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Developing Environmental Awareness in Preschool Students Through Indoor Activities[1]

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Abstract

Conducted as action research, the study aimed to develop environmental awareness among preschool students through indoor activities. The research was conducted with a class of 11 preschool students from a low socio-economic background over a total of 23 class hours. Considering the interests and needs of the learners, among the environmental issues that should be explored during the preschool period, 'soil' was selected as the research topic. The instruments employed in the research were card-matching activities, mind maps, semi-structured interviews, and an exhibition evaluation form. Content analysis was applied in the examination of the collected data. As a result, it was concluded that students developed awareness about the structure of the soil, soil types, the usage areas of soil, soil pollution, and soil protection and that they could practice what they had learnt outside of the school environment. The research has two important implications: first, it shows that environmental awareness can be improved through indoor activities conducted in schools within low socio-economic areas, where natural environmental conditions are not considered ideal. Second, thanks to being conducted as action research, teachers may create better opportunities for problems related to environmental awareness to be more visible in the classroom, thereby enabling them to resolve such issues.

Key words*: action research; environmental awareness; environmental education; indoor activities; preschool education.*

[1] *The study emerged as a result of the reanalysis of data from a thesis completed in 2019 by the first author under the supervision of the second author, in line with the purpose of the research. The data were collected just prior to the full closure of schools across Turkey during the COVID-19 pandemic. The research has never previously been published.*

Introduction

> *To be a scientist is to be naive. We are so focused on our search for truth we fail to consider how few actually want us to find it…The truth doesn't care about our needs or wants—it doesn't care about our governments, our ideologies, our religions—to lie in wait for all time. This at last is the gift of Chernobyl… What happened there, what happened after, even the good we did, all of it... all of it, madness.* (Renck, 2019)

The words of Valery Legasov, the protagonist of HBO's 2019 acclaimed mini-series Chernobyl, may be surprising to some people who thought of Chernobyl as nothing more than a computer virus. In fact, Legasov, a Russian nuclear scientist who was caught up amid this tug of war, spoke about one of the most significant environmental disasters ever, which happened in 1986 in Chernobyl. However, those words are almost an answer to Rachel Carson's *Silent Spring*, written 24 years prior to the disaster. In *Silent Spring*, Carson calls for humans to act responsibly, carefully, and as stewards of the living earth.

> *We stand now where two roads diverge. … The road we have long been travelling is deceptively easy, a smooth superhighway on which we progress with great speed, but at its end lies disaster. The other fork of the road — the one less travelled by — offers our last; our only chance to reach a destination that assures the preservation of the earth*. (Carson, 1962, p. 277)

It is plausible to say that series like Chernobyl, movies, cartoons, and the campaigns of environmental organisations contribute significantly to our environmental awareness and our understandings of "the other road less travelled". However, especially following the Tbilisi declaration in 1977, studies have shown that EA can be developed mostly through a framework for environmental education (EE), delivered across all levels and to all age groups, starting right from early childhood education (Leal Filho, Mifsud, & Pace, 2018).

Environmental awareness (EA) is defined as the awareness of environmental issues, environmental sensitivity, and being active towards protecting the environment (Grodziéska-Jurczak, Stepska, Nieszporek, & Bryda, 2006), the realisation of one's relationships relating to nature, and the development of the necessary perception for environmental behaviours (Schreuder, van Erp, Toet, & Kallen, 2016). Individuals with developed EA have a descriptive and interpretative perspective on the cause-effect relationship in environmental problems (Jeronen & Kaikkonen, 2002). According to the results of research conducted by the Organisation for Economic Co-operation and Development (OECD), a direct relationship was revealed to exist between the education level received at school and EA (Coertjens, Pauw, Maeyer, & Petegem, 2010). In addition, in research published by Korhonen and Lappalainen (2004), which analysed what affects

children's awareness of the environment under different environmental conditions, the researchers concluded that education plays an essential role in establishing EA. Broom (2018) stated that EA, which starts to take shape within the preschool period, is effective in developing positive behaviours towards the environment in subsequent years. In other words, respect and care for the natural environment should be developed during the first few years of a child's life, or such attitudes may never develop in adulthood (Evans, Otto, & Kaiser, 2018). Thanks to planned and systematic EE given in the early years of life (Hahn and Garrett, 2017), which supports children's physical, emotional, social, cognitive, and holistic development (Carter, 2016), children can develop their personality and gain a worldlier perspective, create values (Green, Kalvaitis, & Worster, 2016), and thereby improve their active learning (Lekies & Brensinger, 2017).

Studies on EA within early childhood education have shown that nature-based early childhood programmes provide direct, nature-rich experiences with a range of objectives, including developing a basic appreciation for the natural world in a holistic and interdisciplinary manner (Ardoin & Bowers, 2020; Cagle, 2018; Chawla, 2015; Larimore, 2016; Pramling-Samuelsson & Kaga, 2008; Rosa, Profice, & Collado, 2018; Sobel, 2015; Wells & Lekies, 2012; Wilson, 2018). However, the question is how EE should be conducted within a context that has limitations regarding the implementation of outdoor activities, such as a lack of funding and administrative support, lack of venue options, and curriculum inflexibility (Behrendt & Franklin, 2014; Jose, Patrick, & Moseley, 2017), as in the context of the current research. In addition, as for EE in Turkey's Preschool Curriculum, the related literature (Gülay & Ekici, 2010; Özkan & Tuğluk, 2020) shows that the general objectives, learning outcomes, and indicators (including special days-weeks) towards developing EA in the curriculum are insufficient. There are other problems, such as the lack of the same favourable physical conditions in all schools, individual differences among learners, the inadequacy of preschool teachers' training, and teachers' inadequacy in harmonising the curriculum with EE (Türkoğlu, 2019). For this reason, it is important for preschool teachers to create learning situations for EA considering those limitations and without neglecting the learning outcomes in the current curriculum.

Objectives of the research and the authors' research expectations

Related literature (Ardoin & Bowers, 2020; Behrendt & Franklin, 2014; Jose, Patrick, & Moseley, 2017) shows that it is difficult to develop EA in countries with a centralised curriculum, in schools that do not have their own gardens or teamwork opportunities, and in schools with students from different or low socio-economic backgrounds. Hence, the aim of the current study was to design and implement an indoor activity-based instruction to develop preschool students' awareness of soil and to examine whether the developed design was effective. For this purpose, answers to the following questions were sought.

1) How did the learning activities develop students' awareness of the theme of soil?
   - How did the learning activities develop students' awareness of the concepts related to the soil?
   - How did the learning activities develop students' awareness of the features of soil?
   - How did the learning activities develop students' awareness of the importance of soil?
   - How did the learning activities develop students' awareness of soil protection?

2) What are the students' perspectives on the developed learning activities?

At the outset of the study, the research expectation of the authors was based on previous similar studies of the same problem (Cagle, 2018; Chawla, 2015; Hahn and Garrett, 2017; Larimore, 2016). In other words, instruction aimed at preschool students to develop their environmental awareness should help them see the *environment* as a concept that is integral to all forms of life and to accept themselves as a part of the environment rather than a subject detached from real life. Hence, all the activities were prepared considering living and non-living things related to soil. The research aimed to propose an environmentally friendly instructional design with a focus on classroom implementation within the regular school context, i.e., having a prescribed central syllabus, school resources, timetabling, routines, etc.

Method

Research design

This research was deemed appropriate to the action research (AR) model, one of the qualitative research paradigms because the implementation takes place within the natural environment of the study group, and also the process is intended to be transferred to the research in a realistic and holistic manner (Johnson, 2011). Since this research aims to describe an implementation within a predetermined theoretical framework (McKernan, 1991), it is referred to as a technical AR. Also, since it is applied within the first researcher's own classroom, it may be classified as an in-class AR (Hendericks, 2008). The research included four weeks of observation, one week of activities used to determine the EE theme, four weeks of activities, final evaluation interviews, and then an exhibition of the produced works. The AR cycle used in this research is presented in Figure 1.

In defining the problem, observations were conducted within the classroom and within the school garden for a period of 30 school days during the daily routines of the study group to reveal how the study group defined the natural environment and how they interacted with that environment. In doing so, it was seen that the students were damaging the plants, trees, and bushes in the vicinity. From dialogue with the students, the researcher thought that this was, to some extent, related to the natural surroundings not being seen by the students as animate. The researcher's assumption at this point was that they would be more sensitive to their environment if they recognised the natural environment elements and the human-environment

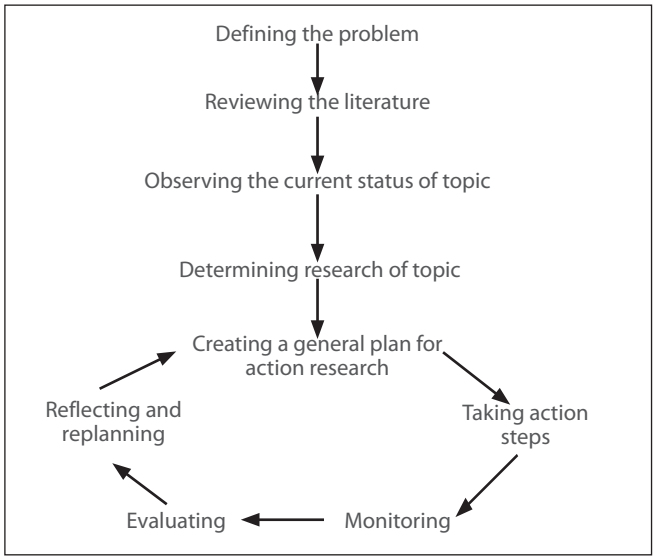

Figure 1. Action Research Cycle

relationship. It was deduced that an EE prepared according to this basic assumption could therefore aim at distinguishing living elements from non-living elements within the students' environment and for them to gain a sense of responsibility toward all elements within their environment.

In determining the status of the topic, it was concluded that EE in early childhood should aim at developing awareness of the environment according to the classification put forward by Braus and Wood (1994/1993), which was based on the aims of EE as stated in the Tbilisi Conference. The focus of the learning was selected to be intertwined education due to the centralised nature of education in Turkey and the interdisciplinary nature of EE. Thus, the implementation was conducted within the 'normal' school context. In determining the theme of the research, the topics to be addressed in early childhood were listed as plants, animals, air, water, soil, recycling, and energy resources (Gülay & Önder, 2011). Three activities were applied to see which environmental issue sparked the most interest in the students. In the 'Creating Interest Centres' activity, "soil, water, air, and recycling" centres were established in the classroom, and materials related to the concept were placed in each centre (soil, stones, a magnifying glass, etc.) to reveal where the students spent most of their time. In the second activity, the story titled Ayşe's Trip was read out loud with the aid of puppets, and the students were asked to draw a picture, at their own discretion, of one of the four elements mentioned in the story. In a subsequent activity, various visuals were displayed on a board so that the students could all see them. After one minute, and after the students had seen all the pictures, the visuals were withdrawn, and each student was asked, *'What is the photo/picture that first caught your attention? Why?'* Following analysis of the observation results and the three activities, it was decided that the theme

of the current research would be soil. Based on the existing literature and the nature of the study theme, EA was studied by focusing on the following: (1) concepts related to soil, (2) the structure and properties of soil, (3) creatures living under/in or above the soil, (4) the importance of soil to all living things, and (5) the protection of soil.

The next stage started by determining the learning objectives and how to include the activities within the existing daily and weekly routines. Whilst determining the learning outcomes and activities of the learning unit, the students' initial mind maps were considered, as well as the cognitive, physical, socio-emotional, and language development areas specified in the preschool curriculum, along with their relational consistency with one another, their potential for stimulating the students, as well as their ease of implementation and apparent level of interest to the students. After planning the activities, the days and times that the activities would be implemented were determined, taking adequate care to comply with the curriculum and not to unnecessarily disrupt the other routine tasks detailed in the curriculum. Due to the lack of suitable space in the school garden, indirect learning opportunities for developing EA, such as drama (Chen & Martin, 2015; Donohoe & O'Sullivan, 2015), experiment and observation (Gülay & Öznacar, 2010; Önkol, Zembat, & Balat, 2011), storytelling (Hadzigeorgiou & Judson, 2017; Hughes, 2013; Tooth & Renshaw, 2009; Wattchow, Burke, & Cutter-Mackenzie, 2008), and art-based pedagogies (Staples, Larson, Worsley, Green, & Carroll, 2019; Tarr, 2008) were designed to be held in the classroom. At the beginning of each activity, introductory activities such as puppet games, video demonstrations, visuals, nursery rhymes, and so on were utilised to prepare students for the lessons. The activities, the developmental areas, the course name, learning outcomes, and methods used for the planned activities are presented in Table 1.

Table 1

Activities, methods, developmental areas, course name, and learning outcomes

Activity	Method / Developmental area	Title of the Course Learning outcomes
What happened to the rocks? Students in the role of rocks hold hands and form a circle. The students in the roles of wind, hot air, cold weather, rain, and snow improvise around the students who formed the rock. The students in the rock role move away from each other and move to different areas of the classroom.	**Drama** Motor / social / cognitive	**Turkish** 1. Students realise how soil is formed through fragmentation and crumbling of rocks as the effect of natural events.
What's in the soil? The granular structure of the soil is examined using a magnifying glass. Soil is placed in a glass jar and its height is marked. By adding water to the jar, bubbles are observed, and the height of the soil is marked.	**Experiment-Observation** Cognitive	**Science** 2. Students realise that soil has a granular structure. 3. Students realise that air is trapped between the soil particles and the various substances that make up the soil.

Activity	Method / Developmental area	Title of the Course Learning outcomes
Pictures of soil Pictures of different types of soil are distributed to the students together with scissors and glue, who then create collages by cutting up the pictures as they see fit.	**Art*** Cognitive / motor	**Art** 4. Students compare different types of soil in terms of features such as their colour and texture.
My pot is made from soil Clay is shown to the students. After examining it, each student is given some clay to then create any shapes they want.	**Art** Cognitive / motor	**Art** 5. Students can list the usage areas of soil for living creatures (making tools, shelter, etc.).
From seed to seedling After reading aloud the story entitled 'I am a little seed', elements necessary for the growth of plants are discussed. Paintings are created in which the elements necessary for the growth of plants are included.	**Storytelling/Art** Cognitive / language	**Turkish** 6. Students can explain that soil is necessary for plants to survive.
May my peppers grow Containers and pepper plant seedlings are distributed to the students. Suitable planting intervals and suitable planting depths are decided, and appropriate instructions are given.	**Experiment-observation** Cognitive / affective	**Science** 7. Students can explain that soil is necessary for plants to survive. 8. Students can explain that plants are necessary for the richness of soil structure.
Mole A mole is constructed using appropriate materials and according to the given instructions.	**Art** Cognitive / motor	**Art** 9. Students can recognise living things, either above or beneath the soil.
Sad Soil After reading aloud a story about soil pollution entitled 'Sad Soil', students are asked questions about the concepts in the story (rubbish left on the ground, waste batteries, etc.).	**Storytelling** Language / cognitive	**Turkish** 10. Students can explain the importance of soil protection (as a living space, food source, shelter, etc.). 11. Students can explain how soil pollution occurs.
I'm cleaning the soil Students gather around a large piece of brown cardboard, which represents the soil. Magnetised little cards to represent pollutant and non-pollutant elements are scattered on the cardboard. The students then clean the soil by removing the cards that can cause soil pollution using a stick shaped like a fishing rod and placing them into containers.	**Play** Cognitive / motor / social	**Game** 12. Students can distinguish between pollutant and non-pollutant elements. 13. Students can explain what should be done to protect the soil.

* All completed works within Art lessons were displayed around the classroom for all to see.

Participants

Researchers

The first researcher, who undertook the role of teacher-researcher (insider), had a total of 6 years of professional experience and worked as a preschool teacher at the school where the research was conducted. In addition, the first researcher actively participated in the design, implementation, and evaluation processes of this action research (AR) study. The second researcher had researched EE prior to the current study and had 18 years of experience in the field of Curriculum and Instruction. Working in the role of a critical friend (outsider) (Stenhouse, 1975), the second researcher was able to facilitate the progress of the research with the first researcher, as a teacher-researcher, throughout the AR. While it was the insider who conducted the first-order AR focusing on teaching improvement in the classroom (teaching context), it was the outsider who took on a proactive role in promoting the learning capacity of the teacher-researcher in reflective inquiry (Elliott, 1985).

Study group

A total of 11 students between 48 and 66 months old participated in the research. It may be said that there was a positive atmosphere in the classroom in terms of effective communication among the students. During the data analysis process, the students were each coded with a pseudonym that was close in meaning to their name.

Parents

While the fathers of the participating students were workers with either lower-secondary or higher-secondary school educational backgrounds, the students' mothers were homemakers with mostly primary education backgrounds. The socio-economic level of the families was considered low. The families were each involved in the exhibition phase of the research and contributed to revealing whether or not the activities conducted within the classroom were also effective in terms of the learners' lives outside of the school.

Research environment

The preschool consisted of two classes, each with 11 students. The preschool classrooms were deemed to be of sufficient size; they included various items and toys placed within the learning centres of the classrooms. While there were the materials necessary in the classroom for preparatory educational activities in mathematics, reading, and writing, there were insufficient materials for environmental activities. The school garden was predominantly set to concrete, with approximately 10% of the total area open to the soil. A limited number of rubbish bins were positioned throughout the school garden, but no recycling bins. The school garden had no play facilities, such as an open or semi-open playground with swings, slides, sand, or water pools.

Instruments

The data collection instruments employed in the research were pre- and post-activities, an Activity Evaluation Form, a Semi-Structured Interview Form, and an Exhibition Form. Researcher diaries (see Appendix 3) were also used in interpreting the results, along with monitoring the difficulties and positive aspects of the research; however, they were not included in the actual coding.

Pre- and post-activities

Two activities were designed to determine how the learners' EA towards the theme of soil developed. In the card-matching activity, which was conducted as an individual activity, 15 visuals related to soil (e.g., different types of soil, items made from soil, plants growing in soil, etc.) and 15 unrelated images (e.g., brown objects, brown toys) were presented. The students were then tasked with pasting the relevant images onto a blank worksheet (See Figures 2a and 2b). In the mind map activity, which was conducted as a large group activity, the students were each asked to state in one word what they first thought, knew, and were interested in learning about soil. While creating their mind maps both before and after the implementation, the students' answers were written on a large piece of cardboard by the teacher-researcher (See Figures 3a and 3b).

Activity evaluation form

The Activity Evaluation Form (see Appendix 2) was prepared to determine whether the learning outcomes were fulfilled. Questions specific to each activity were given to the students, and their answers were subsequently recorded. A Student Opinion Form was used to determine the students' views on each activity. Three emoji-type symbols were used on the form due to the students' literacy level. Prior to the implementation of the action plan, the three symbols were shown to the students, and meaning unity was attempted to be formed by the teacher-researcher by explaining what each symbol meant. This helped to ensure that the students marked the smiley face where they had liked an activity, the indecisive face where they felt either unsure or only moderately happy about an activity, and the sad face where they had not liked an activity.

Semi-structured interview form

In order to arrive at a holistic understanding of the concept of 'soil', interviews were held with each student to reveal the pertinent data that could not otherwise have been observed or obtained (Stake, 1995). Each interview was an intersubjective process between the student and the teacher-researcher (Kvale & Brinkmann, 2009) and provided significant in-depth data about the students' perceptions of the activities (see Appendix 1). The researchers prepared questions in the semi-structured interview form based on related literature. Later, the form was checked by two academicians from the field of Curriculum and Instruction, one academician from the field of Instructional Evaluation and Assessment, and one academician from the field of Preschool Teaching.

The semi-structured interview form was then applied to preschool students from the other preschool class as a pilot test.

Exhibition form

Following the completion of all the activities, the parents who had participated in the exhibition were asked for their opinion regarding the activities and what kind of changes they had witnessed in their children's lives outside of the school environment. The results obtained from this stage were used to complement the student responses.

Data processing

Content analysis, one of the qualitative data analysis methods, was used to examine the collected data and ensure that the analytical process remained accurate and realistic (Johnson, 2011). The researchers carefully examined the collected data, and codes were assigned according to main categories and subcategories and then assimilated from a list of categories into themes. During the analysis of the responses given during the semi-structured interviews, frequency-based content analysis was applied, wherein the findings were reached through the frequency of data acquisition (i.e., how often the identified elements were repeated) (Creswell, 2014). The activity evaluation was analysed with regard to the outcomes using preformed checklists, and the students' opinions were analysed according to the symbols marked for each activity.

Trustworthiness

The concept of trustworthiness in qualitative research relies upon four general criteria, as proposed by Lincoln and Guba (1985): credibility, transferability, dependability, and confirmability. Table 2 shows the quality criterion and its description, strategies to provide that criterion, and provisions made by the researchers in the current research. It was developed by the researchers based on the literature review (Bogdan & Biklen, 2007; Creswell & Miller, 2000; Kornbluh, 2015; Korstjens & Moser, 2018; Lincoln & Guba, 1985; Merriam, 2009; Stahl & King, 2020).

Table 2
Quality criterion and description, strategies to provide criterion, and researchers' provision

Quality criterion and its description	Strategies used to attain criterion	Researchers' provision in the current research
Credibility Asks how congruent the findings are	Adoption of appropriate, well-recognised research methods	Action research; a research methodology seeking transformative change through the simultaneous process of acting and doing research, which is linked together by critical reflection.
	Prolonged engagement	Research lasted 9 weeks
	Providing a brief description of the participants	(see: Participants)

Quality criterion and its description	Strategies used to attain criterion	Researchers' provision in the current research
	Triangulation	Investigator/ coder triangulation – data analysed by two independent coders. Reliability formula for coders (Miles & Huberman, 1994) calculated as P = Na / (Na + Nd). Coding reliability was calculated as .92 for mind maps, .96 for Card Matching, .92 for interviews, .96 for the activity evaluation form, and .94 for the exhibition form. Instrument triangulation (see: Data Collection Instruments)
	Ensuring honesty of informants	The research focused on classroom implementation within the 'regular' school context of the students.
	Detailing the researchers' background	Researchers' biographical information supplied.
	Thick description of the phenomenon under scrutiny	A detailed description of environmental education and environmental awareness (see: Introduction)
	Examination of previous research to frame findings	Previous research described in detail (see: Introduction)
		Findings presented in relation to previous studies (see: Discussion)
Transferability / Dependability Showing that the findings have applicability in other contexts	Provision of copious information regarding all aspects of research	The phenomenon in question, participants, location, instruments, data processing, and trustworthiness are all described in detail to allow for comparisons to be drawn.
	Admission of researchers' beliefs and assumptions	Researcher's beliefs and assumptions reported (see: Objectives of the research)
	Reflexivity	A reflexive journal maintained (see: Appendix 3)
	Verification of researcher's thoughts	Sample visuals included (see: Findings)

Research results

Results regarding first research question

Soil-related concepts

Table 3 shows details regarding the visuals correctly identified by the students on the concept of the soil before (BA) and after the Card-matching activity (AA). The selected visuals related to the soil were labelled Right Visual (RV), while those unrelated to the soil were labelled Wrong Visual (WV).

Table 3
Analysis of card-matching activity

Student pseudonym	BA/RV	BA/WV	AA/RV	AA/WV
Ali	8	2	14	1
Ahmet	10	1	15	1
Ayşe	3	2	8	1
Zeynep	10	2	13	-
Omer	9	3	12	-
Mehmet	7	2	13	-
Fatma	9	4	12	2
İsmet	11	3	12	-
Leyla	10	1	14	1
Gül	12	2	15	-
Mustafa	9	2	13	-
Total	98	24	141	6

When Table 3 is examined, it can be seen that the students improved their ability to distinguish visuals related to soil. The number of visuals they picked up correctly, out of 30, increased following the activity. The card-matching activity for the student coded as Ali is shown in Figure 2.

Figure 2a. Ali's initial card-matching activity

Figure 2b. Ali's final card-matching activity

Ali chose ten visuals from among the 30 images related to the soil before the implementation. While eight of the selected visuals (three images of soil types, a farmer, a shovel, an hourglass, a plant, and a mole) were correctly chosen, two of the selected visuals (ice cream and a child) were not related to soil. After the implementation, Ali selected 15 of the 30 visuals and pasted them onto the page. Fourteen visuals (a farmer, a shovel, an hourglass, a flowerpot, a mole, soil pollution, a tree, plant roots, a rock, an animal living in/on the soil, and three visuals for three soil types) were chosen correctly. The initial mind-map and final mind-map created in accordance with the participants' responses to the question 'What comes to your mind first when I say soil?' are presented in Figure 3, and the analysis based on the mind-maps is shown in Table 4.

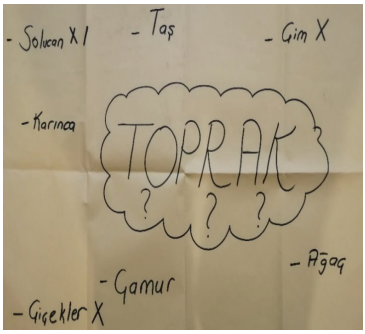

Figure 3a. Initial mind-map

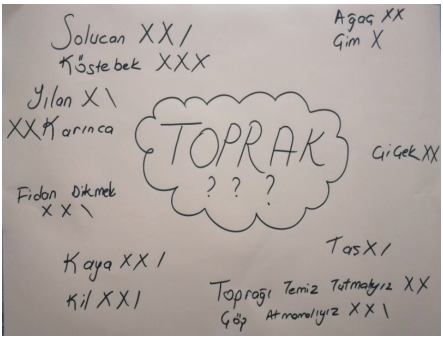

Figure 3b. Final mind-map

Table 4
Analysis of mind-map activity

Themes / Categories	Frequency BA	Frequency AA
Animals living in/on the Soil		
Worm	3	5
Ant	1	4
Mole	-	6
Snake	-	3
Soil structure		
Rock	-	5
Mud	1	-
Stone	1	3
Clay	-	5
Protection of soil		
Cleaning the soil	-	4
Collecting rubbish	-	5
Things growing in the soil		
Tree	1	4
Grass	2	2
Flower	2	4
Seedling	-	5
Total	11	55

A total of 11 answers were shown in the mind map prior to the activities, and three categories were formed: Animals living in/on the soil, Soil structure, and Things growing in the soil. As can be seen, a new category called Protection of Soil emerged in the mind map created following the implementation. The 'mole', 'rock', 'snake', 'clay', and 'seedling' were not identified prior to the activities. While the most common response given prior to the activities was 'worm', following the activities, it was 'cleaning the soil', 'collecting rubbish', 'rocks', 'mole', 'worm', and 'seedling'.

Structure and properties of the soil

Prior to the implementation, only three of the students answered the question of how the soil was formed, and all three provided incorrect answers. However,

following the implementation, all the students stated that soil was formed because of the fragmentation and crumbling of rocks due to various natural events. While none of the students could state that soil was granular before the implementation, almost all the students stated that soil has a granular structure and that there is air between the granules. Prior to the implementation, all the students stated that they did not know about the different types of soil, but following the implementation, they talked about soil types and even the different locations of soil (e.g., at the beach or in the garden). While students provided only short answers prior to the implementation (e.g., we walk, we play) to the question of what purpose soil was used for, following the implementation, more of the students were able to state that soil is used in different areas and that soil is also a habitat for different living things.

Importance of the soil

While the students named the water and sun as elements necessary for plants to live before the implementation, the heat was added to that list following the implementation, whereas the students' answers were more detailed. Prior to the implementation, the students were unable to answer whether or not plants were beneficial to the structure of the soil. However, after the implementation, all of the students, except for two, stated that soil has a healthier and stronger structure with plant roots. As for the animals that utilise the soil as their habitat, the number of living beings mentioned in the pre-activity questioning increased following the implementation, with snakes and moles added to the animals named by the students.

Conserving the soil

There was an improvement in both the quantity and quality of the students' responses following the implementation. While the students gave only short answers before the implementation to the question of *'Why should we conserve the soil?'* such as 'it gets dirty' or 'we get sick', following the implementation, 11 of the students were able to provide clear answers such as *survival of plants, animals living,* and *being protected from microbes*. It was seen that the students realised that it was not only themselves but also all living things in nature that were affected by pollution, and as such, they noticeably started to treat nature as a whole. While the students mostly responded to the factors that pollute the soil with just 'rubbish' or 'having been littered' prior to the implementation, the students expanded upon the concept of rubbish after the activity, mentioning pollutants in greater detail, including gases and even pesticides. Whilst the students gave only limited answers to actions that could be taken to keep the soil clean prior to the implementation (i.e., not littering), they were able to detail how to keep the soil clean. At this point, the most striking finding is that all the students emphasised the acts of recycling. In addition, three of the students emphasised the need to plant trees, but significantly, they talked about doing so not after the damage had occurred to the soil but before – as a preventative measure. The title of some activities, some semi-structured interview questions (SSIQ) prepared for activities, and some sample answers before (BI) and after the implementation (AI) are presented in Table 5.

Table 5
Activities, interview questions, and direct quotations from the students

Title of the Activity	Semi-structured interview questions	Before Implementation	After Implementation
What happened to the rocks?	How is soil formed?	I think the soil has always been there. (Mehmet)	Rain falls on the rocks, the wind comes, it breaks up, then it becomes soil. (Mehmet)
What's in the soil?	What is between the sand particles and Stones?	Nothing. (Ayşe)	Air. (Ayşe)
Pictures of soil	Do you think there are different soil types?	I don't know, I didn't see. (Ömer)	Red, brownish, stony, sand on the beach. And there is humus soil. (Ömer)
My pot is made from soil	For what purpose can soil be used?	We'll build a house. (Gül)	We build houses, animals can live underneath it, and forests and trees grow. We make goods and we plant flowers. (Gül)
From seed to seedling	What is required for plants to survive?	Water. (Fatma)	Water, sun, heat, but we plant it in the ground because that's where trees grow. (Fatma)
May my peppers grow	Are plants and their roots beneficial to the soil?	I don't know. (Ahmet)	Yes, as it transforms it into humus soil. (Ahmet)
I am cleaning the soil	How do we protect the soil?	Not throwing our rubbish on the floor. (Zeynep)	Recycling batteries and plastic bags, planting trees, putting rubbish in the bin. (Zeynep)

Findings relating to the second research question

Figure 4 presents the data regarding students' views on each of the activities on the Student Opinion Form, and Figure 5 presents the findings obtained from the semi-structured interviews and Activity Evaluation forms.

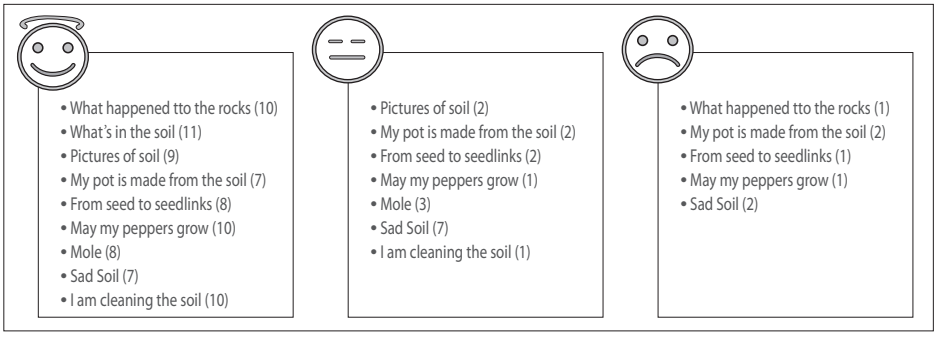

Figure 4. Students' views on each of the activities

Which activity they liked most	How they felt after the activity	What they have learnt	What they didn't like about the activity	If they were the teacher, they would ...
•May my peppers grow (4) •I am cleaning the soil (4) •What's in the soil (1) •What happened to the rocks (1) •Mole (1)	•Happy/Excited (5) •Good (3) •Curious (4) •Felt like they have learnt something new (4)	•How to plant seedlings/pepper (5) •Keeping the soil clean (5) •How the soil is formed (7) •Animals that live underground (3) •Different types of soil (4)	•Clay (it was sticky) (3) •Drama was too short •Felt a bit tired with the cut/paste exercise. •There were few pictures •The role in the drama	•plant flowers as well as peppers (2) •plan more games (2) •repeat the experiment •ask more riddles •do the same (10) •prepare songs (1)
•Just learnt that the earth is made of rocks, the game was also fun, I felt happy. [Gül] •Playing with clay was fun for me. I wish we could play a little more. [Leyla]	•I don't want the soil to be ruined; I want to keep it clean. [İsmet] •I will ask my mother to plant them at home, too. [Gül] •Wow, we have seedlings! [Ömer]	•I didn't know moles lived underground. They looked very cute. [Zeynep] •I've never seen red soil, I wish it was in our garden. [Mehmet] •If the soil gets dirty, the flowers may die. I want to protect the soil; so then the flowers won't die. [Fatma]	•I was a bit tired with the cut/paste exercise. (Ayşe) •I didn't like the clay. It was sticky. (Ali)	•If I were you, I would have made us plant two or three seedlings. [Leyla] •When I poured water into the glass, a bubble appeared, and then the height of the soil changed. If I were you, I would do this activity, too. [Mustafa] •If I were you, I would have more games. (Ahmet)

Figure 5. Student views on the whole process

As can be seen, the students mostly liked the activities and found them enjoyable or useful. It was observed that none of the students disliked the activities 'What's in the soil', 'May my peppers grow', 'Mole', and 'I am cleaning the soil', which were notably hands-on activities. When the reasons given by the students who expressed negative opinions about the activities are examined, it can be seen that the student who reportedly did not like the 'What happened to the rocks' activity did not like his role in the drama; the students who did not like the 'My pot is made from soil' activity, did not want to get their hands dirty. Furthermore, the student who did not like the 'From seed to seedling' activity became bored during the post-painting activity (storytelling). Similarly, the students who reportedly did not like the 'Sad soil' activity had not found the story to be of much interest to them. The activities that the students liked the most were 'May my peppers grow', 'I'm cleaning the soil', 'Mole', 'What's in the soil', and 'What happened to the rocks'. With reference to how the students felt following the activities – they provided positive responses such as their being happy, good, and excited. However, if more riddles and music were included, it could have been perceived by the students as being a more attractive and enjoyable process. The results of the semi-structured interviews conducted with parents following the exhibition are presented in Figure 6.

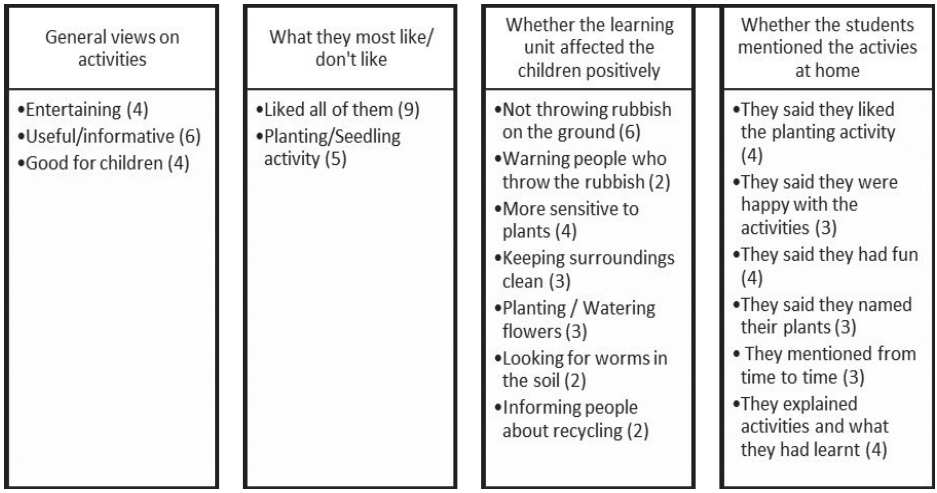

Figure 6. Results of exhibition SSIQ

Considering the answers given by the parents, it can be seen that the students transferred what they had learnt in the lesson to their life outside of school. The activities were seen not only as tasks to be performed in the lesson but also as learning outcomes in their daily lives. The students warned not only their friends about environmental pollution but also others around them and were especially careful about recycling.

Discussion and conclusion

When the findings of the current study were evaluated in terms of the first research question, the students were seen to have developed an awareness of soil. In terms of the study's pre-activities, the students were unable to associate the plants and animals, the usage areas of the soil, and the visuals about soil conservation. However, from the post-activity results, a positive difference was noted in the students' ability to understand the structure of the soil, the areas of its usage in daily life, and the relationship between the soil and the tools that are used with the soil. For example, in the final mind map, the students added the word' rock' with regard to how soil is formed. When these findings were evaluated in terms of the study's second research question, in the responses obtained from the SSIQ forms, it was seen that the students mostly evaluated the activities positively. In addition, the students stated wanting to undertake similar studies in their other courses, too. Also, the fact that the students had been informing their parents about the activities led to the conclusion that having multiple learning areas brought together was effective in raising the students' EA and in teaching them to take on responsibility.

The first strength of the current study may be said to relate to the quality of education, given that the research was conducted through indirect rather than direct learning methods within the natural environment. With the drama method used in the 'What

happened to the rocks' activity, the students were able to understand that soil was formed because of rock erosion based on the effects of different natural events. This result aligns with Tanrıverdi's (2012) and Drown and Christensen's (2014) studies that posited how drama studies could be used as a tool to contribute to the conceptual development of preschool-aged children. Additionally, Donohoe and O'Sullivan (2015) shared a view that through roleplay, children can attain empathic reasoning, i.e., they can think about how it might feel to be someone or something else. As a result of art-based pedagogies such as drawing and painting, collage work, and creating a model (e.g., making a mole out of clay), the students were able to learn about the colour and texture of the soil. It was noted that the students were able to compare different types of soil in terms of their characteristics, list the areas of use of soil for living things (e.g., for making tools or for shelter), and distinguish the creatures that use soil as a living space, either above or beneath the ground. This result complies with the views of Tarr (2008), who stated that through the creation of art, children could represent and interpret their own experiences regarding the environment, and with Swartz's (2005) view that, through building and moulding, children can interpret and construct their own sense of place in their environment.

Through the experimental and observational activities applied in the 'What is in the soil' and 'May my peppers grow' activities, the students were able to realise that soil has a granular structure, that there is air between the particles, that soil consists of various substances, the importance of soil to maintain the vitality of plants, and that plants are necessary to maintain the soil's richness. Considering observation together with experiment-based activities, the results of the current research can be considered in line with the view of Gülay and Öznacar (2010), who posited that scientific techniques such as experimentation and observation, in which natural phenomena can be repeated, can be used to develop the EA of children. With the storytelling method used in the 'From seed to seedling' and 'Sad soil' activities, it was observed that the students developed awareness about the importance of soil protection (in terms of it being the habitat of living things, as a food source for some living things, and shelter, etc.) and the elements that can pollute the soil. This result is seen as being in line with the views of Hadzigeorgiou and Judson (2017), Hughes (2013), and Tooth and Renshaw (2009), given that the use of stories related to the environment can be an effective means of promoting young learners' positive attitudes and values towards the environment. When the methods used in the current study are evaluated in general, it may be said that indirect methods such as drama and roleplay, art and model building, storytelling, and observation and experimentation may be considered effective methods to improve the EA of preschool students, and especially when direct methods are not otherwise possible.

Another strength of the current study relating to the quality of education is that only indoor activities were covered. In their systematic literature review of 66 studies published between 1995 and 2018 that involved preschool EE, Ardoin and Bowers

(2020) found that the majority (n = 54, 83%) of the studies were conducted in natural environments. Also, in a similar project to the current research on soil education aimed at preschool students, Gülay Ogelman (2012) mostly conducted activities in an outdoor setting. The current research showed that the EA of young learners could also be improved through solely indoor-based activities. Accordingly, in educational institutions that have an inadequate physical environment to facilitate outdoor-based activities with preschool students, preschool teachers can consider utilising easily accessible low-cost tools such as soil, seeds and seedlings, and glass jars to offer indoor-based experiments, as well as employing indirect teaching methods such as storytelling, art, drama, and experimentation.

At this juncture, the most important points that practitioners should be aware of are the research theme and the applied research model. The subject of soil was determined in the current study after a month-long observation period and three separate activities aimed at determining the interests and needs of the participant students. The authors, therefore, recommend that preschool teachers and researchers who seek to design instruction targeting the EA development of young students specifically determine their environmental subject of study according to the interests and needs of the target students. Additionally, they should select activity-based models that will enable their students to be actively involved during all stages of the process. In the current study, the activities were tailored to the students' needs and interests to purposefully involve them through active participation in a way that led them to achieve the determined learning outcomes. Thus, the importance of learning is emphasised in conjunction with planned activities, as opposed to students remaining only passively involved or where inappropriate learning methods and techniques are employed.

The third strength of the current study comes from its integrated instructional design that focuses on classroom implementation within the "normal" school context. In the preparation of the instructional design, cognitive, language, socio-emotional, and motor skills determined by the Turkish Ministry of National Education for 36-72-month-old children were taken into consideration in the development of the current study's learning outcomes, and the determined activities were integrated into different courses. For example, during the final evaluation interviews that were held following the completion of all the activities, the students reported 'May my peppers grow' to be their favourite activity, where they took responsibility for growing a seedling plant, which was considered suitable for the cognitive, motor, and social skills development of the students.

It is thought that the findings of the current study will serve as an example, providing a resource for educators to utilise in designing their own course activities. In this respect, this research presents concrete and detailed lesson designs to preschool teachers who are sensitive to EE but perhaps have reservations about how to facilitate the provision of such instruction, especially where their school's environment does not support outdoor-based activities. It is also thought that this research, having a

substantial design and being based on the key aspects of the practices that need to be considered, will support preschool teachers, specialists, and curriculum developers in planning and organising their own EE curricula. That is primarily due to the fact that the activities practiced in the current study are deemed both applicable and adaptable, having been designed to utilise easily accessible low-cost materials, and thus may be readily applied in schools that face economic or physical limitations.

The final topic to be addressed here is the research method applied in the current study. As Melis, Wold, Bjørgen, and Moe (2020) stated, methodological approaches to research involving young children fall under great scrutiny, so researchers must continue to critically engage in discussions on what it means to engage children as active participants in academic research. The method selected in this study fits into the realm of AR, which was emphasised by Punch (2002), wherein 'reflexivity should be a central part of the research process with children, whereas researchers critically reflect not only on their role and their assumptions but also on the choice of methods and their implementation' (p. 323). According to the data obtained from the researcher's diary, it was seen that, generally, no problems were experienced with the progress of the activities and that any issues were resolved within the relevant activity, thanks to the flexibility of the AR application. The results obtained from the researcher's self-assessment on potential improvements to the applied process may be summarised as reducing the duration of certain activities, excluding some of the subjects (such as pesticides) that are perhaps not considered suitable for the target students' age or life experience, and, where possible, performing a single activity in each course. In addition to improving the research skills of the teacher-researcher, the AR in the current study also led to an improvement in their teaching skills, providing a base of new knowledge and understanding about how to improve educational practices, as well as how to resolve significant problems encountered in the classroom (Mills, 2003; Stringer, 2004). The current study also provided the teacher-researcher with the opportunity to observe the participant students much more closely and thereby observe that certain problems can stem from the way that teaching material is presented rather than from the students themselves. In summary, a greater number of teachers and researchers should be encouraged to engage with AR practices to create opportunities for them to see their professional shortcomings and to gather information about how best to teach young learners.

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Appendix

Appendix 1

Activity Evaluation Form to evaluate learning outcomes

Activity: 'My pot is made from soil'

1. For what purposes can the soil be used?
2. What kinds of items can be made with the soil?
3. What type of soil did we use in the event?
4. Does the clay look like the soil in the garden?

Appendix 2

Activity Evaluation Form to evaluate learning outcomes

Our activity is now completed for today. I would like to hear your opinions so that our activities can be made better for you. I just have a few questions for each of you.

- Did you like the activity?
- How was the activity? How do you think it was?
- How did you feel during the activity?
- What can we do to make the activity better and to help you learn more?
- What things did you not like about the activity?
- Did you tell your family about our activity?

Activity photograph

Activity: 'I am cleaning the soil'

Appendix 3

Excerpt from the Teacher-Researcher's diary

Activity: 'May my peppers grow'

Although the children had seen the soil around them, they were unaware of how the land was used.… At first, they only answered water [in terms of what the plants needed to grow], they were not aware of the role played by heat and sunlight. I think the process was effective as they were personally able to experience the water, sunlight, and temperature factors necessary for the growth of plants.

Razvijanje svijesti o okolišu kod djece predškolske dobi pomoću aktivnosti u zatvorenom prostoru[1]

Sažetak

Cilj je ovoga akcijskoga istraživanja razviti svijest o okolišu kod djece predškolske dobi pomoću aktivnosti u zatvorenom prostoru. Istraživanje je provedeno sa skupinom od jedanaestero djece predškolske dobi nižega socioekonomskog položaja kroz ukupno 23 nastavna sata. Uzimajući u obzir interese i potrebe djece, a sukladno temama iz područja zaštite okoliša koje bi trebale biti uključene u predškolsko obrazovanje, odabrano je „tlo" kao tema istraživanja. Istraživački instrumentarij upotrijebljen u ovome slučaju sastojao se od aktivnosti spajanja karata, umnih mapa, polustrukturiranih intervjua te obrasca za evaluaciju izložbe. Obrada prikupljenih podataka ostvarena je analizom sadržaja. Istraživanje je pokazalo da su djeca razvijala svijest o sastavu tla, vrstama tla, područjima korištenja tla te zagađenju i zaštiti tla, a temeljem toga, djeca su bila u mogućnosti primjenjivati stečena znanja u svakodnevnom životu izvan škole. Ovo istraživanje ima dvije važne implikacije: prvo, pokazano je da se svijest o okolišu može poboljšati putem aktivnosti u zatvorenom prostoru provedenih u školi koja pripada području nižega socioekonomskoga položaja, gdje se prirodni okolišni uvjeti ne smatraju idealnima. Drugo, zahvaljujući tome što je ovo istraživanje provedeno kao akcijsko istraživanje, učitelji imaju priliku povećati vidljivost pitanja povezanih sa sviješću o ekologiji u samoj učionici, čime im se omogućuje rješavanje takvih pitanja.

Ključne riječi: *akcijsko istraživanje; aktivnosti u zatvorenom prostoru; obrazovanje za okoliš; predškolsko obrazovanje; svijest o okolišu.*

Uvod

Biti znanstvenik znači biti naivan. Toliko smo usredotočeni na potragu za

[1] *Ovaj je rad rezultat ponovne analize podataka prikupljenih za potrebe diplomskoga rada prvoga autora koji je pisan pod nadzorom drugoga autora, a sukladan je svrsi istraživanja. Podatci su prikupljeni neposredno prije potpunoga zatvaranja škola diljem Turske zbog pandemije koronavirusa. Istraživanje nije ranije objavljivano.*

> istinom da propuštamo uzeti u obzir koliko nas zapravo malo želi da je pronađemo... Istina ne mari za naše potrebe ili želje – ne mari za naše vlade, naše ideologije, naše religije – u vječnome iščekivanju. Ovo je napokon dar Černobila… Što se dogodilo tamo, što se dogodilo poslije, čak i ono dobro što smo učinili, sve to... sve to, ludilo. (Renck, 2019)

Riječi Valeryja Legasova, protagonista hvaljene HBO-ove serije iz 2019. godine, *Černobil*, mogu se činiti iznenađujućima za neke ljude koji su mislili da je Černobil samo računalni virus. Legasov, ruski nuklearni znanstvenik koji se zatekao u središtu ovoga prepucavanja zapravo je govorio o jednoj od najznačajnijih ekoloških katastrofa ikada, a koja se dogodila 1986. u Černobilu. Te su riječi, međutim, gotovo odgovor na *Tiho proljeće* Rachel Carson, knjigu napisanu 24 godine ranije. Carson u *Tihom proljeću* poziva čovječanstvo na odgovorno i pažljivo ponašanje kao upravitelja životom na Zemlji.

> Sada stojimo na mjestu gdje se dva puta razdvajaju. … Put kojim već dugo idemo varljivo je lagan, glatka autocesta na kojoj napredujemo velikom brzinom, ali na njenom je kraju katastrofa. Drugo račvanje puta – ono kojim se rjeđe putuje – nudi našu posljednju; našu jedinu priliku da stignemo do odredišta koje osigurava očuvanje Zemlje. (Carson, 1962, p. 277)

Razumno je ustvrditi da serije poput *Černobila*, filmovi, crtani filmovi i kampanje ekoloških organizacija značajno doprinose našoj ekološkoj svijesti i našem razumijevanju „drugoga puta kojim se rjeđe ide". Međutim, posebno nakon deklaracije iz Tbilisija 1977., istraživanja su pokazala da se svijest o okolišu može razviti uglavnom putem okvira obrazovanja za okoliš primijenjenoga na svim razinama i svim dobnim skupinama, počevši od obrazovanja u ranom djetinjstvu (Leal Filho, Mifsud i Pace, 2018).

Svijest o okolišu (SO) definira se kao svijest o pitanjima okoliša, osjetljivost na okoliš te aktivnost u zaštiti okoliša (Grodziéska-Jurczak, Stepska, Nieszporek i Bryda, 2006), zatim kao spoznaja o vlastitoj povezanosti s prirodom i razvoj potrebne percepcije za ponašanja u okolišu (Schreuder, van Erp, Toet i Kallen, 2016). Pojedinci s razvijenom sviješću o okolišu imaju deskriptivno i interpretativno gledište prema uzročno-posljedičnim vezama koje se odnose na pitanja okoliša (Jeronen i Kaikkonen, 2002). Prema rezultatima istraživanja Organizacije za ekonomsku suradnju i razvoj (OECD), postoji izravna povezanost između stupnja obrazovanja stečene u školi i svijesti o okolišu (Coertjens, Pauw, Maeyer i Petegem, 2010). Nadalje, Korhonen i Lappalainen (2004) analizirali su čimbenike koji utječu na dječju svijest o okolišu u različitim okolišnim uvjetima te su zaključili da da obrazovanje ima ključnu ulogu u podizanju svijesti o okolišu (SO). Broom (2018) smatra da je SO, koja se počinje oblikovati u predškolskoj dobi, učinkovita u razvoju pozitivnih ponašanja prema okolišu u kasnijoj dobi. Drugim riječima, poštovanje i brigu za prirodni okoliš potrebno je razvijati tijekom prvih nekoliko godina djetetova života jer nije izgledno da se u protivnome takvi stavovi

razvijaju u odrasloj dobi (Evans, Otto i Kaiser, 2018). Zahvaljujući planiranome i sustavnome obrazovanju za okoliš u ranim godinama života (Hahn i Garrett, 2017), što potpomaže dječji tjelesni, emocionalni, društveni, kognitivni i holistički razvoj (Carter, 2016), djeca razvijaju svoju osobnost i stječu praktičani svjetonazor, stvaraju vrijednosti (Green, Kalvaitis i Worster, 2016), i samim time poboljšavaju svoje aktivno učenje (Lekies i Brensinger, 2017).

Istraživanja obrazovanja za okoliš u ranome obrazovanju pokazuju da programi koji se temelje na prirodi daju izravna i prirodom bogata iskustva s nizom ciljeva, uključujući razvoj temeljnoga uvažavanja prirodnoga svijeta na holistički i interdisciplinaran način (Ardoin i Bowers, 2020; Cagle, 2018; Chawla, 2015; Larimore, 2016; Pramling-Samuelsson i Kaga, 2008; Rosa, Profice i Collado, 2018; Sobel, 2015; Wells i Lekies, 2012; Wilson, 2018). Međutim, postavlja se pitanje kako provoditi obrazovanje za okoliš u kontekstu koji ima ograničenja u vidu provedbe aktivnosti na otvorenom kao što je manjak financiranja i administrativne potpore, nedostatak prostora za provedbu aktivnosti i nefleksibilnost kurikula (Behrendt i Franklin, 2014; Jose, Patrick i Moseley, 2017), kao što je slučaj u ovome istraživanju. Osim toga, što se tiče obrazovanja za okoliš u turskome kurikulu za predškolsko obrazovanje, relevantna literatura (Gülay i Ekici, 2010; Özkan i Tuğluk, 2020) pokazuje da su opći ciljevi, ishodi učenja i pokazatelji (uključujući posebne prigode) razvoja obrazovanja za okoliš u kurikulu nedostatni. Postoje i drugi problemi poput neujednačenih povoljnih materijalnih uvjeta u svim školama, individualnih razlika među učenicima, manjkavosti u stručnoj osposobljenosti odgojitelja u predškolskom obrazovanju te njihova nedostatna mogućnost usklađivanja postojećega kurikula s odgojem za okoliš (Türkoğlu, 2019). Stoga je važno da odgojitelji stvaraju situacije za učenje u kojima bi se razvijala svijest o okolišu uzimajući u obzir ograničenja i ne zanemarujući ishode učenja u postojećem kurikulu.

Ciljevi istraživanja i istraživačka očekivanja autora

Povezana literatura (Ardoin i Bowers, 2020; Behrendt i Franklin, 2014; Jose, Patrick i Moseley, 2017) pokazuje da je razvoj obrazovanja za okoliš otežan u zemljama s centraliziranim nastavnim planom i programom, u školama koje nemaju vlastite vrtove ili okolnosti za timski rad te u školama s učenicima iz različitih ili niskih socioekonomskih uvjeta. Stoga je cilj ovoga istraživanja osmisliti i provesti poučavanje koje se temelji na aktivnostima u zatvorenome prostoru kako bi se kod učenika predškolske dobi razvila svijest o tlu te ispitati je li osmišljeni dizajn bio učinkovit. U tu svrhu tražili su se odgovori na sljedeća pitanja.

1. Kako su aktivnosti učenja djelovale na razvoj učeničke svijesti o temi tla?
   - Kako su aktivnosti učenja djelovale na razvoj učeničke svijesti o pojmovima koji se odnose na tlo?
   - Kako su aktivnosti učenja djelovale na razvoj učeničke svijesti o značajkama

tla?
- Kako su aktivnosti učenja djelovale na razvoj učeničke svijesti o važnosti tla?
- Kako su aktivnosti učenja djelovale na razvoj učeničke svijesti o zaštiti tla?

2. Kakva su gledišta učenika o razvijenim aktivnostima učenja?

Na samome početku istraživačka očekivanja autora, temeljena na prethodnim sličnim istraživanjima iste pojave (Cagle, 2018; Chawla, 2015; Hahn i Garrett, 2017; Larimore, 2016), bila su da poučavanje predškolske djece usmjereno na razvoj svijesti o okolišu treba olakšavati shvaćanje *okoliša* kao pojma koji je sastavni dio žive prirode te postići da djeca prihvaćaju sebe kao dio okoliša, a ne kao objekte odvojene od stvarnoga života. Stoga su sve aktivnosti pripremljene uzimajući u obzir živa i neživa bića vezana uz tlo. Cilj istraživanja bio je postaviti ekološki prihvatljiv plan poučavanja s naglaskom na provedbu u učionici unutar uobičajenoga školskoga konteksta, odnosno izraditi propisani središnji nastavni plan i program, školske resurse, raspored sati, rutine itd.

Postupak

Nacrt istraživanja

Za ovo se istraživanje prikladnim smatra model akcijskoga istraživanja (AI) kao jedna od paradigmi kvalitativnoga istraživanja jer se provedba odvija u prirodnome okružju skupine ispitanika, a također je namjera i sam proces prenijeti u istraživanje na realističan i cjelovit način (Johnson, 2011). Budući da je cilj ovoga istraživanja opisati provedbu unutar unaprijed određenoga teorijskoga okvira (McKernan, 1991), radi se o tehničkome akcijskom istraživanju. Usto, budući da se istraživanje odvija u učionici prvoga istraživača, može se klasificirati kao razredno akcijsko istraživanje (Hendericks, 2008). Istraživanje je uključivalo četiri tjedna promatranja, jedan tjedan aktivnosti za određivanje teme odgoja za okoliš, četiri tjedna aktivnosti, završne evaluacijske intervjue, a potom i izložbu nastalih radova. Ciklus provedenoga akcijskoga istraživanja prikazan je na slici 1.

Slika 1.

Prilikom utvrđivanja problema, promatranja su provedena unutar učionice i unutar školskoga vrta u razdoblju od 30 školskih dana tijekom dnevnih rutina ciljne skupine djece kako bi se otkrilo kako je ta skupina definirala prirodni okoliš i u kakvoj su interakciji s okolišem. Pritom je bilo vidljivo da učenici oštećuju biljke, drveće i grmlje u blizini. Iz razgovora s djecom, istraživač je zaključio da je to donekle povezano s prirodnim okružjem koje učenici ne vide kao živo. Pretpostavka istraživača u tome je trenutku bila da bi djeca bila osjetljivija na svoj okoliš kada bi prepoznala elemente prirodnoga okoliša te odnos čovjeka i okoliša. Zaključeno je da bi odgoj za okoliš, pripremljen u skladu s ovom osnovnom pretpostavkom, za cilj mogao imati razlikovanje živih elemenata od neživih elemenata unutar djetetove okoline te stjecanje osjećaja odgovornosti prema svim elementima u svojoj okolini.

U određivanju statusa teme zaključeno je da cilj odgoja za okoliš u ranome djetinjstvu

treba biti razvijanje svijesti o okolišu prema klasifikaciji koju su iznijeli Braus i Wood (1994/1993), a koja se temeljila na ciljevima odgoja za okoliš navedenima na konferenciji u Tbilisiju. Za fokus učenja odabrano je isprepleteno obrazovanje zbog centralizirane prirode obrazovanja u Turskoj i interdisciplinarne prirode odgoja za okoliš. Dakle, provedba se odvija unutar „normalnoga" školskoga konteksta. U određivanju teme istraživanja navedene su teme kojima se treba baviti u ranome djetinjstvu: biljke, životinje, zrak, voda, tlo, recikliranje i izvori energije (Gülay i Önder, 2011). Provedene su tri aktivnosti kako bi se vidjelo koji ekološki problem kod učenika potiče najviše interesa. U aktivnosti „Stvaranje interesnih centara", centri za tlo, vodu, zrak i recikliranje uspostavljeni su u učionici, a materijali povezani s konceptom postavljeni su u svaki centar (zemlja, kamenje, povećalo itd.) kako bi se otkrilo gdje učenici provode najviše vremena. U drugoj je aktivnosti uz pomoć lutaka naglas pročitana priča naslovljena *Ayšino putovanje*, a učenici su prema vlastitom nahođenju trebali nacrtati jedan od četiri elemenata spomenutih u priči. U sljedećoj aktivnosti, različiti vizualni elementi prikazani su na ploči tako da ih svi učenici mogu vidjeti. Po isteku jedne minute, nakon što je učenicima dopušteno vidjeti sve slike, one su povučene, a svaki je učenik upitan „Koja je fotografija/slika prva privukla tvoju pozornost? Zašto?". Nakon analize rezultata promatranja i triju aktivnosti, odlučeno je da će tema ovoga istraživanja biti tlo. Na temelju postojeće literature i prirode teme proučavanja, svijest o okolišu proučava se s naglaskom na sljedeće: (1) pojmove povezane s tlom, (2) strukturu i svojstva tla, (3) bića koja žive ispod/u ili iznad tla, (4) važnost tla za sva živa bića i (5) zaštitu tla.

Sljedeća faza započela je određivanjem ciljeva učenja i načina uključivanja aktivnosti u postojeće dnevne i tjedne rutine. Pri određivanju ishoda učenja i aktivnosti nastavne jedinice uzete su u obzir početne umne mape učenika, kao i područja kognitivnoga, tjelesnoga, socio-emocionalnoga i jezičnoga razvoja navedena u predškolskom kurikulu, zajedno s njihovom relacijskom dosljednošću, potencijalom za poticanje učenika te jednostavnošću provedbe i vidljivom razinom zanimanja pobuđenoga kod učenika. Nakon planiranja, određeni su dani i termini u kojima će se aktivnosti provoditi, pazeći pritom na usklađenost s nastavnim planom i programom te da se bespotrebno ne ometaju ostali rutinski zadatci navedeni u nastavnom planu i programu. Zbog nedostatka prikladnoga prostora u školskome vrtu, neizravne prilike za učenje i razvoj svijesti o okolišu, kao što su drama (Chen i Martin, 2015; Donohoe i O'Sullivan, 2015), eksperiment i promatranje (Gülay i Öznacar, 2010; Önkol, Zembat i Balat, 2011), pripovijedanje (Hadzigeorgiou i Judson, 2017; Hughes, 2013; Tooth i Renshaw, 2009; Wattchow, Burke i Cutter-Mackenzie, 2008) i pedagogije temeljene na likovnoj umjetnosti (Staples, Larson, Worsley, Green i Carroll, 2019; Tarr, 2008) osmišljene su za održavanje unutar učionice. Na početku svake aktivnosti provedene su uvodne etape kao što su lutkarske igre, videodemonstracije, vizualni materijali, pjesmice za djecu itd. kako bi se učenici pripremili za nastavu. Aktivnosti, razvojna područja, naziv predmeta, ishodi učenja i metode rada za planirane aktivnosti prikazani su u Tablici 1.

Tablica 1
Aktivnosti, metode, razvojna područja, naziv nastavnoga predmeta i ishodi učenja

Aktivnost	Metoda / Razvojno područje	Nastavni predmet Ishodi učenja
Što se dogodilo kamenju? Učenici u ulozi stijene drže se za ruke i formiraju krug. Učenici u ulogama vjetra, vrućega zraka, hladnoga vremena, kiše i snijega improviziraju oko učenika koji su formirali stijenu. Učenici u ulozi stijene udaljavaju se jedni od drugih i odmiču u različite dijelove učionice.	**Drama** Motoričko /društveno/ kognitivno	**Turski jezik** 14. Učenici razumiju da tlo nastaje fragmentacijom i mrvljenjem stijena, što je učinak prirodnih događaja.
Što je u tlu? Zrnata struktura tla ispituje se pomoću povećala. U staklenku se stavi zemlja i obilježava se njezina visina. Dodavanjem vode u staklenku uočavaju se mjehurići te se obilježava visina zemlje.	**Eksperiment-promatranje** Kognitivno	**Priroda i društvo** 15. Učenici uočavaju da tlo ima zrnastu strukturu. 16. Učenici otkrivaju da je zrak zarobljen između čestica tla i raznih tvari koje čine tlo.
Slike tla Slike različitih vrsta tla zajedno sa škarama i ljepilom dijele se učenicima koji potom izrađuju kolaž režući slike kako im odgovara.	**Likovna kultura*** Kognitivno / motoričko	**Likovna kultura** 17. Učenici uspoređuju različite vrste tla u smislu značajki poput bolje I teksture.
Moj je lonac izrađen od zemlje Učenicima se pokazuje glina. Nakon što je prouče, svaki učenik dobiva malo gline za izradu oblika koje želi.	**Likovna kultura** Kognitivno / motoričko	**Likovna kultura** 18. Učenici znaju navesti područja uporabe tla za živa bića (izrada alata, skloništa i sl.).
Od sjemena do sadnice Nakon čitanja priče „Ja sam mala sjemenka", razgovara se o elementima nužnima za rast biljaka. Nastaju slike koje obuhvaćaju elemente potrebne za rast biljaka.	**Pripovijedanje/Likovna kultura** Kognitivno / jezično	**Turski jezik** 19. Učenici mogu objasniti da je tlo neophodno za preživljavanje biljaka.
Neka moje paprike rastu Učenicima se dijele posude i sadnice paprike. Određuju se pravilni razmaci sadnje i pripadajuće dubine sadnje te se daju odgovarajuće upute.	**Eksperiment-promatranje** Kognitivno / afektivno	**Priroda i društvo** 20. Učenici mogu objasniti da je tlo neophodno za preživljavanje biljaka. 21. Učenici mogu objasniti da su biljke neophodne za bogatstvo strukture tla.

Aktivnost	Metoda / Razvojno područje	Nastavni predmet Ishodi učenja
Krtica Krtica se izrađuje od odgovarajućih materijala i prema zadanim uputama.	**Likovna kultura** Kognitivno / motoričko	**Likovna kultura** 22. Učenici prepoznaju živa bića iznad ili ispod tla.
Tužno tlo Nakon čitanja priče o onečišćenju tla „Tužno tlo", učenicima se postavljaju pitanja o pojmovima iz priče (smeće ostavljeno na tlu, otpadne baterije itd.).	**Pripovijedanje** Jezično / kognitivno	**Turski jezik** 23. Učenici mogu objasniti važnost zaštite tla (kao životnoga prostora, izvora hrane, skloništa itd.). 24. Učenici znaju objasniti kako dolazi do onečišćenja tla.
Čistim tlo Učenici se okupljaju oko velikoga komada smeđega kartona koji predstavlja tlo. Na kartonu su razbacane magnetizirane kartice koje predstavljaju zagađivače i elemente koji ne zagađuju. Učenici čiste tlo tako što štapićem u obliku štapa za pecanje uklanjaju kartice koje mogu uzrokovati onečišćenje tla i stavljaju ih u posude.	**Igra** Kognitivno / motoričko / društveno	**Igra** 25. Učenici razlikuju zagađivače i nezagađivače. 26. Učenici mogu objasniti što je potrebno učiniti za zaštitu tla.

***** Svi radovi dovršeni na satu Likovne kulture bili su izloženi u učionici kako bi ih svi mogli vidjeti.

Sudionici

Istraživači

Prvi istraživač, koji je preuzeo i ulogu učitelja-istraživača (*insider*), imao je ukupno 6 godina radnoga iskustva te je radio kao odgojitelj u školi u kojoj je istraživanje provedeno. Osim toga, prvi je istraživač aktivno sudjelovao u dizajnu, provedbi i procesima evaluacije ovoga akcijskoga istraživanja (AI). Drugi se istraživač bavio proučavanjem odgoja za okoliš prije ovoga istraživanja i imao je ukupno 18 godina iskustva u području kurikula i nastave. Radeći u ulozi kritičkoga prijatelja (*outsider*) (Stenhouse, 1975), drugi je istraživač pomagao u provedbi akcijskoga istraživanja prvome, učitelju-istraživaču. Dok je insajder provodio akcijsko istraživanje prvoga reda usmjeravajući se na poboljšanje poučavanja u učionici (kontekst poučavanja), autsajder je preuzeo proaktivnu ulogu u promicanju sposobnosti učenja učitelja-istraživača u reflektivnom ispitivanju (Elliott, 1985).

Proučavana skupina

U istraživanju je sudjelovalo ukupno 11 učenika u dobi od 48 do 66 mjeseci. Moguće je ustvrditi da je u njihovoj učionici među učenicima vladalo pozitivno komunikacijsko

ozračje. Tijekom analize podataka, svaki je učenik kodiran pseudonimom koji je po značenju bio blizak njihovom imenu.

Roditelji

Očevi učenika koji su sudjelovali bili su radnici s nižom ili višom srednjom školom, a majke su bile domaćice pretežno s osnovnoškolskim obrazovanjem. Socioekonomski položaj obitelji smatran je niskim. Obitelji su bile uključene u izložbenu fazu istraživanja i pridonijele su otkrivanju jesu li aktivnosti koje su se provodile unutar učionice također bile učinkovite u životima učenika izvan škole.

Istraživačko okružje

Predškolska ustanova sastojala se od dva razreda, svaki s 11 učenika. Predškolske učionice ocijenjene su dovoljno velikima, uključivale su razne predmete i igračke razmještene po centrima za učenje. U pojedinoj učionici bilo je dovoljno materijala potrebnih za pripremne obrazovne aktivnosti iz matematike, čitanja i pisanja, no nije bilo dovoljno materijala za ekološke aktivnosti. Školski vrt pretežno je bio betoniran, s otprilike 10 % ukupne površine otvorenoga tla. Po cijelom školskom vrtu bio je postavljen ograničen broj kanti za smeće, ali ne i kanti za recikliranje. U školskome vrtu nije bilo sadržaja za igru poput otvorenoga ili poluotvorenoga igrališta s ljuljačkama, toboganima, pijeskom ili bazenima za vodu.

Instrumenti

Instrumenti za prikupljanje podataka u ovome istraživanju bile su aktivnosti prije i poslije provedbe, Obrazac za procjenu aktivnosti, Obrazac za polustrukturirani intervju i Obrazac za izlaganje. Dnevnici istraživača (vidi Dodatak 3) korišteni su za interpretaciju rezultata, uz praćenje poteškoća i pozitivnih strana istraživanja, no oni nisu bili uključeni u stvarno kodiranje.

Aktivnosti prije i nakon

Dvije aktivnosti osmišljene su kako bi se utvrdio razvojni tijek učeničke svijesti o okolišu u odnosu na temu tla. U aktivnosti spajanja kartica, koja je provedena kao individualna aktivnost, prikazano je 15 slika povezanih s tlom (npr. različite vrste tla, predmeti napravljeni od zemlje, biljke koje rastu u tlu itd.) i 15 nepovezanih slika (npr. smeđi predmeti , smeđe igračke), a učenici su zatim imali zadatak zalijepiti relevantne slike na prazan radni list (vidi slike 2a i 2b). U aktivnosti izrade umne mape, koja je provedena kao aktivnost za veliku skupinu, od učenika se tražilo da u jednoj riječi navedu što su prvo pomislili, što su znali te što su željeli naučiti o tlu. Dok su izrađivali svoje umne mape prije i nakon provedbe, učitelj-istraživač ispisivao je odgovore učenika na veliki komad kartona (vidi slike 3a i 3b).

Obrazac za evaluaciju aktivnosti

Obrazac za evaluaciju aktivnosti (vidi Prilog 2) pripremljen je kako bi se utvrdilo jesu li ishodi učenja ispunjeni, s pitanjima koja su određena za svaku aktivnost i postavljena

učenicima, a njihovi su odgovori potom zabilježeni. Za utvrđivanje stavova učenika o svakoj aktivnosti korišten je Obrazac za mišljenje učenika. Na obrascu su prikazana tri simbola tipa *emoji* zbog učeničke razine pismenosti. Prije provedbe akcijskoga plana učenicima su pokazana tri simbola, a učitelj-istraživač nastojao je postići značenjsku usuglašenost objašnjavajući što pojedini simbol znači. To je pomoglo osigurati da će učenici označiti smješka na mjestu gdje im se neka aktivnost svidjela, neodlučno lice za aktivnost tijekom koje su se osjećali ili nesigurno ili samo umjereno sretno te tužno lice kada im se aktivnost nije svidjela.

Obrazac za polustrukturirani intervju

S ciljem cjelovita razumijevanja pojma „tla", intervjui su održani sa svakim učenikom kako bi se otkrili relevantni podatci do kojih se ne bi moglo doći promatranjem ili nekim drugim načinom (Stake, 1995). Svaki intervju bio je intersubjektivni proces između učenika i nastavnika-istraživača (Kvale i Brinkmann, 2009) i pružio je značajne detaljne podatke o učeničkim percepcijama aktivnosti (vidi Prilog 1). Pitanja koja sadrži obrazac za polustrukturirani intervju pripremili su istraživači na temelju srodne literature. Obrazac su kasnije provjerila dva akademika iz područja Programa i nastave, jedan akademik iz polja Vrednovanje i ocjenjivanje nastave te jedan akademik iz područja Predškolskoga odgoja. Polustrukturirani obrazac intervjua zatim je testiran na skupini učenika predškolske dobi iz drugoga predškolskog razreda kao pokusni obrazac.

Obrazac za izlaganje

Po završetku svih aktivnosti, roditelji koji su sudjelovali u izložbi zamoljeni su za mišljenje o aktivnostima i kakvim su promjenama svjedočili u životima svoje djece izvan školskoga okružja. Rezultati dobiveni u ovoj fazi poslužili su kao nadopuna učeničkih odgovora.

Obrada podataka

Analiza sadržaja, jedna od kvalitativnih metoda analize podataka, primijenjena s ciljem ispitivanja prikupljenih podataka i osiguravanja točnosti i realnosti analitičkoga procesa (Johnson, 2011). Prikupljene podatke pažljivo su provjerili istraživači, a šifre su dodijeljene prema glavnim kategorijama i potkategorijama te su potom asimilirane s popisa kategorija u teme. Prilikom analize odgovora dobivenih iz polustrukturiranih intervjua primijenjena je analiza sadržaja temeljena na učestalosti, pri čemu su rezultati dobiveni iz učestalosti prikupljanja podataka, tj. koliko često su se ponavljali identificirani elementi (Creswell, 2014). Evaluacija aktivnosti analizirana je s obzirom na ishode pomoću unaprijed izrađenih kontrolnih popisa, a mišljenja učenika analizirana su prema simbolima koji su naznačeni za svaku aktivnost.

Pouzdanost

Pojam pouzdanosti u kvalitativnom istraživanju oslanja se na četiri opća kriterija, kako navode Lincoln i Guba (1985): vjerodostojnost, prenosivost, pouzdanost i

potvrdljivost. Tablica 2, koju su izradili istraživači temeljem pregleda literature (Bogdan i Biklen, 2007; Creswell i Miller, 2000; Kornbluh, 2015; Korstjens i Moser, 2018; Lincoln i Guba, 1985; Merriam, 2009; Stahl i King, 2020), prikazuje kriterij kvalitete i njegov opis, strategije za postizanje toga kriterija i odredbe koje su istraživači donijeli u ovome istraživanju.

Tablica 2
Kriterij i opis kvalitete, strategije za osiguranje kriterija i istraživačke mjere

Kriterij kvalitete i njegov opis	Strategije primijenjene za postizanje kriterija	Mjere istraživača u ovome istraživanju
Vjerodostojnost Pokazatelj podudarnosti rezultata	Provedba odgovarajućih, dobro poznatih istraživačkih metoda	Akcijsko istraživanje; istraživačka metodologija koja traži transformativnu promjenu kroz simultani proces djelovanja i istraživanja, što je međusobno povezano kritičkim promišljanjem.
	Dugotrajni angažman	Istraživanje je trajalo 9 tjedana
	Davanje sažetoga opisa sudionika	(vidi: Sudionici)
	triangulacija	Triangulacija istraživač/koder – podatke analiziraju dva neovisna kodera. Formula pouzdanosti kodera (Miles i Huberman, 1994) izračunato kao P = Na / (Na + Nd). Dobivena pouzdanost kodiranja iznosi ,92 za umne mape, ,96 za slaganje kartica, ,92 za intervjue, ,96 za obrazac za procjenu aktivnosti i ,94 za obrazac za izlaganje. Triangulacija instrumenta (vidi: Instrumenti za prikupljanje podataka)
	Osiguravanje čestitosti izvjestitelja	Istraživanje je usmjereno na provedbu u učionici unutar redovnoga školskog konteksta.
	Detaljan opis konteksta istraživača	Priloženi biografski podatci istraživača.
	Detaljan opis proučavanoga fenomena	Detaljan opis ekološkoga odgoja i ekološke svijesti (vidi: Uvod)
	Pregled prethodnih istraživanja kako bi se uklopili rezultati	Detaljno opisana prethodna istraživanja (vidi: Uvod) Rezultati prikazani u odnosu na ranija istraživanja (vidi: Rasprava)
Prenosivost / Pouzdanost Pokazatelj primjenjivosti rezultata u drugim kontekstima	Davanje opsežnih informacija o svim aspektima istraživanja	Proučavani fenomen, sudionici, lokacija, instrumenti, obrada podataka i pouzdanost detaljno su opisani kako bi se omogućile usporedbe.

Kriterij kvalitete i njegov opis	Strategije primijenjene za postizanje kriterija	Mjere istraživača u ovome istraživanju
	Prihvaćanje uvjerenja i pretpostavki istraživača	Izvještava se o uvjerenjima i pretpostavkama istraživača (vidi: Ciljevi istraživanja)
	Refleksivnost	Održava se refleksivni dnevnik (vidi: Prilog 3)
	Provjera istraživačevih mišljenja	Uključeni su ogledni uzorci (vidi: Rezultati istraživanja)

Rezultati istraživanja

Rezultati koji se odnose na prvo istraživačko pitanje

Pojmovi vezani uz tlo

Tablica 3 prikazuje pojedinosti o vizualnim elementima koje su učenici točno identificirali o pojmu tla prije (BA) i nakon aktivnosti (AA) povezivanja kartica. Odabrani vizualni prikazi koji se odnose na tlo označeni su kao Ispravan prikaz (RV), dok su oni koji nisu povezani s tlom označeni kao Pogrešni prikaz (WV).

Tablica 3

Kada se promotri Tablica 3, vidljivo je da su učenici poboljšali svoju sposobnost razlikovanja vizualnih elemenata povezanih s tlom. Broj sličica koje su ispravno odabrali, od ponuđenih 30, povećao se nakon provedbe aktivnosti. Aktivnost spajanja kartica za učenika kodnoga imena Ali prikazana je na Slici 2.

Slika 2a.

Slika 2b

Ali je prije provedbe odabrao deset sličica povezanih s tlom od ponuđenih 30. Dok je osam od odabranih vizuala (tri slike koje prikazuj vrste tla, poljoprivrednik, lopata, pješčani sat, biljka i krtica) ispravno odabrano, dvije od odabranih sličica (sladoled i dijete) nisu bila povezana s tlom. Ali je nakon provedbe odabrao 15 od 30 sličica i zalijepio ih na stranicu. Ispravno je odabrao 14 sličica (farmer, lopata, pješčani sat, tegla za cvijeće, krtica, onečišćenje tla, stablo, korijenje biljke, kamen, životinja koja živi u/na tlu i tri sličice za tri vrste tla). Početna i završna umna mapa izrađena sukladno odgovorima ispitanika na pitanje „Što vam prvo padne na pamet kad kažem tlo?" prikazane su na Slici 3, dok je analiza temeljena na umnim mapama prikazana u Tablici 4.

Slika 3a

Slika 3b

Tabica 4

Analiza aktivnosti s umnim mapama

Teme/ Kategorije	Učestalost PA	Učestalost NA
Životinje koje žive u/na tlu		
Crv	3	5
Mrav	1	4
Krtica	-	6
Zmija	-	3
Struktura tla		
Stijena	-	5
Blato	1	-
Kamen	1	3
Glina	-	5
Zaštita tla		
Čišćenje tla	-	4
Skupljanje smeća	-	5
Stvari koje rastu u tlu		
Stablo	1	4
Trava	2	2
Cvijet	2	4
Sadnica	-	5
Ukupno	11	55

Ukupno je 11 odgovora prikazano na umnoj mapi prije provedbe aktivnosti te su imenovane tri kategorije: Životinje koje žive u/na tlu, Struktura tla i Što raste u tlu. Kao što je vidljivo iz prikaza, nova kategorija pod nazivom Zaštita tla pojavila se na umnoj mapi izrađenoj nakon provedbe. „Krtica", „kamen", „zmija", „glina" i „sadnica" nisu prepoznati prije aktivnosti. Dok je prije provedbe najčešći odgovor bio „crv", nakon provedbe to su bili „čišćenje tla", „skupljanje smeća", „kamenje", „krtica", „crv" i „sadnica".

Struktura i svojstva tla

Prije same provedbe samo je troje učenika odgovorilo na pitanje kako nastaje tlo, no sva su tri odgovora bila netočna. Međutim, svi su učenici nakon provedbe izjavili da tlo nastaje zbog usitnjavanje i mrvljenja stijena zbog raznih prirodnih pojava. Iako nitko od učenika prije provedbe nije mogao ustvrditi da je tlo zrnato, gotovo su svi učenici izjavili da tlo ima zrnatu strukturu i da se između granula nalazi zrak. Prije provedbe svi su učenici izjavili da ne znaju za različite vrste tla, no nakon provedbe razgovarali su o vrstama tla, pa čak i o različitim lokacijama tla (npr. na plaži ili u vrtu). Dok su prije provedbe aktivnosti učenici davali samo kratke odgovore (npr. šetamo, igramo se) na pitanje u koje svrhe se koristi tlo, nakon provedbe više je učenika navelo da se tlo koristi u različitim područjima te da je tlo stanište za različita živa bića.

Važnost tla

Učenici prije provedbe kao elemente neophodne za život biljaka naveli vodu i sunce, no nakon provedbe dodana je i toplina, a odgovori učenika bili su detaljniji. Učenici

prije provedbe nisu znali odgovoriti na pitanje djeluju li biljke na strukturu tla ili ne. Međutim, nakon provedbe svi su učenici, osim dvoje, izjavili da tlo ima zdraviju i čvršću strukturu s korijenom biljaka. Što se tiče životinja koje koriste tlo kao svoje stanište, broj živih bića spomenutih u ispitivanju prije aktivnosti povećao se nakon provedbe, a životinjama koje su učenici imenovali prije provedbe dodane su zmije i krtice.

Očuvanje tla

Nakon provedbe došlo je do poboljšanja u kvantiteti i kvaliteti učeničkih odgovora. Dok su učenici prije same provedbe na pitanje „Zašto trebamo čuvati tlo?" dali samo kratke odgovore kao što su „prlja se" ili „razbolimo se", nakon provedbe, 11 učenika uspjelo je dati jasne odgovore poput *preživljavanja biljaka*, *života životinja* i *zaštite od mikroba*. Bilo je vidljivo da su učenici spoznali da nisu samo oni, već da su i sva živa bića u prirodi pogođena onečišćenjem te su se kao takvi zamjetno počeli odnositi prema prirodi kao cjelini. Dok su učenici prije provedbe većinom imenovali čimbenike koji zagađuju samo kao „smeće" ili „bačeno u smeće", nakon aktivnosti učenici su proširili koncept smeća detaljnije opisujući onečišćivače, uključujući plinove, pa čak i pesticide. Prije provedbe učenici su davali samo ograničene odgovore o radnjama koje bi pomogle očuvati tlo čistim (tj. nebacanje smeća), no detaljno su opisivali kako ga održavati čistim. U tome trenutku, najupečatljivije otkriće bilo je da su svi učenici navodili postupke recikliranja. Osim toga, troje učenika navelo je potrebu sadnje drveća, a važno je istaknuti da se o tome govorilo kao o preventivnoj mjeri, a ne kao o koraku koji je potrebno poduzeti nakon što nastane šteta na tlu. Nazivi nekih aktivnosti, primjeri pitanja iz polustrukturiranih intervjua pripremljenih za aktivnosti te primjeri odgovora prije (BI) i nakon provedbe (AI) prikazani su u Tablici 5.

Tablica 5

Na Slici 4 prikazani su podatci o stavovima učenika o svakoj od aktivnosti na Obrascu za mišljenje učenika, a na Slici 5 prikazani su rezultati dobiveni iz polustrukturiranih intervjua i Obrazaca za ocjenu aktivnosti.

Slika 4.

Slika 5

Kao što je vidljivo, učenicima su se aktivnosti većinom svidjele i smatrali su ih ugodnima ili korisnima. Vidljivo je i da nije bilo učenika kojima se nisu svidjele aktivnosti „Što je u tlu", „Neka moje paprike rastu", „Krtica" i „Čistim tlo" koje su bile izrazito praktične aktivnosti. Kada se promotre razlozi učenika koji su izrazili negativna mišljenja o aktivnostima, vidljivo je da se učeniku kojemu se nije svidjela aktivnost „Što se dogodilo kamenju" zapravo nije svidjela njegova uloga u drami, a učenici kojima se nije svidjela aktivnost „Moj je lonac od zemlje" nisu željeli zaprljati ruke. Nadalje, učeniku kojemu se nije svidjela aktivnost „Od sjemena do sadnice" postalo je dosadno tijekom aktivnosti nakon slikanja (pričanja), a učenici kojima se nije svidjela aktivnost „Tužno tlo" navode kako ih nije odviše zanimala priča vezana uz aktivnost.

Aktivnosti koje su se učenicima najviše svidjele su „Neka moje paprike rastu", „Čistim tlo", „Krtica", „Što je u zemlji" i „Što se dogodilo s kamenjem". S obzirom na to kako su se učenici osjećali nakon aktivnosti - dali su pozitivne odgovore navodeći da su sretni, dobro i uzbuđeni. Međutim, da je bilo uključeno više zagonetki i glazbe, učenicima bi se cjelokupan proces mogao učiniti privlačnijim te bi više u njemu uživali. Rezultati polustrukturiranih intervjua s roditeljima nakon izložbe prikazani su na Slici 6.

Slika 6

S obzirom na odgovore roditelja, vidljivo je da su učenici prenijeli znanje stečeno u školi i na život izvan škole. Aktivnosti nisu smatrane samo zadatcima koje je potrebno izvršiti za vrijeme nastave, već su prepoznate i kao ishodi učenja važni za svakodnevni život. Učenici su o zagađenju upozoravali svoje prijatelje, jednako kao i druge ljude oko sebe te su posebno vodili računa o recikliranju.

Rasprava i zaključak

Kada se rezultati ovoga istraživanja vrednuju u odnosu na prvo istraživačko pitanje, pokazalo se da su učenici razvili svijest o tlu. Što se tiče aktivnosti provedenih prije istraživanja, učenici nisu uspijevali povezati biljke i životinje, područja uporabe tla i sličice koji prikazuju očuvanje tla. Međutim, aktivnosti provedene nakon istraživanja rezultirale su pozitivnom razlikom u učeničkom razumijevanju strukture tla, područja uporabe tla u svakodnevnom životu te povezanosti tla i alatima kojima se tlo obrađuje. Primjerice, učenici su u završnu umnu mapu dodali riječ „stijena" kada se govorilo o tome kako nastaje tlo. Što se drugoga istraživačkoga pitanja tiče, rezultati dobiveni putem obrazaca za polustrukturirani intervju pokazuju da učenici aktivnosti ocjenjuju pretežito pozitivnima. Osim toga, izjave učenika otkrivaju interes za sličnim aktivnostima i u drugim nastavnim predmetima. Također, učenici su o istraživačkim aktivnostima izvještavali svoje roditelje, što navodi na zaključak da spajanje nekoliko područja učenja potpomaže razvoj učeničke svijesti o okolišu i učenje o preuzimanju odgovornosti.

Prvu je prednost ovoga istraživanja moguće povezati s kvalitetom obrazovanja jer je istraživanje provedeno posrednim, a ne neposrednim, metodama učenja u prirodnom okružju. Kroz dramsku metodu primijenjenu u aktivnosti „Što se dogodilo sa stijenama" učenici su mogli uvidjeti da je tlo nastalo zbog erozije stijena na temelju učinaka različitih prirodnih događaja. To je u skladu s istraživanjima koje su proveli Tanrıverdi (2012) te Drown i Christensen (2014), gdje se pokazalo kako su dramske aktivnosti prikladan alat za konceptualni razvoj djece predškolske dobi. Nadalje, Donohoe i O'Sullivan (2015) dijele mišljenje da kroz igru uloga djeca mogu razviti empatijsko zaključivanje, odnosno mogu razmišljati o tome kako bi se osjećali kada bi bili netko ili nešto drugo. Pomoću likovnih pedagogija kao što su crtanje i slikanje, kolaž i izrade modela (npr. izrada krtice od gline), učenici su učili o boji i teksturi tla. Opaženo je da su učenici uspoređivali različite vrste tla po karakteristikama, navodili područja uporabe tla za živa bića (npr. za izradu oruđa ili za sklonište) te razlikovali

bića koja koriste tlo kao životni prostor, bilo iznad ili ispod zemlje. Ovi su rezultati u skladu sa stajalištima Tarra (2008) koji smatra da kroz stvaranje likovnih radova djeca mogu predstavljati i interpretirati vlastita iskustva u vezi s okolinom, te sa Swartzovim (2005) stajalištem da kroz gradnju i oblikovanje, djeca mogu interpretirati i izgraditi vlastiti osjećaj mjesta u svojoj okolini.

Kroz eksperimentalne i promatračke aktivnosti primijenjene u aktivnostima „Što je u tlu" i „Neka moja paprika raste" učenici su mogli uvidjeti da tlo ima zrnastu strukturu, da se između čestica nalazi zrak, da se tlo sastoji od raznih tvari, važnost tla za održavanje vitalnosti biljaka te da su biljke neophodne za održavanje bogatstva tla. Uzimajući u obzir promatranje i aktivnosti temeljene na eksperimentu, rezultati ovoga istraživanja smatraju se u skladu s gledištem Gülaya i Öznacara (2010) koji su smatrali da se znanstvene tehnike poput eksperimentiranja i promatranja, u kojima se prirodni fenomeni mogu ponavljati, mogu koristiti za razvoj odgoja za okoliš u djece. Metodom pripovijedanja u aktivnostima „Od sjemena do sadnice" i „Tužno tlo" uočeno je da su učenici razvili svijest o važnosti zaštite tla (u smislu da je ono stanište živih bića, izvor hrane nekim živim bićima, sklonište itd.) i elementima koji mogu zagaditi tlo. Smatra se da je ovaj ishod u skladu sa stajalištima Hadzigeorgioua i Judsona (2017), Hughesa (2013) te Tootha i Renshawa (2009), u smislu da uporaba priča povezanih s okolišem može biti učinkovito sredstvo za promicanje pozitivnih stavova i vrijednosti usmjerenih na okoliš među učenicima mlađe dobi. Kada se izvrši općenita procjena metoda primijenjenih u ovome istraživanju, može se zaključiti da se neizravne metode kao što su drama i igra uloga, likovna kultura i izrada modela, pripovijedanje te promatranje i eksperimentiranje smatraju učinkovitima u poboljšanju odgoja za okoliš kod učenika predškolske dobi, posebice kada izravne metode nisu provedive.

Još jedna prednost ovoga istraživanja povezana s kvalitetom obrazovanja jest uključenost isključivo aktivnosti u zatvorenom prostoru. U svojem sustavnom pregledu literature koji obuhvaća 66 istraživanja odgoja za okoliš u predškolskoj dobi provedenih između 1995. i 2018. Ardoin i Bowers (2020) navode da je većina (n = 54,83 %) istraživanja provedena u prirodnome okružju. Nadalje, u projektu sličnome ovom istraživanju obrazovanja o tlu među učenicima predškolske dobi, Gülay Ogelman (2012) uglavnom provodi aktivnosti na otvorenom. U ovom se istraživanju pokazalo da se odgoj za okoliš u predškolske djece može poboljšati isključivo aktivnostima u zatvorenom prostoru. Prema tome, u obrazovnim ustanovama s neprikladnim materijalnim uvjetima za provedbu aktivnosti na otvorenom, odgojitelji za rad s predškolskom djecom mogu razmotriti uporabu lako dostupnih jeftinih pomagala kao što su tlo, sjeme, sadnice i staklenke za provedbu eksperimenata u zatvorenom prostoru te primjenu neizravnih metoda poučavanja kao što su pripovijedanje, likovna kultura, drama i eksperimentiranje.

U ovome stadiju, najvažnije točke kojih bi praktičari trebali biti svjesni su tema istraživanja i primijenjeni model. Tema tla u ovome se istraživanju iskristalizirala nakon jednomjesečnoga promatranja i triju zasebnih aktivnosti čiji je cilj bio odrediti

interese i potrebe djece koja su sudjelovala u istraživanju. Autori stoga preporučuju odgojiteljima i istraživačima ranoga i predškolskoga odgoja i obrazovanja kojima je cilj osmisliti poučavanje odgoja za okoliš da svoje teme odrede prema interesima i potrebama ciljane skupine djece. Nadalje, trebali bi birati modele temeljene na aktivnostima koji će njihovim učenicima omogućiti aktivnu uključenost tijekom svih etapa u procesu. U ovome su istraživanju aktivnosti bile prilagođene potrebama i interesima učenika kako bi ih se svrhovito uključilo putem aktivnoga sudjelovanja na način koji vodi ka postizanju utvrđenih ishoda učenja. Dakle, naglašava se važnost učenja u sprezi s planiranim aktivnostima, za razliku od pasivne uključenosti učenika ili uporabe neprikladnih metoda i tehnika učenja.

Treća prednost ovoga istraživanja proizlazi iz integriranoga nastavnoga plana usmjerenoga na provedbu u razredu unutar „uobičajenoga" školskoga konteksta. U pripremu plana poučavanja, tj. pri razradi ishoda učenja u ovome istraživanju uključene su kognitivne, jezične, socioemocionalne i motoričke vještine koje je propisalo tursko Ministarstvo nacionalnoga obrazovanja za djecu od 36 do 72 mjeseca, a određene aktivnosti uklopljene su u različite nastavne predmete. Primjerice, tijekom završnih evaluacijskih razgovora koji su održani po završetku svih aktivnosti, učenici kao najdražu aktivnost navode „Neka moje paprike rastu", gdje su preuzeli odgovornost za uzgoj sadnica, što je ocijenjeno dobrim za razvoj kognitivnih, motoričkih i socijalnih vještina učenika.

Smatra se da će rezultati ovoga istraživanja poslužiti kao primjer i ponuditi resurse koje edukatori mogu iskoristiti za izradu vlastitih nastavnih aktivnosti. U tom smislu, ovo istraživanje nudi konkretne i detaljne planove nastavnih sati svim odgojiteljima koji su senzibilizirani za temu odgoja za okoliš, no možda su suzdržani u planiranju takvoga poučavanja, naročito u slučajevima gdje školsko okružje ne podržava aktivnosti na otvorenom. S obzirom na opsežan plan rada i utemeljenost na ključnim vidovima prakse koje je neophodno uključiti, smatra se da će ovo istraživanje doprinijeti planiranju i organizaciji kurikula odgoja za okoliš koje provode odgojitelji, specijalizirani nastavnici i djelatnici zaduženi za izradu kurikula. Razlog tomu je ocijenjena primjenjivost i prilagodljivost aktivnosti iz ovoga istraživanja budući da su osmišljene za primjenu lako dostupnih jeftinih materijala, što ih čini lako provedivima u školama koje se suočavaju s ekonomskim ili materijalnim ograničenjima.

Posljednja tema koja se ovdje razmatra jest istraživačka metoda primijenjena u ovome istraživanju. Kao što kažu Melis, Wold, Bjørgen i Moe (2020), metodološki pristupi istraživanju koji uključuju malu djecu pod povećanim su nadzorom i istraživači se moraju nastaviti kritički uključivati u rasprave o tome što znači uključiti djecu kao aktivne sudionike u akademskom istraživanju. Metoda odabrana za ovo istraživanje uklapa se u područje akcijskoga istraživanja, što naglašava Punch (2002), gdje bi „refleksivnost trebala biti središnji dio istraživačkoga procesa s djecom, dok istraživači kritički promišljaju ne samo o svojoj ulozi i pretpostavkama, već i o izboru metoda i njihovoj primjeni" (str. 323). Prema podatcima dobivenima iz dnevnika istraživača,

vidljivo je da načelno nije bilo problema s odvijanjem aktivnosti i da su svi problemi riješeni unutar relevantne aktivnosti zahvaljujući fleksibilnosti primijenjenoga akcijskoga istraživanja. Rezultati dobiveni samoprocjenom istraživača o mogućim poboljšanjima primijenjenoga procesa odnose se na smanjenje trajanja određenih aktivnosti, izbacivanje nekih tema (kao što su pesticidi) koje se možda ne smatraju prikladnima za dob ili životno iskustvo uključenih učenika i, gdje je moguće, izvođenje jedne aktivnosti u svakom nastavnom predmetu. Osim poboljšanja istraživačkih vještina nastavnika-istraživača, akcijsko istraživanje u ovome je slučaju također dovelo do poboljšanja njihovih nastavnih vještina pružajući temelje za nova znanja i razumijevanje načina kako poboljšati obrazovne prakse te kako riješiti značajnije probleme s kojima se nastavnici susreću u učionici (Mills, 2003; Stringer, 2004). Ovo je istraživanje također omogućilo nastavniku-istraživaču pomnije promatranje sudionika, pri čemu je mogao uočiti da određeni problemi proizlaze iz načina na koji se prikazuju nastavni materijali, a ne potječu od samih učenika. Ukratko, potrebno je potaknuti veći broj nastavnika i istraživača na praktičnu primjenu akcijskoga istraživanja kao alata koji omogućuje uviđanje vlastitih profesionalnih nedostataka i prikupljanje informacija o prigodnim načinima poučavanja učenika mlađe dobi.

Prilozi

Prilog 1

Obrazac za evaluaciju aktivnosti za evaluaciju ishoda učenja

Aktivnost: 'Moj lonac izrađen je od zemlje'

1. U koje se svrhe može koristiti tlo?
2. Koje se vrste predmeta mogu izraditi od zemlje?
3. Koju smo vrstu tla koristili u ovoj aktivnosti?
4. Izgleda li glina kao zemlja u vrtu?

Prilog 2

Obrazac za evaluaciju aktivnosti za evaluaciju ishoda učenja

Naša je aktivnost za danas završena. Želim čuti vaše mišljenje kako bi naše aktivnosti bile što bolje za vas. Imam samo nekoliko pitanja za svakoga od vas.

- Je li ti se svidjela aktivnost?
- Kako je prošla aktivnost? Kako ti se čini da je prošla?
- Kako si se osjećao/osjećala tijekom aktivnosti?
- Što možemo učiniti kako bi aktivnost bila bolja i kako bi naučio/naučila više?
- Što ti se nije svidjelo kod ove aktivnosti?
- Jesi li govorio/govorila svojoj obitelji o ovoj aktivnosti?

Fotografija aktivnosti

Aktivnost: „Čistim tlo"

Prilog 3

Izvadak iz dnevnika nastavnika-istraživača

Aktivnost: „Neka moje paprike rastu"

Iako su djeca vidjela tlo oko sebe, nisu bila svjesna kako se zemlja koristi.... Isprva su odgovorili samo vodu [u smislu onoga što je biljkama potrebno za rast], nisu bili svjesni uloge koju ima toplina i Sunčeva svjetlost. Mislim da je proces bio učinkovit jer su osobno mogli iskusiti učinak vode, Sunčeve svjetlosti i temperature koji su potrebni za rast biljaka.