

## **The Concept of Sustainable Development in Turkish Science Education**

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### **Introduction**

The rise in the human population, wealth, advances in science and technology, and the impact of man on the environment are issues that today's people have to face. The resources of our world also have a limit. We know that we are very close to that limit due to human activities. As a result of the destruction of indifferent and ruthless steps taken in the name of industrialization and development, the self-renewal ability of the world is decreasing. For this reason, people are faced with many problems such as global warming, climate change, endangered creatures and an unsuitable environment for life. Industrialization has brought important benefits and upgraded technologies for the economic welfare of the society, but on the other hand, since the environment is used as a resource in the industrialization process, it has not a positive effect on environmental sustainability, but has negative effects.

The natural systems of the world show many symptoms such as the destruction of the ozone layer due to increasing human population, increased consumption and waste, climate change, nitrogenization of the biosphere, extinction of many species, new types of pollution and the difficulty of accessing drinking water. This situation affects living and non-living things and the relationship between them (Atmaca, 2018).

In general terms, sustainability can be expressed as the capacity for continuity of a situation or phenomenon. Therefore, the concept of sustainability is a concept that expresses a process because the ecosystem expressed by the concept is to ensure that people benefit from many phenomena such as atmosphere, water and land resources for generations (Eryılmaz, 2011).

Development, on the other hand, is the attempts made to become better than the current situation of individuals or societies. It is a wide-ranging concept that covers all the efforts made for the positive development of the economic, social and cultural structure of societies (Tolunay & Akyol, 2006; Atmaca et al., 2018). Sustainable Development (SD) is a concept that is formed by the terms "Sustainability" and "Development" and includes more than one discipline area (Çelik, 2019).

Sustainable development is a concept whose definition is controversial because it has a wide variety of meanings. Since sustainable development is adopted by many audiences such as governments, large businesses and environmentalists, field-based definitions are made for each audience (Giddings et al., 2002)

The most general definition of sustainable development in the literature is the definition in the Brundtland Report (Our Common Future) prepared by the United Nations Commission on Environment and Development in 1987 as “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Brundtland, 1987).

If it is desired for individuals to make sustainable development principles a lifestyle, the way to do this is to educate individuals according to the goals and principles of development. For sustainable development, education is an issue that should be promoted on a global scale, just like sustainable development. To emphasize the importance of education for sustainable development, the period between 2004 and 2015 was declared as the ‘Decade of Education for Sustainable Development’ by the United Nations. With the declaration of the Decade of Education for Sustainable Development, it is aimed to provide an opportunity for all individuals to learn about the results, behaviors and lifestyles of improvements made in the fields of society, economy and environment for sustainability (Çolak, 2012).

It is certain that individuals who grow up with an appropriate, effective and productive science education will be one of the most beneficial individuals in the development of their country and in all areas. Science course is one of the courses in which students will gain awareness of sustainable development. For this reason, it is very important that the students of the science education department, who will be the science teachers of the future, graduate as teacher candidates with sustainable development awareness. Sustainable development awareness of students depends on science teacher's knowledge about sustainable development (Çobanoğlu & Türer, 2015). For all these reasons, science education is an indispensable educational field for sustainable development.

### **Sustainable Development and Education**

Society consists of people who live in a certain environment, serve a common purpose, and cooperate by adhering to certain rules. Education, on the other hand, is the process of creating a desired change in the behavior of the individual through his own life and intentionally. It is all the processes that the individual changes and develops the knowledge, attitudes, abilities and other behavior patterns that are valuable for the society he lives in. In short, education can also be defined as the process of developing behavior in the desired direction. Every society needs education and training institutions to develop and progress. Education is the set of rules created by society. Therefore, society and education are closely related concepts (Aslan, 2001).

It is possible to make the desired changes in the behavior of the individuals who make up the society through education. Education of individuals is essential for the realization of sustainable development. Individuals who are conscious of sustainable development are those with high responsibility towards their environment and they shape their lives by considering the needs of the next generations (Kanmaz, 2019).

Human and environmental relations are at the center of education approaches for environmental education and sustainable development. However, while environmental education focuses on environmental problems and how to solve them so that we can have a better future, education for sustainable development focuses on the conditions in which people live and social development for a desired future (Pavlova, 2011). In education for sustainable development, unlike environmental education, human is at the center and it is aimed to transform sustainability into a lifestyle in the fields of economy, ecology and society. Environmental education has been given importance with the numerous conferences and international events since the 1970s, but in the late 1980s and early 1990s, with the introduction of a new vision to education, education for sustainable development entered our agenda (Palmer & Neal, 1994).

The key point in achieving the goal of sustainable development is individuals. Individuals are at the center of the economy, environment and society. The element that will realize sustainable development is individuals. It is very important for individuals in society to live in accordance with the goals and principles of sustainable development. This is only possible with education especially science education. In this context, the concept of education for sustainable development has come to the fore (Atmaca, 2018).

The great South African thinker Nelson Mandela says ‘‘Education is the most powerful weapon which you can use to change the world’’ and states how important education is for change, which is one of the most important goals of sustainable development. In today’s world, the necessity of mentality change is undeniable in order to ensure sustainability. Education is an indispensable prerequisite for sustainable development as it enables individuals, communities, social groups, countries and institutions to make better and more accurate assessments and choices about sustainable development (Gürbüz, 2020).

In the ‘‘Educational Strategy Vision for Sustainable Development’’ report by United Nations Economic Commission for Europe (UNECE), education for sustainable development is defined as follows: Education for sustainable development develops and strengthens the capacity of individuals, groups, communities, institutions and countries to make assessments and choices in favor of sustainable development (Akgül, 2020). By changing the perspective of individuals, it makes our world safer, healthier and prosperous and improves people’s quality of life. Education for sustainable development can provide opportunities for critical thinking, greater awareness and greater empowerment, which

are necessary for the discovery of new visions and concepts and the development of new methods and tools (Türer, 2010).

Education is at the center of sustainable development. But what is meant is not educational information overload. Education for sustainable development aims to educate individuals according to the principles of sustainable development in many aspects such as knowledge, attitudes, values and behaviors, with a program that includes environmental, economic and social issues.

Currently, at the point where the changing and increasing environmental problems arise, educators are given responsibilities for raising people who have adopted a sustainable lifestyle. In this case, it is inevitable that the subject of education for sustainable development will start to take place in the discussions about education strategies (Tuncer & Erdoğan, 2006).

According to UNESCO, Education for Sustainable Development can be achieved by developing skills, attitudes, values and understanding rather than passively receiving information. “In some European Union country programs (Belgium, Finland, Greece, etc.), environmental education is given as a separate course, in others it is given with an interdisciplinary approach (Austria; Denmark, etc.) or intertwined with different courses (Netherlands, England, etc.)” (Erikan, 2020).

“Sustainable development education will contribute to the development of a new understanding and sense of responsibility in the environmental, social and economic sense in students, as well as raising the awareness that the choices they make as a member of the society affect the whole society” (Alkış & Öztürk, 2007). “Sustainable development education does not only explain environmental issues with biological and physical parameters, but also evaluates economic, historical, cultural, aesthetic, social, political components and the interactions of these components within and among themselves” (Okur, 2015).

In the 36th part of Agenda 21, which is the first document in which the definition of sustainable development education is made, the things to be done when starting sustainable development education are gathered under four main headings. These are described as,

- Improving basic education,
- Updating existing education in line with the requirements of sustainable development thought,
- Developing public awareness,

- Extending education and work to all public sectors.

Through sustainable development education, individuals have the capacity to gain and evaluate sustainable development awareness.

To achieve this goal, by calling for the following issues for governments, international agencies, businesses and non-governmental organizations in Agenda 21, it was emphasized that sustainable development education is an issue that should be addressed at the global level;

- Ensuring that everyone has access to basic education and functional literacy,
- Ensuring that environmental and development education is accessible to individuals of all age groups,
- Ensuring that the concepts of environment and development are integrated into all education programs with analyzes of the causes of major problems, including all individuals,
- Ensuring the inclusion of children in educational institutions in regional and local studies on environmental health, including clean drinking water, sanitation, environmental and economic impacts of food and resource use (UNESCO, 2002; UNESCO, 2005).

Sustainable development education not only provides the present and future generations to be a fair society with environmental integrity, economic continuity and cultural diversity, but also provides the attitudes, behaviors and values necessary for an equal right to education, good social transformation and a sustainable future. It contributes to justice, gender equality, poverty reduction, democracy and peaceful societies (UNESCO, 2013).

After the World Sustainable Development Summit (2002), UNESCO was designated as the executor of Sustainable Development Education. Thus, UNESCO prepared a work program to accelerate the reforms on this issue and to coordinate the works of the relevant units. The main objectives in this program are:

- Identifying the key messages of education for sustainable development,
- Including the subject of education in the National Strategy and Action Plans,
- Ensuring that education policies are reviewed at the national level and that formal education systems are harmonized,
- Increasing investment in education,

- Providing trainings on the development of sustainable consumption and production habits in all countries,
- Developing awareness at the community level,
- Encouraging and sharing creative practices (Gürbüz, 2020).

One of the aims of sustainable development is to ensure that all individuals have equal rights and freedoms. In this context, with sustainable development education, the necessary environment is created for those with learning difficulties or socially disadvantaged individuals to receive education like healthy people (UNESCO, 2009).

To deal with sustainability in an education curriculum, the following five dimensions should be taken into account (McKeown, 2002):

**Information:** This is related to environment, social knowledge and economy. Students need to know what is going on around them, the activities of human beings and whether these activities have negative effects on the environment and what can be done to prevent these negative effects. However, students also need to know the dimensions of the relationship between the environment, society and economy. They should be aware of the basic concepts required for living together such as poverty, democracy, justice, peace and tolerance and they should lead their lives accordingly.

**Problems:** These are related to economic, social and environmental issues such as clean water, poverty, access to basic nutrients, decision making, protecting and managing the environment, which are the foundations of Sustainable Development Education. These topics/issues should be integrated into the education curriculum and should also be appropriate to the regional/local structure.

**Skills:** It is related to the skills that will enable individuals to interact with the environment correctly and meet the needs of the society they live in. However, skills should help individuals continue to learn so that they can continue their sustainable lives after leaving school. These skills can be listed as follows:

- The ability to communicate effectively (both orally and in writing),
- Thinking about systems (both natural and social sciences),
- Considering priority issues over time and anticipating outcomes
- Think critically about issues of value,
- Separating number, quantity, quality and value,
- Move from knowledge to action,

- Working collaboratively with other people,
- Using these processes: knowing, questioning, acting, judging, imagining, connecting, valuing and choosing,
- Develop an aesthetic response to the environment” (McKeown, 2002).

**Perspectives:** These are related to perspectives that individuals need to understand local issues as well as global issues in a universal sense. Students need to see problems from a global perspective. In addition, they should benefit from the views of different stakeholders while evaluating the issues. Here are some perspectives that students should grasp:

- Social, environmental and economic issues change over time.
- Today, global environmental problems are interrelated.
- Local issues must be understood in a global context, local and national boundaries of communities must be analyzed.
- A decision should be made on any issue, taking into account different points of view.
- Advancing technology and science cannot solve all our problems.

**Values:** These are about valuing people’s personality, respecting the environment and other individuals in the world. Students need to grasp their own values, the values of the societies in which they live, and the values and sensitivities of other people and societies around the world. An important part of these values is social justice. Social justice includes meeting the basic needs of people such as shelter, nutrition and dressing, and respecting the values and traditions of different societies (Gürbüz, 2020).

As a result of sustainable development education, individuals should have the following competence areas (Kaya & Tomal, 2011):

- Reconciliation skills: This skill area considers sustainable development as a shared culture, includes the skills of negotiation and reconciliation with others.
- Skill to see and plan relationships: It sees the relationship between nature and culture and makes planning accordingly.
- Solidarity skills: It collaborates to achieve international equality for present and future generations.
- Motivational skills: It is willing for sustainable development and takes part in



studies to be done in this direction. It acts by considering future generations in all its behaviors.

- Critical thinking skills: It develops guiding principles for an ecologically, economically and socially sustainable world with a sense of responsibility, perceives and evaluates itself and others in terms of the current situation.

### **Sustainable Development in Turkey**

In sustainable development education, individuals become aware of the fact that environmental and social sustainability is a global goal and gain the necessary knowledge, skills and perspective. In addition, with education, individuals are aware that they should not use the resources of nature as if there is no end, and they are aware that they should also consider the environment in their production activities. The existence of individuals, who act in accordance with the goals of sustainable development, exhibit positive behaviors related to the concept in question, and make the goals of sustainable development a lifestyle, is possible with effective sustainable development education (Atmaca, 2018; Aytar, 2016; Aydođan, 2010)

Education for sustainable development ensures that individuals, institutions and organizations, societies and states act with the awareness of sustainable development and it increases the level of welfare by offering people a healthier, safer world. For sustainable development, individuals can have a new perspective for sustainable development, creative and critical thinking skills to develop methods and technologies and they get awareness of sustainable development. Education should not be regarded as a system given only at schools. In this context, training should be given to all public institutions and organizations within the scope of sustainable development, and awareness of sustainable development should be increased.

Sustainable development is a multifaceted structure and is concerned with the environmental, economic and social consequences of human activities. Adults' understanding of the importance of education for sustainable development is very important for young individuals to gain a positive understanding. With sustainable development education, individuals gain knowledge, skills and values and have higher living standards without harming the planet they live in (Atmaca, 2018).

The basic value of education for sustainable development is stated as respect. This is the respect that present and future generations should have for the world, for the people of the world, or for all the blessings the world has given to people. Sustainable development education is about teaching individuals what needs to be done to make the world a safer, healthier, more productive and fairer world than it is now, and to raise individuals who are aware of their rights and responsibilities. Sustainable development education should



not be considered as a database containing only information about the environment, society and economy. In addition to the knowledge in these areas, the behaviors, skills, perspectives and values required for individuals to lead a sustainable life for generations, and the identification of the causes and solutions of the problems that prevent the realization of sustainable development, are within the scope of sustainable development education. In this context, for the realization of sustainable development, the education system and curricula must comply with the fundamentals and principles of sustainable development. For this reason, the current education system and curricula should be carefully examined, the content and scope of the curriculum should be examined, the compatibility of the knowledge, skills and acquisitions to be gained should be discussed, and it should be determined what should be included and excluded from the scope of the curriculum. The current education system and curricula should be revised according to the principles of sustainable development. In this way, an appropriate education system and curriculum should be obtained for sustainable development education (McKeown, 2002).

Environmental awareness, nature protection, sustainability approach have started to create an agenda in Turkey. Turkey's interest in the environment goes back to the 1970s. In 1978, Prime Ministry Environment Undersecretariat was established to follow the developments both in the country and in the world related to sustainable development and the environment, so this took place on the agenda as a state policy (Erkol, 2019). In Turkey, there are many laws, regulations in constitutional and legal dimensions for the protection of nature and nature-friendly organizations and sustainable development. Environmental protection law, which was included for the first time in the constitution that was amended in 1982, took place in the constitutional dimension for the first time (Budak, 2000). While emphasizing the importance of environmental protection and environmental health in this constitutional arrangement, it did not mention the factors that should and should not be in an ideal environment. In fact, it seems that the outline of the environmental protection law was not fully drawn. In addition, it is seen that the concept of "sustainable development" is not clearly expressed in this constitution (Egeli, 1996). The environmental protection law in 1983 addressed the environment as a whole. It was pointed out that it is not only important to prevent environmental pollution with wastes to be thrown into the environment, but also protect existing natural resources and manage the soil correctly. In 1986, a regulation was made for the purpose of controlling Air Quality and preventing air pollution. A regulation was made to prevent noise pollution and to minimize the damage it causes to people. Again in 1988, a regulation for water quality control was made. In the following years, regulations were made on medical waste control and harms of toxic chemicals and assessment of their environmental effects (Okumuş, 2002).

Apart from the regulations, there have been many national and international arrangements in Turkey. Convention for the Protection of the World Cultural and Natural heritage is the first international agreement signed by Turkey. Later, the Protocol on Substances that Deplete the Ozone Layer (Montreal) was signed. Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Biological Diversity and Convention to Combat Desertification are international conventions signed chronologically. Some of the regional agreements are The Convention for the Protection of the Mediterranean Sea against Pollution (Barcelona) and The Convention on the Conservation of European Wildlife and Natural Habitats (Arat et al., 2002).

In the five-year development plans published by the State Planning Organization (SPO), the changes and developments taking place in the name of sustainable development in Turkey are followed. For the first time in Turkey, an environmentally friendly conservation plan was put on the agenda in the 3rd Five-Year Development Plan. The first development plan (1973-1977) started to take place in development plans for the first time as an indicator of the increase in environmental attitudes and sensitivity in Turkey in the period after the Stockholm Conference (1972) (Egeli, 1996). In the 1979 Year Program published in the Official Gazette in 1978, it was accepted as a principle to create an environmental pollution inventory for Turkey, but the preparation of a status report and the collection of environmental documents after the decree took place in 1991 after the establishment of the Department of Environmental Inventory under the Ministry of Environment (Erkol, 2019).

Studies on education for sustainable development in Turkey are carried out by the Ministry of National Education, the Ministry of Environment and Forestry and non-governmental organizations. These education and training activities are carried out in order to enable individuals to realize the relationship between society and the environment and to develop awareness of social, economic and environmental sustainability. Turkish Environmental Education Foundation (TÜRÇEV), a non-governmental organization, aims to provide sustainable development education in pre-school education institutions and primary schools with its different projects. While students involved in projects such as Eco-Schools, Forest in Schools, Young Spokespersons of the Environment gain information about sustainable development, they also raise awareness of their environment (Kanmaz, 2019). In addition, TÜBİTAK Science and Society Projects Support Program applications are among the studies related to sustainable development education and environmental education (Sütgibi, 2018).

UNESCO Turkish National Commission established a committee on education for sustainable development. This committee examined the technical and policy dimensions

of education for sustainable development. In the Turkey Sustainable Development Report (Ministry of Development) prepared for Rio+20, attention was drawn to the strong connection between education and sustainable development. It is mentioned about the awareness of the courses to be applied about the environment and sustainability in Turkey (Teksöz, 2014).

The most important example showing that the concept of sustainable development has been integrated into the education system is the Primary School (3, 4, 5, 6, 7, 8th Grades) Science Course Curriculum (MEB) prepared in 2013. The purpose of education for sustainable development is stated in the Science Course Curriculum prepared in 2013 as “recognizing that the environment and society are a whole and developing the awareness of sustainable development” (Teksöz, 2014).

There are also activities carried out by non-governmental organizations in Turkey. For example, forest in schools, young spokespersons of the environment projects and Turkish Environmental Education Foundation (TÜRÇEV) in pre-school education institutions, Eco-Schools, environmental awareness, sustainable development education and environmental education in primary and secondary schools are some of the non-governmental organizations (WEB 3). According to Teksöz (2014), for the realization of education for sustainable development;

- Education priorities for ESD in Turkey should be determined.
- Targets related to these priorities and project topics related to these targets should be determined.
- Education center should be established for sustainable development.
- The Ministry of National Education (MNE), Ministry of Environment and Urbanization (MoEU), Ministry of Water and Forestry (MWF), UNESCO Turkey, local governments, Non-Governmental Organizations (NGOs) and universities should be located in the center of ESD.
- All projects related to ESD should be carried out and recorded from this center.
- Schools should prepare their own ESD projects.
- Good projects should be rewarded.
- They should be shared and developed internationally (Dal, 2020).

### **Conclusion**

In order for sustainable development to take place, individuals with an understanding

of sustainable development should be raised. Raising individuals with a sustainable development understanding will be thanks to teachers with a sustainable development understanding (Çobanoğlu & Türer, 2015).

If we want to raise individuals with sustainable development awareness, educators in all fields must be individuals with sustainable development awareness. Teacher candidates who continue their undergraduate education in science education faculties are the educators of the future to whom we will entrust our children. Science education faculty students, who are the teachers of the future, are the people who will raise our future generations. Education process should be realized in accordance with its purpose and efficiently, the individuals who provide the education should have awareness about the field they teach, and therefore their knowledge, skills, values and behaviors related to that field should be ethical and sufficient. In this context, in order to raise individuals with sustainable development awareness, it should be ensured that teacher candidates who have chosen teaching as a profession and who are studying at science education faculties should approach teaching profession as individuals with sustainable development awareness when they graduate from their undergraduate programs (Atmaca, 2018).

Teaching education given in science education faculties is of great importance for sustainable development. It is the teachers who will ensure that the sustainable life style becomes widespread. For this reason, education programs in all higher education institutions, especially in science education faculties, should be arranged according to the principles of sustainable development. The education program to be given to teacher candidates in science education faculties should be of a quality that will serve the purpose of sustainable development. (Demirbaş, 2015).

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