


Environmental Problems and Education in Last Five Years

Olcay Sinan ^{1*} , Muhammet Usak ² , Yusuf Sinan ³

¹The University of Texas at Austin, USA

²Kazan Federal University, RUSSIA

³Austin Community College, USA

*Corresponding Author: olcaysinan@utexas.edu

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ABSTRACT

Environmental education continues to be popular all the time. Researchers have been trying to raise awareness of people by doing valuable studies on this issue. However, it is very difficult to follow all of these studies. That is why this mini-review aims to present a bunch of studies on environmental pollution in the last 5 years for researchers. In order to achieve this aim, the ERIC (Education Resources Information Center) database was searched using the “Environmental” and “Pollution” keywords. Then the full-text articles directly related to environmental education since 2018 were summarized in a table in which countries they were made and which data collection tools were used. These studies were read independently by the researchers and qualitative data analysis was carried out. According to the results of the data analysis, four themes were created: i) Research on environmental education; ii) Teaching-learning method and activities about environmental education; iii) Literacy, knowledge, attitude, behavior and, awareness about environmental education; iv) COVID-19 and challenge. The relevant texts of the selected studies were placed into the appropriate theme. In the last part of the study, some suggestions were presented for future studies.

Keywords: environmental pollution, environmental education, COVID-19

INTRODUCTION

In recent decades, the rapid population growth, humans’ unconscious behavior against the environment, unplanned urbanization, industrialization, and reduced natural resources accelerate environmental problems. Although many studies have been carried out to reduce environmental problems in recent years, they are still insufficient. In order to solve environmental problems, much more effort is needed. Changing people’s knowledge, attitudes, perceptions, and behaviors can be achieved with long-term studies (Sinan, 2015). The easiest and shortest way to do this is to carry out activities related to environmental education starting from a very early age. The development of social consciousness and the development of more environmentally friendly individuals with the responsibilities could be provided by educational institutions. Raising individuals who are conscious and have a positive attitude about environmental protection could be possible only with the environmental education given in schools. Accordingly, it is extremely important that all students from kindergarten to college should take the courses in schools and attend the activities regarding environmental education. In addition to these, it is very important and inevitable to evaluate the situation to understand how

effective the activities related to environmental education are. For this reason, this mini-review is aimed to examine the studies on environmental pollution in the last five years and to provide an overview.

METHODOLOGY

This study is in the form of a literature review regarding environmental pollution in the ERIC database (eric.ed.gov). In order to perform the aim, literature search was conducted through the ERIC database. Environmental and pollution were used as keywords. When it was searched, 152 articles were obtained. After “Full text” and “Peer reviewed only” articles were selected and refined the search results. In the next step, the number of articles remaining was 112. After clicking “since 2018”, 51 articles endured. When the environmental education descriptor was selected, 36 articles remained. Finally, these articles were examined one by one, some of them not directly related to our research topic were eliminated and the number of articles in the final list was 21. A qualitative approach was adopted in the review and content analysis was carried out. To perform the analysis, firstly, all the articles have been downloaded and read independently by researchers. Each researcher determined the topics separately and worked

Table 1. Countries and data collection tools

Author(s)	Countries	Data Collection Tools
Ablak and Yesiltas	Turkey	Survey
Aksan et al.	Turkey	Test
Berber	Turkey	Interview
Doğan and Simsar	Turkey	Open-ended questions
Duran	Turkey	Interview, Drawing
Hasturk and Unal Balliel	Turkey	Environmental and Attitude Scale, Interview
Ichsan et al.	Indonesia	Test
Itasanmi and Jegede	Nigeria	Questionnaire, Survey
Kalayci	Turkey	Test, Drawing Technique, and Open-ended questions
Kiraz and Salman	Northern Cyprus	Interview
Kuswendi and Arga	Indonesia	Test and Questionnaire
Mahat et al.	Malaysia	Test
Mutlu et al.	Turkey	Scale
Ozer Keskin and Aksakal	Turkey	Scale and Interview
Pullu and Pullu	Turkey	Interview, Attitude and Behavior Scale
Recepoglu	Turkey	Interview
Sholahuddin et al.	Indonesia	Test
Topal et al.	Turkey	Test, Interview, and Scale
Urbanska et al.	Czech Republic, Hungary, Poland, Romania, Turkey, United Kingdom	Survey
Yuksel	Turkey	Interview
Zannat et al.	Bangladesh	Questionnaire and Survey

together to reach a consensus on the themes. It was decided that these themes were Environmental Issue or Literacy, i) Research environmental education, ii) Teaching-Learning Method and Activities about Environmental Education, iii) Literacy, Knowledge, Attitude, Behavior and, Awareness about Environmental Education, and iv) COVID-19 and Challenge.

Table 1 summarizes which countries the articles selected for this mini-review were made in and which measurement tools were used in the articles. **Table 1** shows that most of the studies included in this mini review were conducted in Turkey, followed by Indonesia. Most of the data collection tools in the selected studies were quantitative tools such as test, survey, questionnaire and scale. However, the interview was used extensively as a qualitative data collection tool.

Environmental problems can be listed factory waste, human waste, harmful gases from factories, exhaust gases, misuse of forested areas, pollution in rivers, unconscious hunting, rapid population growth, uncontrolled urbanization, global warming, greenhouse effect, nuclear pollution, acid rain, mass extinction of plant and animal species, desertification, ozone depletion and chemical waste off (Ablak and Yesiltas, 2020; Zannat et al., 2021). It can be said that the most important environmental problem is environmental pollution (Duran, 2021; Recepoglu, 2021; Dogan and Simsar, 2019; Kalayci, 2020). Environmental pollution, "Is the event of intense mixing of foreign substances with air, water, and soil that adversely affects the health of all living things, that causes material damage on inanimate environmental assets and spoils their qualities." (Cepel, 2003). The students explained that the environmental pollution consisted mostly of air pollution, water pollution, waste pollution and noise pollution (Kiraz and Salman, 2021). In another study, it was stated that water and air pollution were the most frequent than space, light, and noise pollution (Ozer Keskin and Aksakal, 2020). The majority of preservice preschool teachers stated that human life would become harder as a result of environmental

pollution, the natural environment would be harmed, the living spaces of the living things would be narrowed and the diseases would occur (Dogan and Simsar, 2019). The undesirable consequences of environmental pollution were expressed as odor, noise and waste (Kalayci, 2020).

The majority of preservice teachers comprehend that environmental pollution was caused by humans (Kalayci, 2020). Moreover, in this study, children defined people either as polluting the environment or as trying to clean the polluted environment. One might suggest that, according to children, people are both the cause and the effect of environmental pollution (Duran, 2021).

If the teachers, who are a role model in the training of students, are sensitive enough about environmental pollution, so they will be the individuals they train (Kalayci, 2020). It was determined that prior to the Awareness Education, teacher candidates were mostly of the opinion about benefits of recycling that environmental pollution will be prevented (Aksan et al., 2019). The students stated that they learned the definition, reasons, effects and types of environmental pollution, gained awareness and responsibility about the environment, learned about behaviors towards preventing environmental pollution and developed an attitude towards environmental pollution (Topal et al., 2020; Ozer Keskin and Aksakal, 2020).

Theme 1: Research on Environmental Education

In this century followed by industrialization and technological developments, the concept of "environmental education" emerged as a new education field with the realization of the negativities the environmental problems cause (Kalayci, 2020). Environmental education is defined as the primary way of cognitive, affective and behavioral change that has become essential for human beings to maintain their lives without destroying nature (Kalayci, 2020). Similarly, environmental education is defined as raising self-sacrificing

people with an awareness of all kinds of problems and solutions to create a more sustainable environment (Ozer Keskin and Aksakal, 2020). Environmental education is a continuous learning process that enables people to get to know concepts related to their environment (Topal et al., 2020). Environmental education has become important in many countries and it is a lifelong process of education (Ablak and Yesiltas, 2020).

Environmental education underlies the society's sufficient knowledge and consciousness about the environment, ensuring sensitive and positive behavioral changes, protecting the natural environment and regaining the damaged environment (Zannat et al., 2021). Increasing environmental awareness to individuals will be achieved through environmental education that will be given at all levels. It is seen that with the statement in National Curriculums the necessity of environmental education is emphasized (Recepoglu, 2021; Mutlu et al., 2021; Mahat et al., 2020; Yuksel, 2021). Environmental education is a key element in raising environmentally conscious individuals (Reported by Ozer Keskin and Aksakal, 2020; Ablak and Yesiltas, 2020; Kiraz and Salman, 2021; Duran, 2021; Mutlu et al., 2021). Environmental education is important in terms of raising individuals who are environmentally sensitive and can offer solutions to environmental problems (Berber, 2021).

The general aim of environmental education is to raise awareness and inform all individuals constituting the society (Topal et al., 2020; Recepoglu, 2021, Mahat et al., 2020). Environmental education aims to raise individuals who can absorb the habitats of living creatures, the elements that make up the environment and the relationships between these elements, have a level of awareness to prevent the deterioration of natural life, and take responsibility for environmental issues (Reported by Kalayci, 2020). Environmental education course "will serve to increase students' environmental sensitivity and improve their sustainable living skills." (Ablak and Yesiltas, 2020). An effective environmental education improves the attitude, value and information about the environment and brings individuals to gain skills that will lead them to display positive environmental actions (Pullu and Pullu, 2021).

In this sense, environmental education is one of the main tasks of schools (Reported by Ablak and Yesiltas, 2020). The study aimed to determine the levels of awareness about environmental education concepts amongst middle school students (Ablak and Yesiltas, 2020). As a result of the discussions in the environmental education course supported by concept cartoons, it could be said that it had positive contributions to teacher candidates in terms of many skills such as critical thinking, argumentation, analytical thinking, problem solving, creative thinking and decision making (Hasturk and Balliel Unal, 2021).

In addition, it can be said that implementing well-prepared environmental education programs from an early age is important. Providing environmental education to children at an early age ensures that they both become conscious of the environment and gain the behavior of protecting and developing the environment (Duran, 2021). It is seen that the aims, attainments, and concepts relevant to environmental education in the preschool curriculum are insufficient (Duran,

2021). Effective environmental education should be given at all levels of education (Berber, 2021). Environmental education in developed countries such as European Union countries is given more space within the education programs whereas recent studies carried out on students in primary and secondary education levels in some countries such as Turkey have revealed that the education system gives less space to environmental issues. Environmental education should be gradually added to education programs starting from the preschool period; both theoretical and applied courses related to environmental education must be involved in the curriculum of preschool teaching programs (Dogan and Simsar, 2019). Preschool curriculum should be revised and it should be ensured that environmental education activities by age groups are adopted within the scope of science education (Duran, 2021, Zannat et al., 2021). Moreover, in order to keep the motivation of the students high in the activities to be used in environmental education, the activities should be well designed considering the pedagogical aspect (Pullu and Pullu, 2021).

Theme 2: Teaching-Learning Method and Activities about Environmental Education

In the articles discussed, after traditional teaching, the situation was evaluated in general. In other words, the number of studies in which the teaching model was investigated was low. For example, (Ichsan et al., 2021) revealed that the ILMIZI (Identify, Limitation, Make mind map, Interpret, Analyze result, Interaction and evaluate) learning model was not effective in improving students' attitudes. This was due to the model that was implemented in a short time; thus, there was not enough time to change the students' attitudes in maintaining the environment (Ichsan et al., 2021). The Awareness Education provided had a significant impact on the knowledge and awareness levels of teacher candidates for waste and recycling (Aksan et al., 2019). Educational movies had significant benefits for both individual outcomes and the instruction process (Topal et al., 2020). The concept cartoon applications developed positively the candidate teachers' attitudes toward environment problems (Hasturk and Balliel Unal, 2021). In another study, it was found that students' environmental knowledge and scientific literacy competences improved after learning by using the CSBLS (cognitive style-based learning strategy) and the students' environmental knowledge scored in the high category in the schools (Sholahuddin et al., 2021). On the other hand, trainings on waste and recycling at every stage of the education, trip-observation, collaborative studying activities, awareness-raising discussions, fieldwork to influence students' attitudes positively and comprehensive projects in colleges and universities would contribute to increasing the sensitivity for recycling (Aksan et al., 2019; Zannat et al., 2021). The preservice science teachers take practical education regarding recycling, separation of wastes and Zero Waste Project; there should be a practical education to create awareness (Yuksel, 2021). However, theoretical knowledge is given, but adequate education is not given at secondary schools (Yuksel, 2021). According to Topal et al. (2020), educational movies had significant benefits for both individual outcomes and the instruction process and contributions to better understanding of the course and the class that was held this way was more

permanent. The activity of utilizing scrap affected the students' environmental literacy in primary schools (Kuswendi and Arga, 2020). In another study, it was determined that after the activity-based practices performed in the environmental education course, the scores of the attitude and behavior of the students concerning environmental problems increased and they acquired awareness, consciousness, and responsibility about the environmental problems along with these activities (Pullu and Pullu, 2021). In the study by Urbanska et al. (2021), teachers used lectures, multimedia presentation, educational movies, and educational games in geography teaching.

Theme 3: Literacy, Knowledge, Attitude, Behavior and, Awareness about Environmental Education

Most studies on environmental education investigated the knowledge, attitude, awareness and literacy levels of the students. Scientific literacy is the ability to explain phenomena and solve problems using scientific knowledge (Sholahuddin et al., 2021). Environmental literacy is essential in environmental education (Ozer Keskin and Aksakal, 2020; Mahat et al., 2020). The concept of environmental literacy means having a good education in the field of the environment and a high level of knowledge about the environment. Environmental literacy, environmental consciousness, and environmental awareness in pupils can be ensured through effective environmental education (Ozer Keskin and Aksakal, 2020). The student environmental literacy needed to be established in a sustainable and gradual manner. The teachers could also integrate environmental literacy in various learning. The activity of utilizing scrap could be an effort to build the environmental literacy of primary school students (Kuswendi, 2020). CSBLS (cognitive style-based learning strategy) could facilitate junior high school students' mastery of environmental knowledge and enable them to achieve scientific literacy (Sholahuddin et al., 2021).

One of the important objectives of science instruction is to provide students with knowledge and awareness towards environmental problems and train them to show attitudes and behaviors towards preventing these problems (Topal et al., 2020). Therefore, the attitudes, behaviors and habits of people can help solve environmental problems if they are made positive by environmental education (Dogana and Simsar, 2019). There is a positive correlation between the environmental knowledge, the environmental attitude, and environmental behavior (Itasanmi and Jegede, 2019). The education has a significant impact on the knowledge and awareness levels of teacher candidates for waste and recycling and so the increase in knowledge and awareness levels of teacher candidates is thought to affect their attitudes and behaviors positively (Aksan et al., 2019). There could be some studies regarding the knowledge, attitudes, behaviors and practices of faculty members and university students on recycling (Yuksel, 2021). The concept cartoons applications changed the attitudes toward environment problems positively (Hasturk and Balliel Unal, 2021). By using educational movies, the student of middle school learned the definition, reasons, effects and types of environmental pollution, gained awareness and responsibility about the environment, learned about behaviors towards preventing environmental pollution and developed a positive attitude

towards environmental pollution (Topal et al., 2020). The activities performed in the environmental education course affected the attitudes of the students towards the environmental problems positively (Pullu and Pullu, 2021). The gifted students had higher awareness scores related to environmental education concepts, compared to their normally developing peers. Changes in the individuals' environmental knowledge, attitudes and behaviors may also affect their awareness levels (Mutlu et al., 2021).

Attitudes are formed because of the experiences, reinforcements, imitations and social learnings throughout people's lives, and the root of many attitudes is in the person's childhood. The attitudes that are acquired in childhood years do not change easily unless there are significant experiences and memories on the subject. The ILMIZI learning model has not been effective in improving students' attitudes because there was not enough time to change the students' attitudes in maintaining the environment (Ichsan et al., 2021).

To make people aware of the importance of the environment, we should take care of education in relation to global challenges and sustainable development (Urbanska et al., 2021). Secondary school students had a high level of awareness about the concepts of environmental education overall (Ablak and Yesiltas, 2020). According to the descriptive results, the students indicated positive environmental awareness and it increased over time (Kiraz and Salman, 2021). The university and the electronic media had a significant role to increase the environmental awareness among the students (Zannat et al., 2021). State institutions, non-governmental organizations, symposiums, congresses, events and competitions, and projects could play an important role in raising awareness of people (Berber, 2021; Yuksel, 2021; Zannat et al., 2021). The students gained awareness to prevent this situation by some activities, their awareness was not enough on its own and they acted with sensitivity and sense of responsibility in raising the other people's awareness as in a butterfly's effect (Pullu and Pullu, 2021).

Theme 4: COVID-19 and Challenge

The COVID-19 epidemic, which started in 2019, has shown its effect all over the world. In almost every country, face-to-face education has been interrupted for a long time and distance education has been implemented more. Despite the large number of studies conducted with distance education (Masalimova, 2022), the COVID-19 outbreak was barely mentioned in the studies selected for the current mini review. Ichsan et al. (2021) mentioned that environmental learning in the COVID-19 pandemic became a challenge for lecturers as well as students and ILMIZI learning model could be an alternative for environmental learning by the model in a long time during the COVID-19 pandemic and change students' attitudes. Ichsan et al. (2021) stated that environmental learning became a challenge for lecturers as well as students during the COVID-19 pandemic, and the ILMIZI learning model could be an alternative for environmental learning by implementing it over a long period and changing the students' attitudes. During the COVID-19 pandemic, the researchers had several obstacles in conducting research that included limited interaction between researchers and subjects, some students

could not participate in online learning because they had difficulty accessing the internet (Kuswendi and Arga, 2020).

CONCLUSION AND RECOMMENDATION

Since people's concerns about environmental pollution are increasing day by day, there are many studies on environmental pollution. The most important reasons for this problem are rapid population growth, unplanned urbanization, reduced natural resources, industrialization, and humans' unconscious behavior against the environment. To sum up, most of the studies related to environmental education are on people's knowledge, attitude, behavior and awareness about the environment. The studies covered in this mini review were conducted in developing countries such as Indonesia, Turkey, Nigeria, Malaysia, and Bangladesh. Studies were conducted with students of all levels, from kindergarten students to university students. However, it was necessary to start from a very young age in order to develop environmental awareness (Duran, 2021). It is possible to achieve economic growth without destroying the environment (Zannat et. al, 2021). In order to raise conscious individuals, both schools and non-governmental organizations should work harder and develop individuals' awareness of environmental problems (Dogan and Simsar, 2019; Mahat et al., 2020; Berber, 2021; Itasanmi and Jegede, 2019). However, in these studies, there were not many findings about how environmental education researches were affected during the COVID-19 pandemic and what kind of changes occurred in environmental problems. For this reason, more research is needed to reveal what kind of changes occurred in environmental problems and environmental education during the pandemic period. Moreover, the limitation of the mini review is that only the articles are indexed in the ERIC database as full text. In addition, there were some non-full text studies in the database. On the other hand, there might also be articles that were not indexed in the ERIC but could be included in this mini-review.

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