Osmangazi Journal of Educational Research **Volume 8(2), Fall 2021**

RESEARCH Open Access

Suggested Citation: Artvinli, E., & Dönmez, L. (2021). GeoGames for transition and transformation in environmental education. *Osmangazi Journal of Educational Research, 8*(2), 39-52.

Submitted: 14/07/2021 **Revised:** 23/09/2021 **Accepted:** 18/11/2021

GeoGames for Transition and Transformation in Environmental Education

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Abstract. Environmental education is an increasing important subject in schools that should be dealt with since early childhood. In early childhood, children's mental perceptions, learning capacities and imaginations are quite high. Every right and wrong behaviour that will be taught during this period will have an impact on the child in the context of consciousness and the unknown. The skills that will be developed from early childhood form a strong infrastructure for a person's future life. Looking at the life science course curriculum, it is aimed to educate individuals who are sensitive, environmentally conscious, and provide conscious consumption of resources. For this reason, it is of great importance for the child to be a conscious individual by taking care of the environment in which he / she is located first. In today's world, this educational process demands a deep interest that cannot be carried out only in the classroom environment. At the same time, in order to appeal to the children of this age in the changing and developing world, teaching with appropriate approaches to their world is valuable in terms of the sustainability of learning. This study covers an analysis aimed at achieving the attainments related to environmental education included in the life science curriculum through GeoGame. In this study, the life science course curriculum was examined by analysing the content through document review. Among the results of this research is that GeoGame is in a form that teaches while entertaining and entertains when learning with the achievements included in the curriculum of life science in early childhood decency.

Keywords. GeoGames, life science curriculum, environmental education.

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It may not sound so bad, given that children are surrounded by technology. But moving away from nature is in a sense "contrary to our nature." Being away from nature is impossible for those of us who exist with nature. That even brief contact with nature has positive effects on children's self-confidence and mental well-being. According to findings, preschool is a very sensitive period for children to recognize nature and develop environmental sensitivity.

Children who have a chance to observe nature show more harmonious behavior, decreased aggression, and improved problem-solving skills. In addition to social and emotional benefits, spending time in a very cognitively useful nature. An increase in attention span was observed after children returned to the classroom environment. Spending more time outdoors is also beneficial in terms of their physical development, because they get a chance to move more. This, in turn, reduces the risks of obesity-related health problems (Orhan, 2019).

Children's feelings of interest and creativity give them great power to learn about the universe in which they are located. Ensuring that they grow up as sensitive individuals also results from strong connections with the environment. Their access to the outside world plays a crucial role in children becoming sensitive individuals.

It is very important to direct children's desire and curiosity correctly in early childhood Therefore, after providing them with a learning environment, it is important to encourage their initiative and highlight their sense of creativity. Because only a person with a high level of creativity and interest can take a sensitive stance towards the environment.

Today, due to rapid population growth and technological advances, children, global warming, decline in biodiversity, soil erosion, reduction in the supply of natural food, energy and water shortages, and environmental problems that threaten the health of both man and nature are born into a world where there are many (Diamond, 2011; Gunderson, 2014). It is known that the main source of these problems is human behavior. In the same time these advantages, there are opportunities to compare the Earth and Moon surface structure, to learn GPS and geographic coordinates in the game. In addition to physical geography issues such as earth sciences, rocks, geomorphological-geological processes, natural resources, the gameplay actions such as building colonies on the lunar surface through collaborative working, can also allow players to experience resource management and planning (Adanalı, 2021).

As with many skills, environmental attitudes skills and achievements are shaped in early childhood, and these attitudes and behaviors follow it in a person's later life. From this point of view, environmental education, which will be given in early childhood, is of great importance. Today, there are many more skills and attitudes, such as attainment information about the environment and the development of attitudes towards the environment is beginning to take shape in early childhood and later years on the environmental behavior of individuals in long-lasting effects (Grodzinska- Jurzcak, Stepska, Nieszporek, and Bryda, 2006).

Enhanced environmental awareness, environmental issues and the environment that protects sensitive to raise a generation of well-planned, consistently applied, it is possible to say that can be achieved with early childhood environmental education programs (Potter, 2010; Wells and Lekies, 2006).

With environmental education at an early age, children can effectively use their scientific process skills, become a good observer, and attainment experiences in which they can structure knowledge themselves (Russo, 2001). Effective environmental education in early childhood is effective in real environments with active participation that are based on knowledge prepared in accordance with children's development and allow children to structure this knowledge themselves (Cohen, 1994).

Many researchers perceive the concepts of how nature children about the environment, especially that observed changes in children's attitudes and behavior through environmental education programs informative as what I have researched (Bonnet and Williams, 1998; Boyes and Stanisstreet, 1993). These studies emphasize that children's knowledge of the environment and attitudes to the environment are shaped in early childhood, and that children who develop environmental awareness will be positive and responsible individuals with a positive attitude to the environment in the later stages of their lives (Basile, 2000; Grodzinska- Jurzcak, Stepska, Nieszporek and Bryda, 2006; Smith, 2001; Turtle, Convery, and Convery, 2015; Wilson, 1996). In addition, the Environmental Education Program prepared with a constructivist educational approach of the children, love the environment, respect for the environment and protection of the environment indicated a positive impact on attitudes and behaviors related to (Wilson, 1993).

According to Handler and Epstein (2015), environmental awareness attainment at an early age can be maintained in the ongoing years of life, which can be achieved at this age by attainment experience in a freeway and in natural environments.

Outside of formal education environments, environmental education, parks, museums, zoos, aquariums, forest/wooded area or field trips to nature centers, such as informal educational environments that can be tailored with an approach that has attracted attention in recent years, where can be held (Heimlich, 2010). Environmental education programs implemented outside of school are more attractive to children than practices related to environmental education in the classroom, because children have the opportunity to explore the environment and attainment different experiences intensively in out-of-school settings (Falk, 2001). These experiences often support the child's emotional development (Stone and Glascott, 1998). The persons that provide the implementation of environmental education as teachers, children learn about the environment and solving environmental problems in the school environment is not easy and meaningful action for thinking that formal environmental education applications mentioned out-of-school learning environments reveals the effectiveness of (Stevenson, Brody, Dillon, and Wals, 2013).

But for a long time, the pandemic conditions that have affected the world and our country have affected every direction of life, as well as the education sector. Distance learning process has become widespread, and students have moved from classroom environment to home environment, making it impossible to process courses intertwined with nature in non-classroom environments. However, in the process of distance education, the impact of the digital world on our lives has been quite strong. And in this context, the impact of digital games, which were originally developed but are not used in the educational environment, on the learning - teaching process has once attainment emerged. Especially since life knowledge, social studies and geography courses are courses that need out-of-class environments and require field work, these digital games are very valuable in terms of providing learning by entertaining while relieving the burden of lessons in the pandemic conditions we are in, and permanent information is acquired at the implementation stage. In this study, in order to address early childhood, an analysis was carried out on which digital games can be taught about the environmental attainments contained in the life science course curriculum, and the contribution of digital games to science makes us smile as the results draw a positive framework.

Purpose of the Research

The aim of this research is to analyze the achievements related to environmental education in the curriculum of the life science course with content analysis in the context of GeoGame.

Achievements related to environmental education are paired with digital games under the title GeoGame.

Method

In this section, the research method, study group, data collection tool and its application and the techniques used in data processing and analysis are discussed.

Research Model

This research occurs in a qualitative pattern. Qualitative research can be defined as research in which qualitative data collection methods are used, such as observation, interview and document analysis; and a process is followed for the realistic and holistic presentation of perceptions and events in a natural environment (Yıldırım and Şimşek, 2016, p. 45). Research data was obtained through document analysis, which is a qualitative research method covering the analysis of written materials containing information about facts and events (Wachter, 2010).

In this study, research data was collected by document analysis technique and the data was analyzed by content analysis. Content analysis is defined as "the systematic reading of a body of texts, images, and symbolic matter, not necessarily from an author's or user's perspective" (Wachter, 2010).

Data Collection Tools

The document review method was used to obtain and analyze the data. Document review is a way of collecting data by reviewing existing documents.

Process

Accessing documents and checking the authenticity of documents. The 2018 life sciences course curriculum, which is a research document, has been reached through the official Ministry of National Education (MoNE, 2018) web page. The document reached is directly included in the research process. In this case, the documents are original.

Understanding documents. At this stage, the aim is to examine research documents in a specific system and also in comparison with each other. Program achievements were studied in terms of their direct and indirect relationship with the value of responsibility (Yıldırım and Şimşek, 2016).

Data analysis

The process of data analysis is the process of exporting the meaning of data. Document analysis is a systematic procedure for reviewing or evaluating documents both printed and electronic (computer-based and internet-transmitted) material. Like other analytical methods in qualitative research, document analysis requires that data be examined and interpreted to elicit meaning, attainment understanding, and develop empirical knowledge (Yıldırım and Şimşek, 2016).

Before coding was performed in the study, studies were conducted on the validity and reliability of the study. The content validity of the data collection tool has been redeveloped in accordance with the review of a training program expert specializing in field education, and it has been decided that it is suitable for the purpose of the study.

The decoders were examined separately by a field Specialist Researcher and expert for reliability. The formula developed by Miles and Huberman (1994) for the reliability calculation of the work was conditioned to work. Reliability=Consensus / (Consensus + disagreement) according to the calculation, the reliability of the research was found to be 94%. The fact that this ratio is more than 70% indicates that the study is reliable (Miles and Huberman, 1994).

Selecting a sample from data. A criteria sampling method was preferred to objective sampling methods when determining a research sample.

Category development. At this stage, the achievements related to environmental education in the 2018 Life Science course curriculum were identified individually and then paired with digital games and shown in table 1.

Defining an analysis unit. Depending on the purpose of the research, concepts such as words, themes, substances and content contained in the document can form analysis units (Yıldırım and Şimşek, 2016). Achievements related to the environment included in the 2018 life science course curriculum 1.,2., and 3., grade attainments were analyzed separately. The data was analyzed by manual method.

Digitization. The data obtained in accordance with the categories, units and attainments of analysis determined in the study were considered separately in each class size and in accordance with the GeoGame.

Results

Students within the framework of the life science course curriculum, which aims to give primary school age students basic knowledge, skills and values on the axis of individual, society and nature: It knows himself and the environment in which he lives. Develops the ability to use resources efficiently. Be sensitive to nature and environment (MoNE, 2018). At the same time, when looking at the skills in the life science course curriculum, it was found that only two skills, such as conservation of nature and the use of resources, are in the context of environmental education. This is a major deficiency in achieving the main aim of a course such as life knowledge.

In this section, the gains in the life science course curriculum in the context of the research problem are matched with GeoGame at each grade level. The purpose of this pairing is to help design courses that entertain while teaching, which teach while having fun in all conditions. Achievements related to environmental education in Table 1, Table 2, and Table 3 shown at grade level. However, the attainments were also matched in relation to GeoGame.

Table 1.

Environmental Education Achievements and GeoGame (MoNE, 2018)

Environmental Education Achievements	GeoGame
LS.1.2.3. It describes the location of house.	YouPlaceIt
LS.1.2.5. It uses resources efficiently at home.	Simcity
LS.1.5.1. It knows where lives.	YouPlaceIt
LS.1.5.2. It notices historical, natural and tourist places in its immediate area.	Minecraft
LS.1.6.1. It observes animals in its immediate area.	Simcity
LS.1.6.2. It observes plants located in the immediate area.	FindeVielfalt Simulation
LS.1.6.3. It takes care to protect animals and plants located in its immediate area.	Minecraft
LS.1.6.4. Be sensitive about keeping nature and its environment clean.	Simcity
LS.1.6.5. Distinguishes substances that can be recycled.	Minecraft
LS.2.1.5. Introduces the immediate surroundings of it school.	YouPlaceIt
LS.2.1.6. The school takes care when using its resources and belongings.	Simcity
LS.2.2.3. It knows the address of the house where it lives.	YouPlaceIt
LS.2.3.4. Explains the necessity of cleanliness for a healthy life.	Simcity
LS.2.5.1. On the map and sphere it shows country, capital and where it lives.	YouPlaceIt
LS.2.5.8. It observes production activities in its immediate area.	FindeVielfalt Simulation
LS.2.6.1. It compares the conditions necessary for plants and animals to live.	Minecraft
LS.2.6.2. It realizes the importance of growing plants and feeding animals.	Minecraft
LS.2.6.3. It gives examples of the effect of natural elements in its	Minecraft

immediate area on human life.	
LS.2.6.4. Contributes to the recycling of consumed substances.	Minecraft
LS.2.6.5. Recognize natural phenomena.	Project Lily Pad
LS.2.6.6. It gives examples of natural disasters.	Project Lily Pad
LS.2.6.7. Explain the measures that can be taken against natural events and natural disasters.	Project Lily Pad
LS.3.1.5. It sketches class and school.	YouPlaceIt
LS.3.2.3. It sketches the place where its house is located.	YouPlaceIt
LS.3.2.6. It makes original recommendations for effective and efficient use of resources in the home.	Minecraft
LS.3.3.1. Uses resources efficiently while maintaining personal.	Minecraft
LS.3.6.1. Understands the importance of plants and animals in terms of human life.	Minecraft
LS.3.6.2. Explores the growing conditions of fruits and vegetables.	FindeVielfalt Simulation
LS.3.6.3. It finds directions by taking advantage of nature.	YouPlaceIt
LS.3.6.4 It gives examples of the impact of humans on natural elements from his immediate environment.	Minecraft
LS.3.6.5. Responsibility for protecting nature and the environment.	Project Lily Pad
LS.3.6.6. It gives examples of the contribution of recycling to itself and the environment in which it lives.	Minecraft

Discussion and Conclusion

In this study, we tried to show the relationship between the achievements related to environmental education and GeoGames in the life science course curriculum. Environmental education in early childhood is of great importance for the future life of the child. Looking at games related to environmental education achievements, Minecraft, Project Lily Pad, Simcity, Youplaceit, FindeVielfalt Simulation, games have been found to be directly effective in consolidating environmental education-related achievements. The value and importance of the game in learning is very important in terms of increasing motivation, providing a positive effect on interest and desire.

Educators have dealt with different directions of the game for teaching. According to Dewey (2004) players not only exhibit physical movements. They try to achieve or influence something specific. It determines reactions according to his predictions for further moves. However, the predicted result causes the flow of activity to change, rather than creating a noticeable change in objects. As a result, the game is played freely and can be shaped at will. Psychologically, the defining qualities of the game are not entertainment or aimlessness.

According to Garvey (1990), the game is satisfying, fun, and motivating. The game allows the player to be active. According to McKinney (2009), the game is sometimes a haven for the child, sometimes a trial and error board where he will apply what he has learned, and sometimes a mysterious world in which he feels most comfortable. Waiting for children in the first level of primary education to sit still in the classroom for 40 minutes contradicts their developmental characteristics (Aykaç, 2005).

Children learn best from their own concrete experience. Information is not given to children. It must be discovered and structured by the student's activities (Charles, 2000). According to Adler (1997) and Stanley (2009), learning with play is one of the most effective methods.

Development of GeoGames, especially on mobile devices, is also a separate issue. Schneider, et al. (2017) stated that GeoGames are location-based games played outdoors, supporting a wide range of learning experiences in areas such as cultural heritage and biodiversity, but that little is still known about how different aspects of location-based gaming interact temporally. In games, especially OriGami, Project Lily Pad and Minecraft-Urban Planning GeoGames have developed spatial thinking skills. Bartoschek et al. (2018) argues that many GeoGames are built on orientation and map understanding capabilities in line with contemporary educational aims that promote spatial literacy. Geographic inquiry skills, especially Project Lily Pad and Minecraft-Urban Planning, SimCity and YouPlaceIt! he is at the forefront of it games.

Considering other serious games and GeoGames in the field on increasing disaster resistance; (Mossoux, et al., 2016), environmental hazards, and tells how these hazards affect the vulnerable population; code red:triage (van der Spec, Wouters, & van Oostendorp, 2011), the urgency of disaster intervention and comprehensive experience in creating first-person perspective highlights the benefits of; YouPlaceIt! (Poplin & Vemuri, 2018), illustrate a sense of place; OriGami (Bartoschek, et al., 2018), which clearly shows route-finding and landmark-based navigation (Tomaszewski, et al., 2020).

Kim & Shin (2016) noted that SimCity has been adopted as a pedagogical tool in its applications such as urban geography, hydrology, planning education and environmental education, but geographers have not systematically studied the benefits of SimCity for Geography teaching, despite its close connection with geographical content and skills.

The attainments of the life science course curriculum related to environmental education in early childhood children in this study which examined environmental awareness through environmental education and desired to learn more GeoGames it has been determined that can be performed in a manner easy and fun.

Recommendations

The use of the game, which is a part of the child's life, as an educational tool, can be said as a result of the data obtained from this study. At the same time, it seems that children who have to participate in the distance learning process in the pandemic conditions we are in have a need to learn by having fun. For this reason, the association and use of GeoGames with educational programs will contribute greatly to the child's learning.

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Conflict of Interest

It has been reported by the authors that there is no conflict of interest.

Funding

No funding was received.

Ethical Standards

We have carried out the research within the framework of the Helsinki Declaration.

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