development and learning motivation, as well as social and emotional development of children (Barnard, 2001; Burger, 2010; Draper, Achmat, Forbes & Lambert, 2012; Senemoğlu, 2011, cited in Yoleri, 2014). Every child needs effective early childhood support, where it ought to be underscored that at-risk children from disadvantaged environments are the least likely to get them (Heckman, 2008, cited in Chi et al., 2016). Furthermore, investing in early childhood education for at-risk children is an effective strategy for reducing social costs (Heckman, 2008). It is necessary to fulfill all children's needs so that a more creative, more productive, and happier new generation can be raised.

The results of the present study suggest that using outdoor learning environments ought to be given priority in preschool education and that children ought to be offered education involving real objects and situations. However, further studies are needed to reveal effects of outdoor education programs on older children at primary, secondary and high school. In addition, the effects of outdoor education on skills other than cognitive, linguistic, social-emotional and motor features (self-efficacy, social skills, attitudes towards science) should be studied.

This study was conducted on thirty-five preschool children from families with low socio-economic status living in İzmir, Turkey. Further similar studies with larger sample sizes from different socio-economic groups should be performed.

In the present study, data were collected with an observation form. The effects of outdoor education activities can also be evaluated with

different measurement tools. It can be recommended that similar studies using both quantitative and qualitative data collection tools should be carried out.

Conclusion

In light of the results of the present study, it can be concluded that outdoor learning activities contribute to cognitive, linguistic, motor and social-emotional development of preschool children. It can be recommended that outdoor activities given in a framework of a programme should be increased in preschool years. Teachers should be informed about outdoor education through pre- and in-service teacher training programmes and outdoor education should also be incorporated into teacher education curricula.

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Note

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Appendix A

Observation Form

Sample gains and indicators from different development areas		
Gain	Indicators	Situation
Cognitive Development:	To tell where an object is.	1/0
Implementation of instructions related to location of objects	To place an object in accordance with instructions.	1/0
	To go to the place instructed.	1/0
	To use maps and sketches.	1/0
Motor development:		
Makes movements that require object control	Throw objects in different sizes and weights to the target.	1/0
Displacement movement	A double foot jump to the certain distance.	1/0
Balancing movement	The balance related to landing movements, the balance related to jump.	1/0
Cognitive Development:		
Counting objects	Point to as many objects as they are instructed.	1/0
	To tell how many objects they have counted.	1/0

Appendix B: Examples of Activities

Example 1

Gains and indicators

Gain 10. Implementation of instructions related to location of objects (Children tell where an object is. They place an object in accordance with instructions. They go to the place as instructed. They use maps and sketches.)

Materials

A small bag made of cloth with a necklace made of beads and bracelets and a map prepared by the teacher.

Treasure hunt

The teacher hides objects in a bag like necklaces, bracelets and rings in the garden. Children are told that they are going to look for treasures hidden in the garden. They are allowed to examine the map and told to go to the places marked on the map by following arrows. Children look for the treasure according to locations found in the garden. Care is taken with the use of the terms “under, on, right, left, inside and outside.” Signs like “next to the tree” and “under the stone” are placed on the map. Each sign is a clue for the next one. Children are encouraged to follow the arrows on the map.

Example 2

Gain

Throwing objects in different sizes and weight to the target.

Materials

A sponge, a piece of chalk, a bucket and some water for each child.

Throwing sponge

The teacher draws a large circle and small circles around the big one. A sponge is given to each child. Children get together on the big circle. They

soak their sponges and throw them into the small circles. They do their best to hit the mark. Then, they throw their sponges to the outer circles. They hopscotch to go and get their sponges back and come back to the big circle in the middle by jumping on their feet.

Example 3

Gains

Motor development: Displacement movement (indicator: A double foot jump to the certain distance). Balancing movement (indicators: The balance related to landing movements, the balance related to jump).

Cognitive development: Counting objects (indicators: children point to objects as many as they are instructed. They tell how many objects they have counted.)

Materials

Hula hoop in different colors for each child.

Hula hoop

First, children are given hula hoops. They are allowed to use them freely for some time. Second, the teacher shows different uses of hula hoops. Third, 10 hula hoops are put on the ground at intervals. The same object in different numbers is placed in each hula hoop: one object in the first one, two objects in the second, three objects in the third one, four objects in the fourth one, five objects in the fifth one, six objects in the sixth one, seven objects in the seventh one, eight objects in the eighth one and nine objects in the ninth one and ten objects in the tenth one. Children get together and they are explained that when the teacher calls out a number, they have to go to the hula hoop in which there are objects in the number given. The game continues until all children can match the numbers and objects.