

## Perceptions and Opinions of High School Students About the Sustainable Education Program: A Mixed-Method Study\*

Assoc. Prof. Dr. Fatma Köybaşı Şemin

ORCID ID: <https://orcid.org/0000-0002-8684-1235>

Sivas Cumhuriyet University, Faculty of Education, Department of Educational Sciences, Sivas – TÜRKİYE  
Murat Yiğittekin

ORCID ID: <https://orcid.org/0000-0002-2781-9804>

PhD Student / Sivas Cumhuriyet University, Faculty of Education, Department of Educational Sciences, Sivas – TÜRKİYE

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### Abstract

Education is a fundamental element that shapes individuals' social status, living standards, and personal development. However, a review of the extant literature reveals studies that highlight the shortcomings of global education systems in building a sustainable future and imparting the competencies required for the 21st century. Contemporary education systems are characterized by a curriculum that emphasizes rote learning, an overreliance on examinations, and a lack of alignment with real-life applications. This approach hinders the cultivation of essential competencies such as critical thinking, creativity, and a sense of responsibility. In the contemporary world, even those who have been awarded degrees from the most distinguished institutions of higher learning often engage in consumption patterns that are not sustainable, and they frequently engage in management practices that are unjust. Consequently, a comprehensive and systemic overhaul of the educational paradigm is imperative. In this context, "sustainable education" signifies a comprehensive approach that transcends the mere raising of environmental awareness. The objective of this study is to ascertain the perspectives of high school students regarding the sustainable education program (SEP). The objective of this study is twofold: first, to ascertain the level of satisfaction with the education they receive at school in the context of sustainable education, and second, to examine their views on the kind of education they want. The research was conducted using a nested mixed research design. A total of 40 students from the 11th grade of a high school in the central district of Sivas participated in the study as the Experimental Group (n=19) and the Control Group (n=21). The results of the study indicated that the experimental group exhibited heightened awareness of sustainable education, while the control group demonstrated no significant change in this regard. The majority of students have expressed their discontent with the quality of education they have received, articulating a preference for an education that emphasizes sustainability. A comprehensive array of research findings and their corresponding recommendations is delineated in the following section.

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## *Lise Öğrencilerinin Sürdürülebilir Eğitim Programı Hakkındaki Algıları ve Görüşleri: Bir Karma Yöntem Çalışması\**

Doç. Dr. Fatma Köybaşı Şemin

Sivas Cumhuriyet Üniversitesi, Eğitim Fakültesi, Eğitim Bilimleri Bölümü, Sivas – TÜRKİYE

Murat Yiğittekin

Doktora Öğrencisi / Sivas Cumhuriyet Üniversitesi, Eğitim Fakültesi, Eğitim Bilimleri Bölümü, Sivas – TÜRKİYE

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### Öz

Eğitim bireylerin sosyal statülerini, yaşam standartlarını ve kişisel gelişimlerini şekillendiren temel bir unsurdur. Ancak alanyazın incelendiğinde küresel eğitim sistemlerinin sürdürülebilir bir gelecek inşa etme ve 21. yüzyılın gerektirdiği yetkinlikleri kazandırma konusunda eksiklikleri olduğunu belirten çalışmalar göze çarpmaktadır. Modern eğitim eleştirel düşünme, yaratıcılık ve sorumluluk bilinci gibi temel nitelikleri geliştirmek yerine, ezbere dayalı, sınav odaklı ve yaşamın gerçeklerinden kopuk bir yapı sergilemektedir. Dünyanın en prestijli eğitim kurumlarından mezun olan bireylerin dahi sürdürülemez tüketim alışkanlıkları ve adaletsiz yönetim uygulamaları benimsemeleri günümüzün bir gerçeğidir. Bu nedenle eğitimde temelden başlayan bir dönüşüm ihtiyacı bulunmaktadır. Bu bağlamda "sürdürülebilir eğitim", yalnızca çevresel farkındalık kazandırmanın ötesinde, bütüncül bir yaklaşımı ifade etmektedir. Bu çalışma, lise öğrencilerinin sürdürülebilir eğitim programı (SEP) hakkındaki görüşlerini belirlemeyi amaçlamaktadır. Ayrıca, sürdürülebilir eğitim bağlamında, okulda aldıkları eğitimden memnuniyetleri ve ne tür bir eğitim istedikleri hakkındaki görüşlerini ortaya koymayı amaçlamaktadır. Araştırma, iç içe geçmiş karma araştırma tasarımı kullanılarak gerçekleştirilmiştir. Sivas'ın merkez ilçesindeki bir lisenin 11. sınıflarından toplam 40 öğrenci, Deney Grubu (n=19) ve Kontrol Grubu (n=21) olarak çalışmaya katılmıştır. Sonuçlara göre, deney grubundaki öğrencilerin algılarının sürdürülebilir eğitim konusundaki farkındalıklarını artırdığı, kontrol grubunda ise herhangi bir fark görülmediği gözlemlenmiştir. Öğrenciler, okulda aldıkları eğitimden memnun olmadıklarını çoğunlukla olumsuz görüşlerle ifade etmişler ve mevcut eğitim yaklaşımı yerine sürdürülebilir eğitim özelliklerine sahip bir eğitim talep etmişlerdir. Çalışma kapsamında ek araştırma sonuçları ve öneriler ayrıntılı olarak verilmiştir.

## INTRODUCTION

Education, which plays a major role in human life, affects people's social status, living standards, lifestyles, self-development, and many other vital elements. According to Howard (2018), education, which occupies an important place in our lives, is not a panacea, a cure for all the diseases in the world. Education may not be a cure; it can, however, foster the development of individuals with positive attributes, such as being healthy, conscious, creative, critical thinkers, and aware of their responsibilities. Education, which is not in line with these aims of education, has created different generations at different times.

The truth behind the creation of different generations such as the medieval ascetic, the humanist individuals of the Renaissance period, the generation of Z born with today's technology and the Internet is the power of education (Durkheim, 2016). Consequently, as a side effect of this power, unfair distribution of income along with unsustainable consumption escalate in direct proportion to the increasing level of education (Howard, 2018). Indeed, the people that govern us in an unjust, unhealthy and unsustainable way, are the people who graduated from the most prestigious colleges and universities in the world. The current world state is an indicator of the need to transform education (Cortese, 2003).

Psychological, biological, and sociological problems are on the rise while the living standards of humans improve at the expense of killing our planet (Myers, 2015). To prevent these problems, education is expected to be sustainable as well as providing a sustainable living. Studies related to incorporating the sustainability in the curriculum and raising the awareness of the students in this topic (Cebrian and Junynet, 2015; Wolff, Sjöblom, Hofman-Bergholm and Palmberg, 2017; Andersson, Jagers, Lindskop, and Martinsson, 2013) as well as successive skills necessary to provide sustainability such as transformational learning, learning by experience, problem-solving, collaborative research, creativity, entrepreneurship are demonstrated by many researchers (Fullan and Langworthy, 2014; Department of Education Nova Scotia, 2015; Sterling, 2002). The OECD (2018) report addresses the question of sustainable education (which education, what kind of education, education for what purpose) by identifying 21st century skills and abilities, including curiosity, deep understanding, learning through practice, critical thinking, communication skills, and technological aptitude, as key components of education that should be emphasized. The constructivist approach, which is a method that enables students to learn by doing and experiencing, rather than being passive knowledge receivers, supports sustainable education by promoting active participation (Koochang, Riley, and Smith, 2009). Howard (2018) argued that the experts stay quiet regarding this issue and suggested a radical change. On the other hand, Sterling (2001) emphasized that education culture and the people's perspective on education should change rather than teaching ecological-economic problems to students. It is a multidimensional and multivariate process to build a qualitative and up to date education. Furthermore, both providing sustainable education to people to have the necessary skills of the time and making the universe sustainable is a common problem. If it is considered from a different angle without knowledge and competency, moral order, sharing and not being harmful to others are essential to sustainable education. According to Cortese (2003), strategies, technologies and policies for a safe, fair, and environmentally sustainable future are among the most complex and interconnected issues that society must overcome. Because, the change sought is a profound cultural change; the most difficult to achieve (Meadows, 1997). However, it is seen that some of the practices aimed at increasing the quality of education have side effects. For example, in parallel with recent developments in the United States (neo-liberalism), the commodification of teacher education has led to an increase in accountability and over regularity as well as attacks against multicultural education (Zeichner, 2010). It

is seen that today's good teachers have decreased their professional commitment and evaluated options such as early retirement or transition to another profession (Sterling, 2001). This is a direct reflection of the global changes in education. Instead of rebuilding the education according to each change, the way should be paved for the sustainable education to establish the concept of independent self-sufficient education.

### **Sustainable Education**

Sustainable development and education depend on the values and principles which constitutes the foundation of sustainable development. The three dimensions of the sustainability (environment, society, and economy) is related to the good of healthy, encourages life-long education, and widely accepted that it affects international results despite being based on local needs and conditions. Sustainable development and education also engage formal, informal, and non-formal education in line with emerging sustainability concept in light of the international issues and domestic priorities (Diemer, Ndiaye, Khushik and Pellaud, 2019).

Education in Türkiye is governed by the Ministry of National Education and teachers have limited freedom in teaching a lesson, determining the contents, applying varied teaching methods and curriculum, however, autonomy of the teachers in Türkiye is very weak compared to OECD countries (Çolak, Altınkurt and Yılmaz, 2017). Consequently, this fact leads education in Türkiye to be conducted with a centralized program made by Turkish educational policies and neglecting the conditions and needs of sustainability on a local basis. Educational policies should be structured to support sustainability in order to provide sustainable education (Leicht, Heiss and Byun, 2018). In recent years, it has been revealed that political parties, nongovernmental organizations, religious groups, interest, and pressure groups possess a certain degree of power in shaping educational policies in Türkiye (Balyer and Tabancalı, 2019). In the same study, it is reported that the situation in which parents making demands based on the interests of their own child leads to the deterioration of perspective on education and educational policies aiming for the success of centralized exams. Therefore, even though, educators and administrators seek new strategies and methods to enhance academic achievement, there is no expectation of a corresponding effort to ensure the sustainability of education.

In Turkish literature, educational studies prioritize tackling issues such as ecology, economy, and environmental awareness related to global warming problems in terms of sustainable development (Özdemir, 2010; Tanrıverdi, 2010; Teksoz, 2014; Uludağ, Karademir and Cingi, 2017; Yıldırım, 2020). Because the course subjects and units regarding the environment in the current curriculum is quite inadequate in transferring the idea of sustainable development to the next generation. However, changing the contents of the courses is far from the real solution of the problem. What should be done first is to train teachers who can apply the philosophy of sustainable development to life (Yapıcı, 2003). In this context, it can be stated that the necessary steps to provide sustainable education is already become late to be taken in Türkiye. In developed countries, an approach has been developed to integrate the sustainability into the education program to provide sustainable education on an international scale.

In a study conducted by Laurie, Nonoyama-Tarumi, McKeown and Hopkins (2016) educational programs and plans of developed countries aimed at sustainability were summarized as follows.

In Finland and Japan, schools and school systems, education and management plans have been comprehensively converted to applications in their sustainable development and educational competencies. The Netherlands aims to integrate the four UNESCO competencies (learning to know, learning to do, learning to be, and learning to live together) into its curriculum. In other places (Australia, Canada, Estonia, Latvia, Peru, USA), Sustainable development and education curriculum outcomes have been integrated into the school curriculum and not imposed as 'add-ons' to schools. This

approach not only informs about the sustainability but also contributes to embracing the philosophy of a sustainable living and becoming a conscious individual. Additionally, utilizing the power of the education to provide a sustainable living on an international effort has been increasing day by day.

Finally, it can be stated that the policies and practices of sustainable education in Türkiye are weaker compared to those in developed countries. A democratic environment which enables to act with a universal level of public awareness instead of interest groups and economic concerns, is crucial in changing the perspective on education and implementing the sustainable education.

The study conducted by Sterling (2001) indicating a much-needed transformation of dimensions such as policies, administration, methods and contents of sustainable education was used as a guidance for this study. According to Şemin (2020), sustainable education depends on a good transformation process, building a healthy future, implementing ethical values, gaining knowledge regarding environmental safety/awareness, and finally having positive education culture. Şemin explains the educational principles of these dimensions as follows.

i) Transformation: Teaching necessary living skills, living knowledge, thinking skills, and different perspectives to the students to prepare for ever changing living conditions.

ii) Building a healthy future: Projecting the potential knowledge and skills with a positive attitude into the future by associating the current subjects and events with global ones using their education.

iii) Ethical values: These are educational outcomes that shows the characteristics of a democratic individual, educated with ethical, moral principles, and universal human rights and applying them in daily life.

iv) Environmental awareness: Providing positive effects on the balance of the nature, raising sensitive individuals about nature and environment is an indispensable aspect of the sustainable education.

v) Education culture: The values that will create unity and integrity in education as well as the educational culture formed by a common sharing, ensure a healthy existence of education. An education culture that prioritizes sharing over a competitive education environment can facilitate the creation of sustainable education.

In this context, a sustainable education program is based on the principles mentioned above and focused on practical applications that will provide deep learning such as critical thinking, problem-solving, collaborative work, creativity etc., to ensure sustainable education (Fullan and Langworthy, 2014).

Sustainable education, in a nutshell, is a way to preserve the ethical values, conveying the lessons learned to everyday life (functional education) in terms of social relationships and environmental awareness. Sustainable education is not to reject or ignore academic knowledge, but to place life itself in the education system in a way that is not abstract from everyday life. The nature of the sustainable education also incorporates the effect of its dimensions namely the chain effect. In other words, if moral values are kept alive in education, there will be a sense of contribution to the whole. Therefore, it is clear that sustainable education is an interrelated process within itself and will have common points in the intersection of its dimensions. The dimensions of education for sustainability (strong values, critical thinking, lifelong learning, participation, being future-oriented, the transformation of individuals and communities) in the Parliamentary Commissioner for the Environment (2004) are similar to the dimensions described in this study in terms of i) preservation of moral values, ii) functional education, iii) participation / social relations, iv) environmental awareness, and v) awareness of contribution to the whole. In this context, the dimensions of sustainable education as a whole can be summarized as follows.



### **Functionality Dimension**

Functionality can be described as the principle of education fulfilling the task that is expected of itself. For instance, if the students don't apply the lessons learned in the school in their everyday life, then this kind of education is considered as dysfunctional. Rather than presenting the content of the courses to the students with advanced theoretical knowledge, addressing the course content and method with practical information applicable in their lives is one of the ways to make education functional and prepared for change. Transformative learning, which includes critical thinking, reflective thinking, creative thinking, problem-solving, and similar skills, is an important factor for making healthy democratic decisions in making a change (Thomas, 2009; Sterling and Thomas, 2006). The relationship between thinking skills and sustainability has more than 40 years of history (Thomas, 2009). According to Lang (2004), it is necessary to pave the way for critical and reflective learning to turn theory into practice in sustainable education. The expression "the one thing that doesn't change is the change itself" should be taught to the students by creating experiential learning situations for the historical and evolutionary events rather than rote-learning. Explaining the economic, ecological, and sociological dimensions of the existing changes, asking for help from experts, and creating schemes that illustrate this situation are the essential factors for the functionality of the education. Concurrently, in order to develop the individual as a whole for sustainable development, new methods should be sought to encourage the teachers and academicians to take more responsibility (Hernandez and Mayur, 2000).

### **Awareness of Contribution to the Whole Dimension**

To provide responsiveness to the needs of the next generation and the power of nature, exemplification of what is inherited from the previous generations and what they will pass on to the next generation may be seen as important in determining the direction of change. A Conscious individual can be trained with an education system that encourages the students to be aware of the world and follow up on social issues in newspapers and magazines, as well as relating the local problems with global ones. Undoubtedly, the media plays a major role in society's awareness in this regard (Hopkins and McKeown, 2000). The technology in the higher education curriculum will solve most of society's problems; students are asked not to object to the assumptions that all human needs and desires can be met (Cortese, 2003). To object to this situation is to make life sustainable with individuals who contribute to the whole and to open the door of sustainable education. In other words, not much emphasis is given to the fact that the technology is not the only solution to the problems such as limited resources, global warming, inequalities in income distribution, and social injustices. In the paradigm of sustainable education, socialism rather than individualism, with an emphasis on the "us" rather than the "me," is vital to create a consciousness of contributing to society. To create awareness of contribution to the whole is to know what goes wrong in individuals' lives or education and to take responsibility for the remedy of things that go wrong, and to share the responsibility they take by inspiring others (Gonggool, Thiengkamol, and Thiengkamol, 2012).

### **Preservation of Moral Values Dimension**

Strong values base to allow for connectivity of self with community; sustainability values include compassion, equity, justice, peace, cultural sensitivity, respect for the environment, and recognition of the rights of future generations (Parliamentary Commissioner for the Environment, 2004). Seeing and taking example of the people who respect in a way not to violate the other individuals' rights can be turned into a habit with education. Habits turn into behaviours, hence, the more these habits are repeated, the more we take care of moral values. Because Kandel (2016) supports with his research the idea that even though we do not know exactly how the brain learns, but repetitive behaviour is permanent. The actualization of the concepts of respect, democratic environment, justice and equality by teachers can be effective for students to adopt that this is a natural process. An

education away from a unifying and holistic approach and geared towards competition and academic focus can have negative consequences. Academic achievement, promotion, and competition can interfere with the sharing of information and may also distract from human characteristics such as respect, equality, rights, etc.

#### **Environmental Awareness Dimension**

Sustainable education can be supported in sustainable living conditions. To ensure sustainable life is primarily possible by showing awareness of the world and the environment we live in. Education is one of the first places to be knocked on the door to educate individuals who are sensitive to the environment. Environmental awareness has an important role in making the world sustainable since the individual's needs of nature and the benefits of nature to the individual are actually intertwined. Louv (2005) reached the conclusion that the children who grow in nature increase their creativity and self-confidence while reducing some of the psychological illnesses such as hyperactivity, attention deficit, etc. We can experience that the existence of living in nature has a therapeutic effect by living with nature (Wagner and Gordon, 2000). If we allow our admiration and respect for nature to increase, behaviour of attention to prevention against pollution of the nature, preservation of natural resources, and saving energy may come spontaneously. Thus, we can realize being in life and gaining sensitivity to global environmental problems. To object the perspective of "Humans are dominant species and are separate from nature; resources are free and inexhaustible; The ecosystems of the world can absorb all human impacts." (Cortese, 2003) is one of the missions of sustainable education.

#### **Sharing/Participation Dimension**

Participation is the foundation of democracy and citizenship in sustainability (Parliamentary Commissioner for the Environment, 2004). Participation plays an important role in ensuring sustainable life by developing the communication, sharing and advancing the civilization (Hernandez and Mayur, 2000). The fact that sharing is the foundation of democracy and as well as being the key to happiness by having social relations and sharing with others should be conveyed to students by experience (Waldinger, 2015). The most common feature of the people who are happy and content with their lives is that they have satisfying social relationships (Diener and Seligman, 2002; Kashdan, 2007). In addition to providing positive emotions to the individual, happiness has positive returns in many areas related to the life of the individual. Lyubomirsky, King and Diener (2005) reveals that happiness strengthens the individual's immune system, increases energy and creativity, makes them more preferred and loved in their social relationships, increases their productivity and allows them to live longer. Designing a sustainable education requires a paradigm towards a systematic perspective that emphasizes collaboration and sharing with strong social relationships. Most of higher education emphasizes individual learning and competition (Cortese, 2003). However, the seeds of life that are thrown into the future are joint working to solve a problem, and that the whole piece is more meaningful and effective than the individual pieces. Finding out how much the teachings at schools are reflected in the students' lives is about whether education is sustainable.

Literature review shows us that the studies about the students' education satisfaction or what kind of education they want are mostly conducted on schools with special programs such as colleges, universities or vocational high schools (Gruber, Fuß, Voss and Gläser - Zikuda, 2010; Alves, and Raposo, 2007; Ali., Zhou, Hussain, Nair and Ragavan, 2016; Elasan and Keskin, 2014). Although no studies have been conducted on this subject, studies on the necessity of radical changes in education for sustainable life have gained weight in recent years. Important subjects such as the content, quality, and method of the education to ensure sustainable life have become the focus of even the non-educator experts. Hence, it is necessary for the educators to focus on this subject not just for the field of education but also to contribute to a sustainable life in the global context. However, it has been observed that

studies on the subject of sustainable education at the international level have gained traction recently and have become a topic of increasing importance in the field of education (McFarlane, and Ogazon, 2011; Warner and Elser, 2015; Mohanty and Dash, 2018; Abbas, Aman, Nurunnabi and Bano, 2019; Geng, Zhu, Zhao, and Zhai, 2020, Navarro-Espinosa et al., 2022). Unfortunately, the same trend cannot be seen in Turkish education system in which there are no specific classes at the high school level dedicated to sustainability and there is no practice aimed at providing knowledge, skill, and awareness regarding sustainability in classes such as geophraphy, biology, health education, and traffic culture. International sustainable education programs are mainly addressed in universities (Lukman and Glavic, 2007; Rowe, 2010) where the studies are more concentrated in higher education (Wu and Shen, 2016). Increasing the implementation of exemplary programs and the practices that serve sustainable education in high schools is important for the widespread adoption of sustainable education in Türkiye. The sustainability of education depends on the fact that the students spend their time well at school and that they have an education system that they can benefit from in their future lives. In order to achieve this, it is very important to reveal the factors that will ensure the transformation of the education system into sustainable education.

In this study, whether the education is sustainable or not, and the effect of the sustainable education program on the students were investigated. The Objective Oriented Program Evaluation approach (Fitzpatrick et al., 2004) was utilized to assess the attainment of the objectives of the sustainable education program. In this context, whether the participants' awareness of sustainable education changed positively was determined with pre-test and post-test. Additionally, their opinions regarding the implemented program were collected. For this purpose, answers to the following questions were sought:

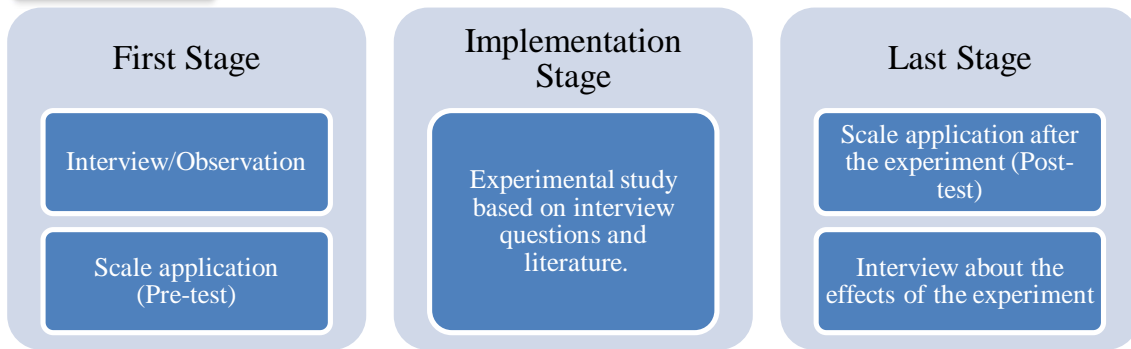
- 1) Do the pre-test scores of the sustainable education perception scale differ according to the group variable?
- 2) Is there a significant difference between the pre-test and post-test scores of the control group according to the scores obtained from the perception of sustainable education scale?
- 3) Is there a significant difference between the pre-test and post-test scores of the experimental group according to the scores obtained from the perception of sustainable education scale?
- 4) What are the students' views on the education they receive at school (whether their education is sustainable)?
- 5) How is the sustainable education program reflected in the students' experiences?

## METHOD

### Research Design

This study is conducted with a mixed method and a nested mixed design. The nested mixed design involves the use of data either in a combined or sequential fashion; but the main idea is that either quantitative or qualitative data is embedded in a wider design (e.g., experiment) and that these data sources have a supporting role over the entire design (Creswell, 2016). To determine the effectiveness of the sustainable education program, using the data from quantitative method was insufficient and therefore, it was also necessary to evaluate the data obtained by qualitative method from a holistic point of view. In this research, which investigates the effectiveness of the program developed to provide sustainable education at school, the following stages are included.

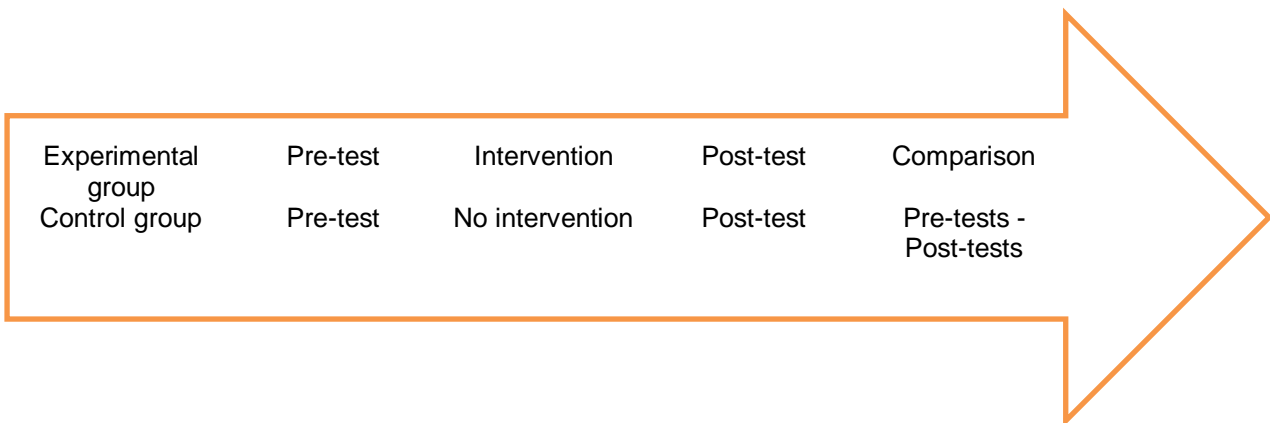




First, the rationale for the collection of qualitative data is determined for the experimental stage with interview questions. The data showed that the participants' interest and knowledge towards sustainable education were insufficient, and the program should be designed to mitigate this outcome. Qualitative data are collected and analysed to support the experimental stage. The experimental study is conducted, and then quantitative data are found and analysed. Next, qualitative data are collected by deciding the rationale for the qualitative phase. Finally, the relationship between quantitative outputs and qualitative findings is determined (Creswell and Plano-Clark, 2014). Firstly, quasi-experimental design and pre-test-post-test random group design were used in the quantitative dimension of the study. In quasi-experimental designs, the participants in the control and experimental groups may not be equivalent in terms of many variables and therefore, the dependent variables may be affected (Christensen, Johnson and Turner, 2015). In this study, the preference of the study design as a quasi-experimental was influenced by the personal, psychological and cultural characteristics of the students.

In the study, comparison group design was performed in the following stage.

**Figure 1**  
Random Design Stage with Pre-Test and Post-Test Control Group



In the qualitative dimension, the research is conducted as a case study. Case studies can answer specific questions of "why" and "how", rather than "what" questions (Yin, 2009). It is a case that will be determined by the answers to the questions of "why" and "how" about the effectiveness of the sustainable education program. At the same time, determining the impression left by the program in which the students take part is also shows that the study is a general case study. According to Robson (2015), all the projects that are carried out at specific times, in certain places and with specific people are

case studies. In this context, explaining and evaluating what sustainable education program is and how it has effects on students shows that the study has a case design.

### Research Participants

In the quantitative dimension, the study group was categorized with two classes as one experimental group and one control group from 11th-grade classes in the public high school located in the central district of Sivas province in the 2018-2019 academic year. For experimental, quasi-experimental and non-experimental patterns involving group comparisons, the number of observations per group is recommended to be 15 (Borg and Mall, 1989; Mertens, 2005). To make the predictions of the study stronger, the number of participants was taken as 19 for experimental group and as 21 for control group. The participants whose pre-test scores on the sustainable education perception scale were disadvantaged were assigned to the experimental group, while the others were assigned to the control group. Information about the experimental and control group is given in the following Table 1.

**Table 1: Demographic Variables of the Study Group**

	N	Experimental Group	Control Group
Gender	Male	7	13
	Female	12	8
Total		19	21

The qualitative dimension of the research was carried out in two stages. The first stage is for obtaining necessary information that helps to experiment. At this stage, all participants in the experimental group were included in the study with homogeneous sampling which is one of the study group purposed sampling methods. Similarly, the study group were determined again with homogeneous sampling method at the other stage. The homogeneous sampling is a method to constitute a sample from a similar subgroup or state in the universe according to the research problem (Yıldırım and Şimşek, 2005).

### Data Collection Tools

In this study, three different data collection tools were used. First, a semi-structured interview form was used to reveal the beliefs and expectations of the students towards sustainable education prior to the study. The semi-structured interview form was prepared according to the opinions of two experts specialized in educational sciences. In addition, the help of the classroom teachers was taken to ensure the questions were appropriate and clear for students' level.

Sustainable education perception scale developed during the study by the researcher was applied to 11th-grade students and used as a data collection tool to be applied to the experimental and control groups in both the pre-test and post-test stages. Sustainable education perception scale is a five-point Likert-type scale consisting of 22 questions in five dimensions. The scale was evaluated via a pilot study with 114 high school students and finalized. According to the exploratory factor analysis results of the scale, the scale items explain 58.7% of the total variance. According to the confirmatory factor analysis,  $\chi^2/df$  and RMSEA values were found as 419.73/197=2.13 and 0.65, respectively. In addition, the values in other goodness of fit tests RMR = 0.05; GFI = .90; CFI = 0.97 NNFI = 0.97 were found to be within the acceptable range. The reliability of the scale was determined by Cronbach's alpha coefficient and calculated as .91. Therefore, the scale can be considered as highly reliable. Another data collection tool is the semi-structured interview form used after the experimental stage to determine the effectiveness of the program applied to the students with the question "What do you think about the effect of the course that you take with the sustainable education program on your knowledge or experiences in your daily life?". The question prepared by the researcher to determine the effect of the experimental stage on the students were finalized by taking the opinions of two faculty members

specialized in educational sciences. The semi-structured interview form was finalized according to the opinion of the linguist regarding the clarity of the questions.

### Sustainable Education Program Development

For the experimental study, following the conducted relevant literature search, the topics, methods and techniques to be included in the program were determined by considering the answers given to qualitative research questions and opinions of experts who specialize in this field. Student gains such as knowledge, skills, experiences through the education, methods, and techniques were determined for the sustainable education program as a weekly implementation program. The sustainable education program was prepared and carried out by the researcher with teaching methods that relate to real-life experiences to help the students absorb the lessons. Both the experimental and the control group had the same classroom teacher. During the implementation process, activities were carried out in accordance with the items determined by the researcher and students were allowed to express their opinions clearly and to participate effectively. Videos, case studies and scenarios, scientific articles, etc. related to specific topics were reviewed. It was observed by the researcher that the students found the activities very appealing. The eight-week sustainable training program to be implemented in the experimental study is organized in the following.

**Table 2:** Sustainable Education Programme

Dimensions / material / activity /time	Aims	Objectives
<b>Dimensions:</b> Life-oriented & functionality	1) To enable students arguing educational problems and criticizing them.	1) Students will be able to argue their educational problems in the classroom and will be able to criticize them.
<b>Materials:</b> Caricature (depicting the criticism of the education) Presentation (What is sustainable education?)	2) To provide students to keep up with current news and developments.	2) Students will keep up with current news and developments via written and visual media, social media etc.
<b>Activities:</b> Discussion about the presentation and caricature Group discussion (review of the differences between their education system and sustainable education)	3) Development of reflective and critical thinking skills to reflect the education in the school to real-life. 4) To raise student's awareness of making real the activities which were learned in the lessons.	3) Students will plan and implement how to apply the acquired knowledge to life. They will take responsibility for self-regulation and self-assessment by reviewing their experience. 4) Students will make decisions by avoiding prejudice and evaluating all kinds of ideas with evidence and logical inferences.
<b>Time:</b> 2 weeks (Two lessons)	5) To raise students' awareness of responsibilities for making their training functional.	5) Students will be able to put theoretical knowledge into practices. 6) Students will be able to study on lessons and to work on project or workshop together by cooperation.

Table 2 Continued

Dimensions / material / activity /time	Aims	Objectives
<b>Dimension:</b> Awareness of contribution to the whole <b>Materials:</b> Scientific articles, magazines, news on ecological subjects, global problems. <b>Activities:</b> Question- answer, (questions about scientific articles, magazines, news on ecological subjects, global problems and answers of questions) Argument development (views regarding the solutions of the problems). <b>Time:</b> 2 weeks (Two lessons)	1) To gain awareness of the needs and rights of the next generation. 2) To ensure that every small positive change will contribute to the whole. 3) To raise students' awareness of taking care of their behaviour to leave a healthy environment for the future. 4) To raise students' awareness of global problems (global warming, extinction of animal species, destruction of forests, water pollution etc.)	1) Students will learn how to not over-consuming resources, not destroying nature, and not hurting creatures etc. 2) Students will be able to participate in activities to protect nature and make projects to be beneficial to people. 3) Students will be able to query global problems and be aware of reasons and results. 4) Students will be able to contribute to civil society organizations. 5) Students will be able to participate in social activities and act to preserve the environment.
<b>Dimension:</b> Moral principles <b>Materials:</b> Stories about ethical problems <b>Activities:</b> Semantic analysis of stories Make corrections to stories according to ethical problems. <b>Time:</b> 2 weeks(Two lessons)	1) To raise students' awareness of equality, justice, respectfulness, fulfilling responsibilities. 2) Developing arguments about the consequences of unethical situations 3) To ensure students take part in moral behaviours.	1) Students will be able to explain the concepts of equality, justice, respectfulness, fulfilling responsibilities. 2) Students will be able to give importance to be respectful and to be sharing. Students will be able to give importance to behave ethically. 3) Students will be able to object to injustice, to defend someone's right respectfully and taking advantage of legal rights.

The objectives related to each dimension of sustainable education and the achievements of the students following these objectives have been determined. A program has been prepared that includes the expected outcome of the student activities, and how long it takes and by which methods the students earn these achievements.

#### Data Analysis

Following the experiment, the post-test scores of the experimental and the control group were determined. Afterwards, the difference between the pre-test and post-test scores of both groups was examined. Since the experimental and control groups were less than 30 people and the distribution was not normal, non-parametric tests were employed in the data analysis. Mann-Whitney-U test was used to compare pre-test and post-test scores (experimental and control groups) whereas the Wilcoxon Signed Ranks Test was used to reveal the difference between the pre- and post-test scores of the experimental group and the pre- and post-test scores of the control group.

The qualitative data obtained from the interviews before and after the experiment were analysed by content analysis. In the content analysis process, the interviews were translated into text and the consistency between the voice recordings and the converted text was examined. The general framework of the opinions given by each participant to all questions was determined and the main themes and categories were obtained through selective coding. The opinion of a specialist in the field of educational sciences (who have experience in the qualitative study) on the compatibility of categories and themes were taken and necessary corrections were made in the corresponding categories and themes accordingly. Finally, the data were interpreted and presented with direct quotations.

### Validity and Reliability in Mixed Method Research

The validity and reliability of this study were determined by multiple validity test applied to both qualitative and quantitative methods described by the authors of [64]. The procedures for these stages are explained in the Table 3.

**Table 3:** Procedures to Ensure the Validity and Reliability of the Study

Multiple validities	Qualitative	Quantitative
	The information about the validity and reliability of the scale used in the qualitative method was given in the data collection tool. The rationale for the analysis is also given in the method section.	To ensure validity and reliability in quantitative research, studies on credibility, transferability, consistency and confirmability [65] were conducted as follows.*

\* To ensure credibility, the researcher explained the students the purpose of the study and how to conduct it. The answers of the students to the interview questions were both translated into text and recorded with audio. The discourse of the students and the statements in the text have been confirmed whether they are the opinions they wish to convey. Also, the opinions of the students about the program were collected by anonymous papers to provide objectivity. The results were analysed with help of another expert to prevent researcher bias.

\* To ensure transferability, each process, purpose, data collection tools, method and findings of the research have been explained one by one and presented to the reader clearly. The raw data obtained in the study and the data processing are explained comprehensively.

\* To ensure consistency, the researcher paid attention to the consistency of the opinions of the participants with each other. Additional probe questions were provided to ensure that the participant fully understood the question for views considered to be inconsistent. In addition, the consistency between the category and the themes is regulated by expert opinions.

\* For the confirmability, direct excerpts are given as examples of the results of the research. The data was made ready to be reviewed again when necessary.

### Work permit and ethical considerations

The study was conducted with the approval of the Sivas Provincial Directorate of National Education, as evidenced by document number 92255297-605.02-E.4076373 dated February 25, 2019.

### FINDINGS

The findings obtained based on the quantitative and qualitative data of the research are given separately. To evaluate the impact of the sustainable education program on students' perceptions, the pre-test and post-test scores of both the experimental and control groups were analyzed using quantitative data. With the qualitative data, the opinions of the students regarding both the education they received at school and the sustainable education program were obtained.



### Quantitative Findings

(1) The results of the Mann-Whitney U test for the pre-test scores of the experimental and control group students are given in the following Table 4.

**Table 4:** The Pre-Test Scores of the Experimental and Control Group

Group	n	Mean Rank	Rank Sums	U	p
Control	21	23,73	474.50	135.5	0.81
Experimental	19	17,28	345.50		

Table 4 reveals that there was no significant difference between pre-test scores of experimental and control group students ( $p > .05$ ). Hence, there is no difference in the perceptions of the experimental and control groups about sustainable education.

(2) The results of the Wilcoxon Signed Ranks Test on whether there is a significant difference between the pre and post test scores of the control group students are as given in the Table 5.

**Table 5**

Wilcoxon Signed Ranks Test for the pre- and post-test scores of the control group students

Score	Groups	N	Mean Rank	Rank Sums	z	p
SEA (pre-test-post-test)	Decreasing	12	9.25	115.50	-1.308	.191
	Increasing	6	9.63	55.50		
	Equal	3				

Table 5 shows that there was no significant difference between the pre-test and post-test scores of the control group students ( $z = 1.308$ ;  $p > 0.05$ ). It is expected that the control group's perceptions of sustainable education do not differ since they do not participate in the sustainable education program.

(3) The results of the Wilcoxon Test on whether there is a significant difference between the pre-test and post-test scores of the experimental group students are as given in the Table 6.

**Table 6:** The results of the Wilcoxon Signed Ranks Test for pre-test and post-test scores of experimental group students

Score	Groups	N	Mean Rank	Rank Sums	z	p
SEA (pre-test-post-test)	Decreasing	1	2.00	188.0	-3.744	.000
	Increasing	18	10.44	2.00		
	Equal	0				

According to Table 6, there was a significant difference between the pre-test and post-test scores of the experimental group students before and after the sustainable education program ( $z = -3.744$ ;  $p < .000$ ). When the mean rank values of the difference scores are examined, it is seen that the significant difference is in favour of the increasing, namely post-test. Based on this finding, it can be said that the sustainable education program is effective in increasing the perception of sustainable education of the students in the experimental group.

### Qualitative Findings

Before the implementation of the effectiveness of the sustainable education program, the students were asked whether the education they received was sustainable or not. Then, students' statements about what kind of education they want are collected. The results of the content analysis according to the opinions of the students are as follows:

(1) Students' opinions are classified according to the following questions: "Can you use the education you receive at school in your life outside the school? What do you think about this topic? Content analysis results of students' responses are given in Table 7.

**Table 7:** Content Analysis Regarding the Reflection of School Education on Everyday Life Outside the School

Theme	Category	Sub-category (reasoning)
Reflection in social life (rsl)	Negative reflection	No interaction with the environment Recitation based education Exam-oriented education Non-functional education Outdated education
Reflection on academic subjects (ras)	Positive reflection	Being successful in exams ; Well-equipped teachers Theoretical courses
Reflection on health issues (rhi)	Negative physical reflection	Insufficient information about health Immobile living
	Psychologically negative reflection	Course intensity Academy-oriented life
	Physically positive reflection	Contribution of medical courses
	Psychologically positive reflection	Gaining psychological stability through experience
Contribution to moral development (cmd)	Negative reflection	Discrimination Inequality
	Positive reflection	Lessons about rights and law School rules
Reflection on personal development (rpd)	Negative reflection	Intensive theoretical courses Rote and enforcing education Intensive study program
	Positive reflection	Having different experiences

According to the table 7, the opinions of the students about the reflection of the education they receive at school to their lives outside the school were examined under the themes of reflection on social life, reflection on academic issues, reflection on health-related issues, reflection on moral development, and reflection on personal development.

In the category of negative reflection of education to social life, there were sub-categories of rote-based education, exam-oriented education, dysfunctional education and outdated education. In addition, there is no opinion about the positive reflection of education to social life. In this theme, the opinion of “I do not think that my education has an impact elsewhere, for me, education at school is all about solving the questions on a paper. (Q1)” points out that education does not affect social life.

Under the category of positive reflection of education to academic subjects, sub-categories of being successful in exams, theoretical and well-equipped teachers were obtained. Also, there is no opinion regarding the negative impact of education on academic life. The quote of “I use the education I received in school, especially in physics, chemistry and biology, mostly in exams and rarely in real life.

History and painting classes are effective in terms of general culture. (Q14)" shows that education is focused on the academic dimension."

Under the theme of physical reflection of students' education in health related subjects, their subcategories of immobile living due to studying continuously and lack of health information were reached. The category of psychological reflection of education was explained by course intensity and academy-oriented life subcategories. The category of positive reflection of education in being a healthy individual is explained with the subcategory of contribution of medical courses whereas the category of psychologically positive reflection has the subcategory of Gaining psychological stability through experience. Parallel to this, the opinion of "I don't think that the education I received has a physical or psychological contribution to me. On the contrary, very difficult courses negatively affect my psychology (S1)" suggests that education may harm students' psychological health as one of the side effects.

Discrimination and inequality subcategories for the category of negative reflection related to the theme education's contribution to moral development and rights for positive reflection category, law and so on. sub-categories of school rules were obtained by giving information in lessons. On the other hand, "I think the best behaviour the school teaches the student is to be fair. Besides, the statements also indicated some teachers show more interest in hardworking students, creating a sense of inequality among students. School is the first place where the necessary behaviours are taught. (S5)" can be interpreted as that education affects ethics and morality.

The subcategories of intensive theoretical courses, rote and enforcing education, and an intensive study program are chosen as the reasons for the negative reflections whereas the subcategory of having different experiences is chosen as positive reflection of the theme of reflection on personal development. Regarding students to improve themselves with the education they receive, the opinion of "I think that the education I receive at school dulls my creative and critical thinking. We cannot improve ourselves with stereotyped knowledge (S12)" shows that the student is in the process of education that does not allow them to develop themselves.

The results show that the current education the students received at school has negative reflections on their non-academic lives, such as their social life, personal health, moral and personal development. It also implicates that there are obstacles in realization of sustainable education. It can be inferred that the students consider sustainable education as a process that brings positive outcomes in cognitive, biological, psychological, and social aspects.

The classification of the students' opinions regarding the question "As a student, what kind of training do you think you should have to continuously develop your skills and abilities to adapt to the changing world conditions?" are given in the below Table 8.

**Table 8:** Students' Opinions About What Kind of Education They Desire

Theme	Category
Skill and talent oriented	Individual education
Constructivist education	Critical thinking
	Up-to-date education
	Free education
	Hands-on education

In Table 8, the education that students want to receive to continuously improve their skills and abilities and adapt to changing world conditions is combined with the theme of “skill and talent-oriented and constructivist education”. Skill and talent-oriented education theme is explained in the category of Individual education. The theme of constructivist education is divided into subcategories of critical thinking, up-to-date education, free education and hands-on education. Some of the students' views on this subject are as follows.

Commenting on skill and talent-oriented education, a student argues: “I want to ensure that students are educated according to their abilities which are determined at a young age. Also, students should take lessons until noon and then focus on improving their skills according to their fields (S2)”. This opinion draws attention to the need for education according to the individual. Regarding the constructivist education taking place in practice, another student comments: “This is the education I want to take to adapt to the changing world conditions, an education that is liberating, respectful to human beings, loving differences, shedding light on art and science without the pressure of religion and politics (S7)”. This view emphasises the demand for free education. Yet another view to reflect constructivist training stated by a student: “I want an education that enables me to learn by experiencing rather than memorising (S4).”, which indicates that we could not fully internalize constructivist education in our education system.

It was observed that the opinions of the students before to the sustainable education program have some points seen as incomplete or wrong that students want to change. It has been revealed that education influences many aspects of their lives and that the education they want to receive for increasing their life skills as an individual is functional and liberating.

After the application of the 8-week sustainable education program to the students, the effects of the program on their knowledge and experience were examined. The students' opinions about the impact of the program they received on the experiences they can use in their lives are as following Table 9.

**Table 9:** Content Analysis of Students' Sustainable Education Program Experiences

Theme	Category
Functional	To prepare for life, Hands-on education, To use in life, To increase the sense of curiosity
Awareness	Understanding perspectives Consciousness of being an individual Getting to know the universe Willingness to take responsibility

Table 9 shows that the courses that students take with the sustainable education program are reflected in the students' experiences under the themes of functional and awareness. Under the functional theme, the opinions of the students are combined under the categories of to prepare for life, hands-on education, to use in life, and to increase the sense of curiosity. Awareness theme is divided into four categories: understanding perspectives, consciousness of being an individual, getting to know the universe, willingness to take responsibility.

I noticed that that the students showed awareness towards sustainability and global issues while the program was implemented. I also observed feelings and thoughts that indicate the students are apathetic to these subjects and only concentrated to academic success and their private life. The

students expressed their feelings on having an education that is not designed according to their interests, talents and skills in their school, and that sustainable education provides flexibility in this regard. Some of the student views on this subject are as follows: As one of the positive effects of the sustainable education program on the student, the comment: "I realized that this education prepared us for life, I started to think about the things I did not realize before and started to open up to other worlds (S9)" shows that the education they received is functional and creating awareness. Another example of positive effects, the remark of a student: "I have experienced learning with love, wondering and being in life (S12)" revealed that they acquired an education that nourishes the feeling of curiosity. In terms of making sense of different points of view, another student argues: "I have seen that I can understand some of the opposite views and events from different perspectives (S3)." This view can be interpreted as that the sustainable education the students received affects multi-faceted thinking.

The qualitative data of the study that indicates absence of awareness on sustainable education is consistent theoretically and coincide with the pre-test scores in the quantitative data of the research. The sustainable education program implemented afterwards is parallel to the increase in the post-test scores of the students and the positive opinions collected with qualitative data about the program. The students were asked for their opinions on the sustainable education program and it was revealed that they were especially affected in the dimension of Life-oriented & Functionality where they realized the need to strengthen their social life and their own abilities and interests. As can be seen from the results, student experiences related to the sustainable education program are positive and contribute to the personality, psychological, cognitive and social development of the students.

## DISCUSSION, CONCLUSION AND RECOMMENDATIONS

In the current study, the results obtained regarding the impact of the sustainable education program (SEP) on students, as well as the results reached regarding the satisfaction level of the students with their lifelong education and what kind of education they want are discussed. Findings related to the SEP applied to students can be evaluated as follows. While the students' awareness of sustainable education in the experimental group increased, the perceptions regarding sustainable education on the control group did not change. In other words, SEP proved to be effective. Findings also show that student views and experiences about the sustainable education program SEP were positive. The characteristics of SEP have been associated with being functional, being preparing for life, being practical (hands-on), being useful in life and increasing the sense of curiosity. In addition, SEP's awareness-raising feature has been associated with changing perspectives, instilling awareness of being an individual, getting to know the universe closely, and ensuring awareness of responsibility. In this context, it was revealed that the students were satisfied and benefited from the implemented SEP. The lack of studies in this context in the literature creates a limitation in comparing the results achieved with other studies. It can be stated that a wide range of research is needed on this subject.

The study evaluated the opinions of high school students concerning what kind of education they want. According to the results, the students stated that they should be given a constructivist education and it should be based on skill and talent. Students' views on the need for skill and talent-oriented education can be evaluated as follows. The concept of providing the same education to everyone and expecting every student to be talented in the same field is a situation that students don't like. The students' desire to be educated according to each individual's skills and abilities overlaps with Varenne and McDermott's (2018) assessment of the American education system as a work of reality and cultural structure imposed on them. Despite the fact that each student has different levels of learning abilities and different interests, uniform education is implemented in schools in Türkiye (Boydak, 2015). In addition, the study conducted by Yarım and Çelik (2020) revealed that teachers tend to stick to the



curriculum and evaluate students in a classifying manner rather than guiding them. Equality in education is not to ensure that everyone goes to the same schools, but to contribute to the development and success of each student in line with their abilities (Demirpolat, 1999). In the content of a democratic education program, the knowledge and skills pointed out by the determined goals are highlighted (Hotaman, 2010). Students' desire for skill and talent-oriented education can be interpreted as implying democratic education in a way. In fact, life-oriented and functional education features that should be at the core of the education system seems to be wanted by students.

Educational concepts such as critical thinking, up-to-date education, free education and hands-on education were included in the expressed features of the constructivist education. In other words, constructivist education encapsulates the ability of the individual to process information, assimilate it, apply specific problem-solving methods, interpret information from a critical perspective, and the educational features that students desire.

Although the progressivism which is a reflection of the philosophy of education, along with the social-cognitive-psychological constructivist approach have been adopted in Turkey since 2005, they are not fully realized in practice (Baş, 2011, Aliusta, Özer and Kan, 2014).

The results obtained on whether students' education at school is reflected in their life outside of school and in what dimensions can be summarized as follows. It has been revealed that their education is memorization based, exam-oriented, non-functional and based on outdated information. It also has a negative impact on their social life since it has no interaction with the environment. It was determined that the positive reflection in the academic dimension stemmed from the theoretically oriented education and the well-equipped teachers (Yalçın, 2022). According to the results, the health aspect is affected both positively and negatively. The inclusion of health-related information in the curriculum and gaining the capacity to solve problems in human relations are the factors that positively affect the health of students. On the other hand, the education system that pushes to a sedentary life, the lack of health-related information in the curriculum, the more academic -focused lifestyle under the course intensity are the factors that negatively affect the health of students (Pascoe, Hetric and Parker, 2020).

Results of the analysis suggest that the contribution of the education students receive at school to their moral development is both positive and negative. While teachers' discrimination among students and not treating students equally affects moral development negatively; giving information about morality in lessons and discipline brought by school rules positively affect moral development (Watson et al., 2019).

Another important result is that memorization of theoretical knowledge, intense study tempo and imposing certain ideas do not contribute to the personal development of students, even though, students gain experience with different experiences in school life and contribute to their personal development.

In general, the negative reflections of the education the students received on their lives were expressed more frequently than the positive reflections in their statements. This indicates that there is a serious problem. While this result could be the outcome of the Turkish education system, it may also be an international problem. For example, it has been shown in most research results that university education is not sufficient to provide the educational talents and skills of the 21st-century society (Leal Filho et al., 2018; Moore, 2005; Watson et al., 2013). Spauull (2013) also evaluated the basic education of North Africa in terms of quality and revealed that only 25% of the schools are functional and the rest could not provide students with the necessary knowledge, skills and abilities that they need to learn. In this context, the negativities and deficiencies in education reflected on the students' lives coincide with the results obtained in the literature.

Overall, the results of the study indicate that the findings obtained by both qualitative and quantitative methods overlap. There is a consistency between the views (qualitative data) and the low pre-test scores (quantitative data) indicating a lack of knowledge and interest in sustainable education before the program was implemented. This result has been obtained with the qualitative method, in which students' satisfaction level with their lifelong education is collected in negative expressions. Moreover, the positive effect of the SEP which is prepared according to students' views on ideal education seen on the experimental group is in parallel with the positive views of the students on the SEP obtained by quantitative method.

The findings of this study have several practical implications. Life-oriented and functional education was demanded by the students according to study results. This can only be achieved with educational policies and a new education curriculum. Therefore, it may be suggested that the curriculum should be updated by experts in the Ministry of Education (MEB) in order to imbue a liveable world consciousness based on functional education that is suitable for teaching skills and abilities necessary for the future.

A teacher training should be designed in cooperation with the Council of Higher Education (YÖK) and the MEB to encourage teaching focused on creative, critical-thinking and problem-solving. In addition, the professional ethics lesson given to teachers should be taught more effectively and practically by academicians.

To provide students with the education in the fields they want to receive according to their skills and ability, a selection and placement program can be prepared which takes into account the interests, skills and attitudes of students, instead of a selection just based on test results.

Sustainable education programs for students should be prepared by education experts and implemented in schools for a longer-term.

#### Study Limitations

The researchers could not closely observe the program throughout the process due to the fact that the program was implemented at certain times. Since the research permit was only given in such a way that it would not prevent the curriculum from progressing, it was not possible to receive assistance in implementing the program with the teacher, and caused the program to be conducted for eight hours over four weeks, with two classes per week. Also, the economic dimension of sustainability was not included in the sustainable education program since the program was applied to the students.

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