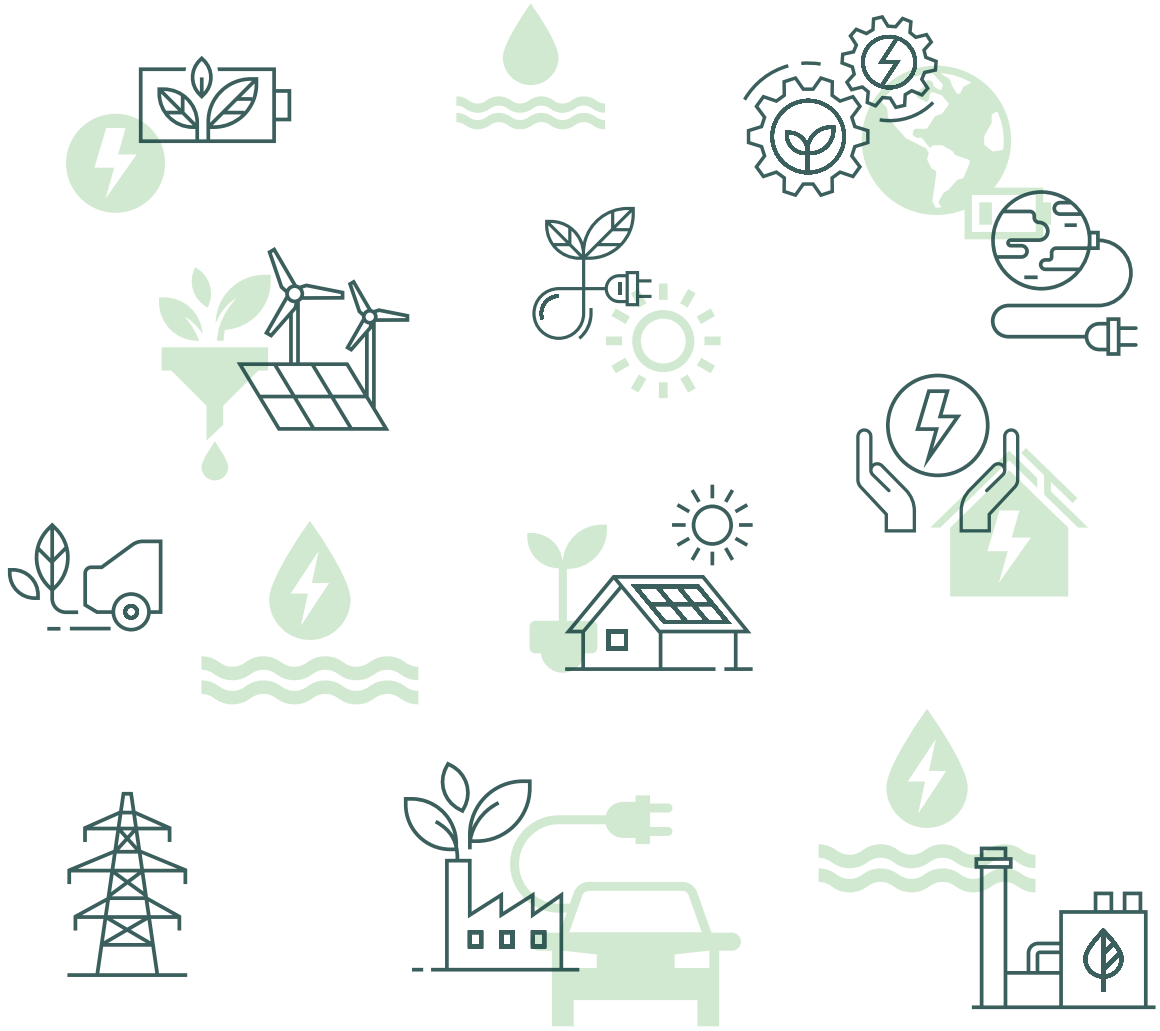
ENVIRONMENTAL LITERACY PROGRAM

IMPACT AND EVALUATION REPORT

SEPTEMBER 2022 – DECEMBER 2022



ÖRAV Kurucu | Garanti BBVA

DOW

İş Birliğinde...

EXECUTIVE SUMMARY

Climate change, global environmental problems, and accompanying social issues have led people living in different countries to develop different perspectives and views on the impact of human activities on increasing environmental problems. These perspectives have helped identify the right approaches to education, food safety, climate change, and several other issues through international and intergovernmental organizations. In recent years, many attempts have been made to incorporate environmental literacy more fully into the education system. By incorporating environmental literacy into educational programs, the goal is for students to grow up in a nature-based educational environment and to continue their everyday practices in the later stages of life on the axis of this awareness. Furthermore, students being raised with this awareness will understand the importance of environmental citizenship, be able to take individual initiatives by actively addressing environmental issues, use their knowledge to educate individuals about the environment.

Teaching is one of the professions that play the most important role in presiding over and adapting to social developments and changes. Education interacts with more than one field, such as economics, law and politics, and the professional and personal development of the teacher, who is one of the most important actors in the educational system, directly affects the changes and developments in other areas of society. Along these lines, the existence of teachers with environmental literacy is crucial to make individuals more aware and activate mechanisms to enforce policies to solve environmental problems at the local and national levels.

Based on these needs and requirements, we as the Teachers Academy Foundation have developed the Environmental Literacy Education Program to enable students and even parents to collaborate through their teachers for a sustainable future and achieve holistic environmental literacy with design-oriented thinking steps. Under the protocol between the Teachers Academy Foundation and the Ministry of National Education, teachers were involved in training through Ministry's management information system MEBBİS.

Participants followed the educational content on the Teachers Academy Foundation's distance learning platform, eCampus. On this platform, the data provided by each participant were collected and transmitted to MEBBİS. This way, teachers who met the criteria for completing the training became eligible to receive a certificate of attendance.

798 participating teachers completed the environmental literacy training. Approximately **19,975 students** were reached by 798 participating teachers. To measure the project's social impact goals, outcomes, and outputs, a series of monitoring and evaluation activities were conducted using quantitative and qualitative research techniques together. The research tools used throughout the training program are: Training Evaluation Questionnaire, Teacher's Pre-test & Post-test, Student's Pre-test & Post-test.

384 participating teachers, 61% female and 39% male, who are from 71 different cities filled out the training evaluation questionnaire includes the questions asking satisfaction levels related to content, planning process and trainers over 10 and a training objective scale. The questionnaire also includes some open-ended questions. The data was analyzed by using SPSS. The results show that more than 95% of the participant were scored for all content, planning process and trainers satisfaction levels as 7 and above. This indicates that the overall satisfaction level related to training program is quite high.

The program aims to enable students and parents to acquire environmental literacy through teachers to first acquire knowledge on the subject and then apply the acquired knowledge to their daily lives and influence others around them. In this context, participating teachers were asked to fill out a 5-point Likert-type (1: Strongly Disagree, 5: Strongly Agree) Training Objective Scale (14 items) to measure learning outcomes. According to results gathered from training objective scales, it can be said that teachers have developed an understanding of the impact of human activities on the natural environment at the end of the

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environmental literacy education program. It can also be said that they gained the theoretical tools necessary to cooperatively implement design-oriented social projects to solve environmental problems in their professional and personal lives.

Moreover, A pre-test and post-test (5-point Likert-type) were applied before and after the project to understand if there were differences between participants' levels of awareness of environmental literacy and any attitude changes. According to results, it can be said that both the level of knowledge teachers has acquired and the possible attitude changes they can go through in their daily lives based on this theoretical baggage they have acquired. It can also be projected that teachers have environmental literacy and can transfer the knowledge acquired in the training program to their professional and personal lives.

On the other hand, in order to better comprehend the knowledge level achieved by elementary school students, who are among the primary beneficiaries of the Environmental Literacy Training Program, a pre-test and a post-test were applied to students, in a similar way to teachers. It is observed that the students' motivation and excitement during the project is high from the beginning to the end of the project. The results show that the mean scores of students' knowledge and attitudes at the end of the program ($\mu = 4.30$, $SD = 0.71$) is statistically significantly higher than the mean scores at the beginning of the program ($\mu = 4.30$, $SD = 0.71$) with the medium effect size, $t(33) = 3.61$, $p < .01$, Cohen's $d = .62$.

According to the findings generated using both quantitative and qualitative techniques, there is an increasing social impact that is not limited to educational environments, also extending from the school to the local through teachers and students. Participating teachers indicated that training had a positive impact on their professional and personal development processes, while emphasizing they had the opportunity to learn concepts they had not heard of before allowing them to brush upon their knowledge of the environment.

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The concept of environmental literacy, which has historically gained importance, especially since the second half of the 20th century, derives its relevance both from academic studies (Ergler, 2020) in the field and from projects carried out by international and intergovernmental organizations (Brereton, 2018). In addition, it is critical that individuals, organizations, and countries have environmental expertise in order to create a common public opinion at the micro and macro levels in international calls to action to address the environmental and related social problems that are occurring around the world. For example, the Sustainable Development Goals (SDGs), which came into force in January 2016, are a universal call to action aimed at protecting the environment and the planet, eradicating poverty, and ensuring that humanity lives in peace and prosperity (Dodds et al., 2016). These 17 interrelated Goals approach the underlying causes of social problems from a holistic perspective.

***Figure 1**. Sustainable Development Goals*

Since implementing the Sustainable Development Goals and taking necessary action on societal issues requires the participation and support of individuals, it is important that the public be made aware of sustainability issues. In this vein, countries in both the Global South and the Global North are trying to grow and rebuild their economies by

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attracting new and sustainable industries to their communities. This requires a workforce that has advanced technical skills and a basic understanding of the concept of sustainability. Therefore, the way to create a workforce with these skills is to raise awareness of environmental literacy early in life.

The concept of environmental literacy encompasses the development of knowledge, attitudes, and skills necessary to make informed decisions about the relationships between natural and urban systems and social, cultural, and economic processes. In this sense, an individual with environmental literacy can do the following:

- Describe and discuss ecological and environmental systems and human influences on these systems;
- Engage in hands-on outdoor learning experiences that involve exploration, investigation, and problem solving;
- Analyzes information about the environment in which he lives and can pose new questions;
- can predict what actions might be taken to respect, protect, and sustain the health and well-being of human communities and environmental systems.

As discussed in detail in the Theory of Change section of the Environmental Literacy Education Program: Social Impact Goals of the Program, teaching practices implemented during the program aim at raising the awareness of teachers, on a personal and professional level, and children, who function as social actors just like adults, about the world they live in, making sure these skills are transferrable to daily life practices in the context of the forecited learning outcomes.

THEORY OF CHANGE DESIGN

The Environmental Literacy Program is basically an training program designed to review the limited resources of the world we live in and our consumption habits, to deal with climate change, the effects of which are becoming visible, and to learn about the related concepts and realize what we can do. The program aims to empower students and even parents to work together for a sustainable future through its teachers, using project management and design-oriented thinking steps to achieve holistic environmental literacy. The topics covered during the program are as follows:

- Causes, Effects of Climate Change and Suggestions on How to Tackle It
- Earth's Resources and Our Consumption Habits
- Renewable Energy
- Carbon Footprint
- Air, Water, Soil, Noise and Light Pollution
- Project Management in Education
- Design Oriented Thinking
- Greenhouse Effect
- Sustainable Development Goals
- Waste Management from Linear Economy to Circular Economy
- Permaculture
- Plastic Waste and Recycling Symbols - Recyclability Potentials

The theory of change as covered in the Environmental Literacy Education Program is summarized in the table below. In this context, the program aims to enable participating teachers, and through them students and parents, to acquire a conceptual level of environmental literacy in the short term, to acquire knowledge about climate change and related environmental issues in the medium term, to

THEORY OF CHANGE DESIGN

make them realize what they can do individually to move from a linear economy to a circular economy, to raise people who are aware of what they can do individually to build a sustainable future in the long term, and to think consciously and in a design-oriented way about the impact of their consumption habits on the environment. From this point of view, the training program started by providing an accurate conceptualization of words such as greenhouse effect, greenhouse gases, carbon footprint, which are frequently encountered in daily life. For example, whether greenhouse gases are harmful or the definition and scope of the carbon footprint are some of the topics covered at the beginning of the program.

In line with the social impact objectives of the training program, the expected results of the Environmental Literacy Program are: teachers, students and parents involved in the project should have a positive attitude towards the natural environment in which they live, display responsible behavior and be adequately knowledgeable to influence others regarding the environment; complete the mentoring process in order to implement and promote sustainable social initiatives within the scope of the program and finally, contribute to the recollection and recycling of 1 million tons of plastic within the scope of DOW's 2030 targets.

At the end of the project, **798 participating teachers** completed the environmental literacy training. Approximately **19,975 students** were reached by 798 participating teachers. It is possible to divide the resources used during the project process into two, namely human and technical resources. The senior trainers coordinating the program and the part-time trainers conducting the mentoring process and their knowledge related to environmental literacy can be considered human resources, while the Teachers Academy Foundation's eKampüs distance learning platform on which the training is conducted, and the Web 2.0 tools used throughout the program can be categorized as technical resources.

In figure 2, the theory of change design of the environmental literacy program was presented. This shows what has been occurred and what has been done up until

today rather than what has been planned at the beginning. According to the initial plan of the project, the design camp and focus group interviews would be held just after mentoring process had completed. Mentoring process completed at the end of the January and design camp and focus group interviews were planned to conduct in February. However, neither design camp nor focus group interviews could not be done due to the earthquake disaster in 6th February in Turkey.

Social Impact Goals	Outcomes	Program Outputs	Events	Resources
Students and parents gain a holistic **environmental literacy** through participating teachers, it is also aimed at raising individuals who can... - be aware of **the limited resources** in the world and review their consumption habits. - have knowledge about the concepts related to **climate change** and be aware of what they can do individually. - cooperate for **a sustainable future** and think in design oriented way.	Raise **environmentally literate individuals** who have **positive attitudes toward the environment,** demonstrate responsible behaviors, and are adequately equipped to influence others in this regard. Conduct a mentoring process to implement and promote **sustainable social initiatives.** Contribute to the 2030 goal to **stop waste** by collecting back or recycling 1 million tons of plastic through DOW's direct action and partnership.	**798 participating teachers** completed the environmental literacy program. **19,975 students** were reached. Through the mentoring program, a contribution was made to the **professional and personal development of participating teachers.**	Classroom and school activities were conducted to raise **students' awareness of the concepts of circular economy and upcycling.** **Recycling activities** were conducted in schools where participating teachers work. Two separate **expert meetings** were held, each lasting about 1 hour.	**Human Resources** ÖRAV Central Team ÖRAV Senior Trainers ÖRAV Part-Time Trainers Ministry of Education **Technical Resources** e-Kampüs MEBBİS Various Web 2.0 Tools

Figure 2. Theory of Change Design

THEORY OF CHANGE DESIGN

Mentoring for the Training Program:

Mentoring refers to the process of facilitating learning and development in a positive and supportive way between someone who has more experience, knowledge, or expertise in a particular area and someone who is new to that area. Depending on the content characteristics and structure of the field in question, mentoring comes into question for different purposes from higher education environments to business ecosystems. The theoretical underpinnings of mentoring are based on theoretical frameworks grounded in the fundamental approaches of developmental psychology such as social constructivism, social learning, and applied learning. This theoretical background helps outline the many benefits for participants, such as interpersonal communication and problem solving, academic performance and motivation, and project management and teamwork. In the context of teacher education in the education world, the mentoring program is based on mutual learning between mentee and mentor. Mentoring contributes to the development of deep learning skills, self-efficacy, and pedagogical competence in the teacher's professional and personal life. In order for the Environmental Literacy Program to achieve its social impact goals and for its designers to improve and more effectively evaluate training content and structures in the future, the Teachers Academy Foundation's competent Part-Time Trainer staff and volunteer teachers who completed their training participated in the mentoring program.

The following section of the report provides analyses of the monitoring and evaluation activities conducted using the quantitative and qualitative measurement tools to measure the social impact of the program within the framework of the Environmental Literacy Theory of Change.

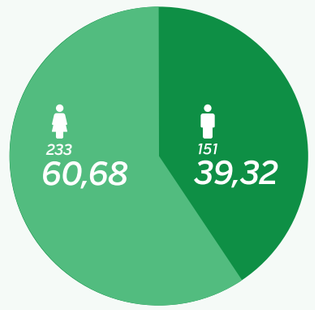
After the training organized within the scope of the project, participant teachers were asked to fill out the training evaluation questionnaire. Teachers who volunteered to fill out this questionnaire answered the questions in the training evaluation questionnaire. In order to investigate the effects of the project on the teachers who continued the mentoring process and their students, a pre-test - post-test model was applied and the responses to both tests were compared. Through constructed response questions in questionnaire and the pre/post-tests, qualitative data was collected and the example of teachers' and students' statements were presented. Descriptive statistics were presented as frequency and percentage, mean, standard deviation and percentiles. The differences between the data collected at two different times were analyzed by paired sample t-test. Statistical significance level was taken as .05.

Demographic Information

384 participating teachers, 61% female and 39% male, who are from 71 different cities filled out the training evaluation questionnaire. The most frequent 10 cities and the distribution of participating teachers are as follows:

30 (8%) İstanbul, 24 (6%) Hatay, 20 (5%) Ankara, 17 (5%) Konya, 16 (4%) Antalya, 14 (4%) Adana, 11 (3%) Gaziantep, 11 (3%) Mersin, 10 (3%) Bursa, 10 (3%) Diyarbakır. It is also seen that more than 76% of the teachers who participated in the training and filled out the evaluation questionnaire have 10 years or more of professional experience (Table 1).

Figure 3. *Pie Chart of Gender Distribution*



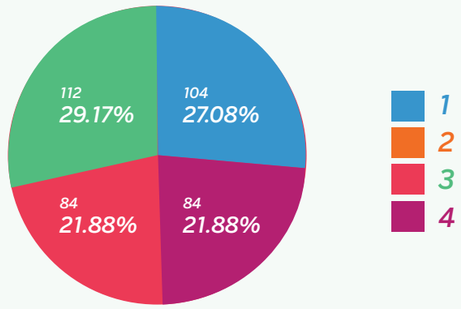
EVALUATION OF TRAINING

Years	Frequency	Percentages
< 1 year	2	0.5%
1 - 5 years	28	7.3%
6 - 10 years	56	14.6%
11 - 15 years	82	21.4%
16 - 20 years	77	20.1%
21 - 25 years	77	20.1%
> 25 years	62	16.1%

Table 1. *Distribution of years of professional experience*

Moreover, all of the participants are elementary school teachers, who are the target group of the project, who work at different grade levels. The distributions of grade levels, from 1 to 4, with the percentages changing between 22% and 29% are presented in figure 4.

Figure 4. *Pie Chart of Grade Levels*



Evaluation of Training Content and Planning Process

The Environment Literacy Program is a 6-days online training program which includes both asynchronous and synchronous content and 2 months mentoring processes, prepared by Teachers Academy Foundation by considering international quality standards (Figure 5). The online training program and activities are conducted on the eCampus platform. This platform provides a space where teachers can communicate with each other and share their experiences, and facilitates access to asynchronous content. Through their teachers, the project aims students to develop interdisciplinary perspective in problem solving and to acquire knowledge and abilities with a holistic approach to education. The content of the training program has been prepared in accordance with these purposes.

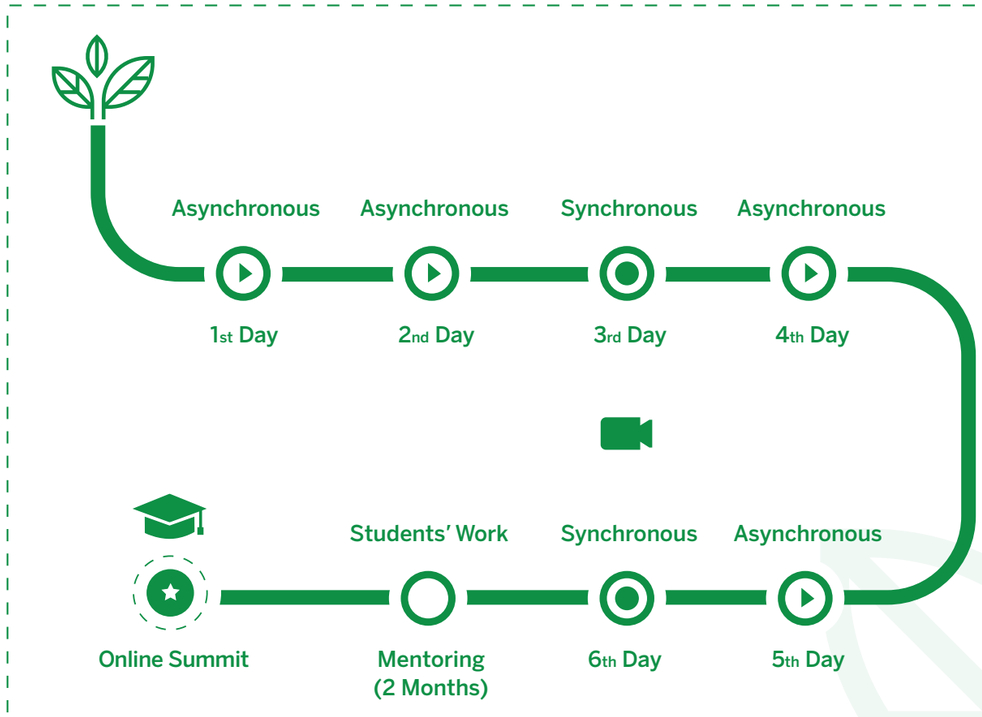


Figure 5. *The Plan of the Program*

EVALUATION OF TRAINING

The training evaluation questionnaire, which participating teachers filled out at the end of the training, includes the questions asking satisfaction levels related to content and planning process over 10. The mean of the content satisfaction of participating teachers was calculated as 9.58. When the scores are examined one by one, the percentage of teachers who select 10 points over 10 is 76.2%, 9 points is 14.9% and 8 points is 4.7%. Table 2 that presents the distribution of content satisfaction scores, shows that 97.4% of the participant were scored content satisfaction level as 7 and above. This result indicates that the satisfaction level related to content of training program is quite high.

Score	Frequency	Percentage	Cumulative Percentage
10	292	76.2	76.2
9	57	14.9	91.1
8	18	4.7	95.8
7	6	1.6	97.4
6	5	1.3	98.7
5	2	0.5	99.2
4	1	0.3	99.5
3	1	0.3	99.7
2	1	0.3	100.0

Table 2. *Distribution of Content Satisfaction Scores*

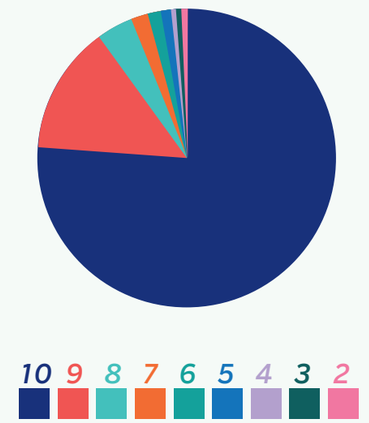


Figure 6. *Pie Chart of Content Satisfaction*

Moreover, the mean of the planning process satisfaction of participating teachers was calculated as 9.55. When the scores are examined one by one, the percentage of teachers who select 10 points over 10 is 76.8%, 9 points is 13.1% and 8 points is 5.7%. Table 3 that presents the distribution of planning process

satisfaction scores, shows that 96.9% of the participant were scored planning process satisfaction level as 7 and above. This result indicates that the satisfaction level related to planning process of training program is also quite high.

Score	Frequency	Percentage	Cumulative Percentage
10	294	76.8	76.8
9	50	13.1	89.8
8	22	5.7	95.6
7	5	1.3	96.9
6	5	1.3	98.2
5	3	0.8	99
4	2	0.5	99.5
2	2	0.5	100

Table 3. Distribution of Planning Process Satisfaction Scores

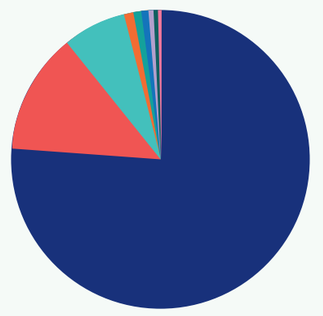


Figure 7. Pie Chart of Planning Satisfaction

In addition to general satisfaction items, a scale was conducted to measure more detailed the satisfaction levels related to content, timing and planning of the training. In this scale, teachers were asked to tick the given statements by selecting the most appropriate option from the options ranging from '1: Strongly Disagree' to '5: Strongly Agree'. The all items and the mean scores for each were presented a bar graph in figure 8. It can be seen that the mean scores change between 4.35 and 4.59 over 5.00. These results indicate that participating teachers found the information given before the training and the time allocated to the training sufficient. In addition, from this evaluation, it can be concluded that the training includes some topics related to the needs of teachers, that the content is understandable and interesting, and that both the content and practices are applicable in the classroom.

EVALUATION OF TRAINING

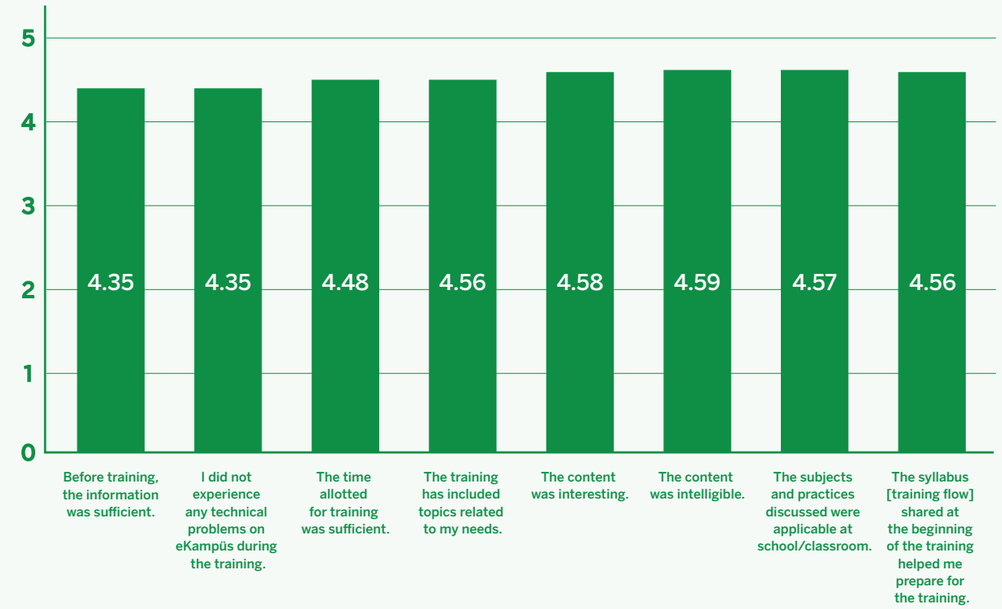


Figure 8. Bar Graph of Content, Time and Planning Scale

A 6-item scale was given to the teachers, which included statements about the training environment, which was conducted synchronously and asynchronously through video contents and interactively. In this scale, teachers were asked to tick the given statements by selecting the most appropriate option from the options ranging from '1: Strongly Disagree' to '5: Strongly Agree'. The all items and the mean scores for each were presented a bar graph in figure 9. It can be seen that the mean scores change between 4.26 and 4.58 over 5.00. According to these results, it can be concluded that participants feel competent to use web-based environments and they have found video based and interactive materials beneficial during the training program. Moreover, it can be said that teachers think that both synchronous and asynchronous trainings and using these methods together have a positive impact on learning.

EVALUATION OF TRAINING

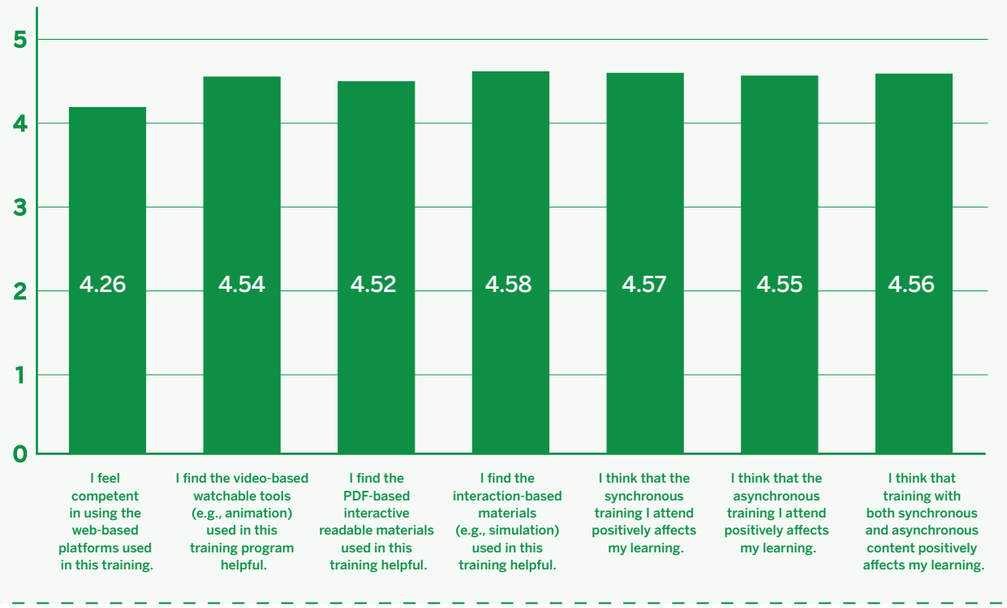


Figure 9. Bar Graph of Training Environment Scale

Evaluation of Trainers

Trainers in ORAV have at least 5 years professional experience in K-12 and can actively use educational technologies. They are development-oriented teachers who are interested in learning processes and innovations in teaching and learning. In order to be an ORAV trainers, these teachers are needed to complete successfully three phases of in-service training program and supervision processes.

In the evaluation questionnaire, participating teachers were asked to assess trainers and identify their general satisfaction level over 10. The mean score was calculated as 9.70. When the scores are examined one by one, the percentage of teachers who select 10 points over 10 is 82.2%, 9 points is 11.0% and 8 points is 4.7%. Table 4 that presents the distribution of satisfaction scores, shows that 98.4% of the participant were scored trainers of the training program 7 and above over 10. This result indicates that the satisfaction level related to trainers of training program is quite high.

Score	Frequency	Percentage	Cumulative Percentage
10	313	82.2	82.2
9	42	11.0	93.2
8	18	4.7	97.9
7	2	0.5	98.4
6	2	0.5	99
5	2	0.5	99.5
4	1	0.3	99.7
2	1	0.3	100

Table 4. Distribution of Trainer Satisfaction Scores

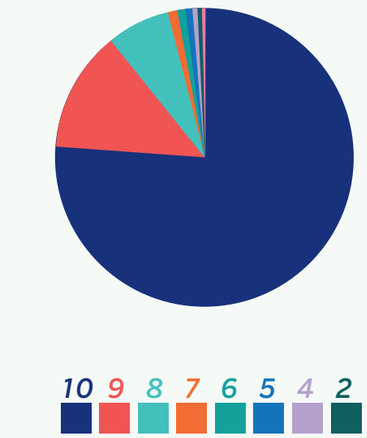


Figure 10. Pie Chart of Trainer Satisfaction

Evaluation of the Impact of the Project on Teachers

As discussed in the Theory of Change section of the Environmental Literacy Education Program, the program aims to enable students and parents to acquire environmental literacy through teachers to first acquire knowledge on the subject and then apply the acquired knowledge to their daily lives and influence others around them. In this context, participating teachers were asked to fill out a 5-point Likert-type (1: Strongly Disagree, 5: Strongly Agree) Training Objective Scale (14 items) to measure learning outcomes.

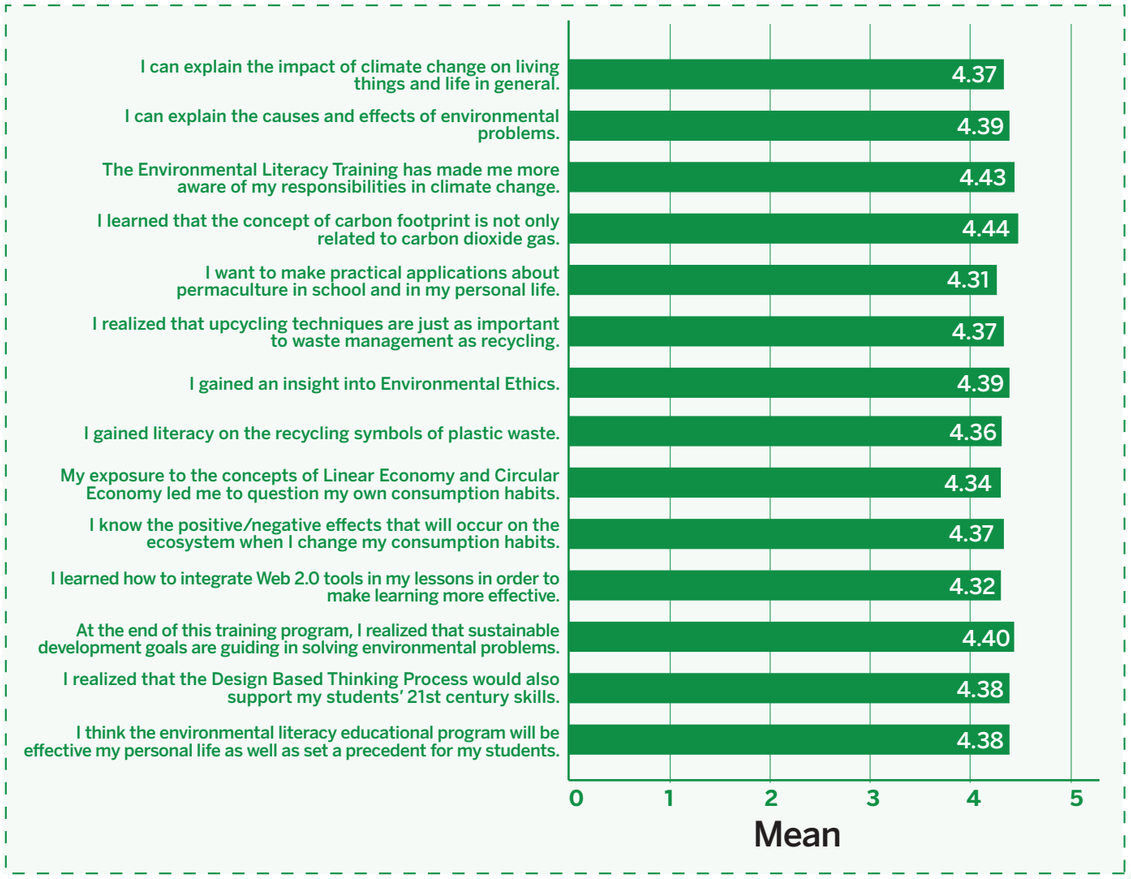


Figure 11. *Bar Chart of Training Objective Scale*

According to results gathered from training objective scales, it can be said that teachers have developed an understanding of the impact of human activities on the natural environment at the end of the environmental literacy education program. It can also be said that they gained the theoretical tools necessary to cooperatively implement design-oriented social projects to solve environmental problems in their professional and personal lives.

Moreover, via the training evaluation questionnaire teachers were asked three open-ended questions to provide more comprehensive analyses of learning outcomes and to understand the impact of the training on the teachers.

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- What can this training be candidate to change in your **professional life?** For example, what will you do differently after this training?
- What can this training be candidate to change in your **personal life?** For example, what will you do differently after this training?
- Can you tell us which aspect of the training is **the most useful** one for you? It can be a topic, application, or method.

Teachers' statements shows that there is a concurrence between the effect of the training program on teacher's professional and personal development and learning outcomes. Participating teachers who filled out the training evaluation questionnaire emphasized that the training had contributed significantly to their development of teaching methods that focus on environmental awareness while allowing them to adopt design-oriented thinking, teamwork, and project management in their professional lives. Similarly, the teachers emphasized that the training program raised their awareness of the impact of man-made activities on the increase of environmental problems in their personal lives enabling them to examine their consumption practices in their daily lives. Examples of teachers' statements are presented below.

"Lots of things will be different in my life. The amount of my waste will decrease. I will buy by thinking more. I will develop ideas in order to use my waste in different fields. Also, I will develop ideas about the future of our world and I will share with my students."

4th Grade Teacher, 16-20 years

"I'll be careful not to buy it if it is unnecessary. I'll fix it rather than buying the new one. I'll put the products that can be recycled on recycle points. I'll be more careful about recycling the waste oils."

1st Grade Teacher, 1-5 years

"I did not know the concept of carbon footprint that well, now I am much more conscious about it. I think the most useful aspects of the project are developing ideas about a topic and applying these ideas as well as discussing and exchanging ideas as a team."

1st Grade Teacher, 6-10 years

According to the Environmental Literacy Education Program's theory of change: At the end of the training program, primary beneficiaries (teachers and students) and secondary beneficiaries (parents and local community members) are expected to become aware of what they can do as individuals for a sustainable future, have positive attitudes towards the environment in which they live, demonstrate responsible behavior and be knowledgeable enough to inform others around them. A pre-test and post-test (5-point Likert-type) were applied before and after the project to understand if there were differences between participants' levels of awareness of environmental literacy and any attitude changes. The pre-test and post-test results of 10* teachers who completed the questionnaires were compared.

The participants were asked to rate their level of motivation and excitement before starting the project in the pre-test and after the end of the project in the post-test out of 10. It is seen that the mean score of motivation and excitement level of the teachers increased from 8.60 to 9.30 (Figure 7). Both values, in pre-test and post-test is higher than 8.50. Therefore, it can be said that the teachers' motivation and excitement during the project is high from the beginning to the end of the project.

**It was planned to send a reminder e-mail to the teachers for the post-test at the beginning of the second semester in order to prevent data loss due to the fact that the completion of the programme coincided with the mid-term break. However, the fact that these e-mails could not be sent and there was a delay in the opening of schools due to the earthquake disaster in our country explains the data loss.*

EVALUATION OF TRAINING

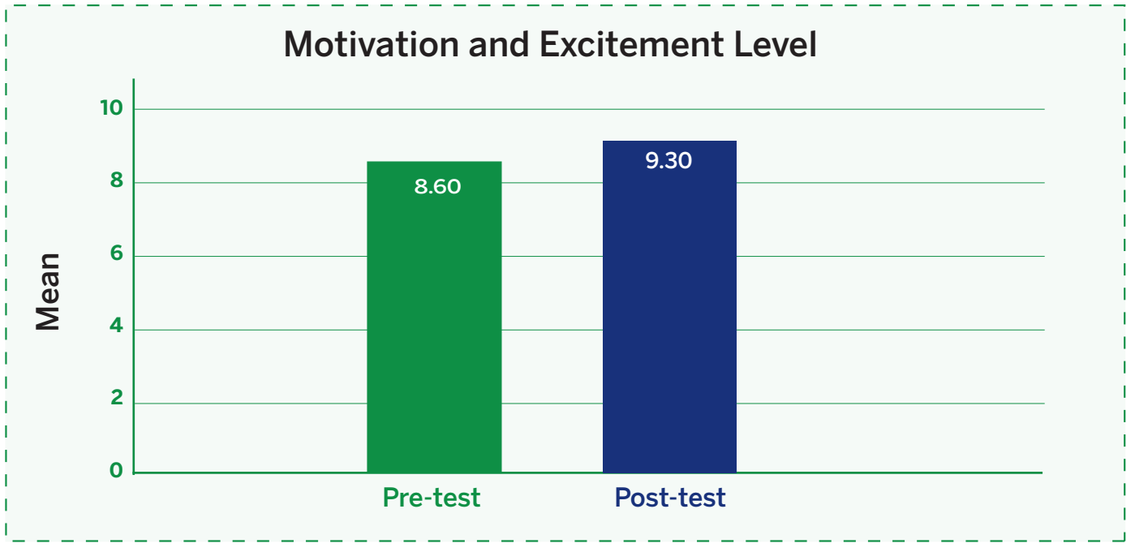

Figure 13. *Bar Graph of Motivation and Excitement Level (Pre-test / Post-test)*

In order to measure the participating teachers' level of awareness of the concept of environmental literacy, they were asked to answer the questions in a scale consisting of 31 items in the form of pre-test and post-test, which includes the topics covered during the training. The items were comprised in three domains.

- Teachers' Level of Environmental Awareness,
- Waste Management Awareness Level and
- Circular Economy and Project Management.

The items in the scale are presented in table 5. There are 3 reversed items and are denoted as "R" in table. Since the data of only 10 participating teachers was matched, inferential statistics were not significant to compare the pre-test and post-test results. However, it can be said that awareness of teachers about environment and waste management is high at the end of the program. The domain of "Circular Economy and Project Management" include items on the teachers' level of knowledge at the end of the environmental literacy program and the attitude changes they experienced.

The most significant increase was calculated in mean of item "I know the difference between the concepts of 'Recycling' and 'Upcycling'". It was calculated 2.89 in pre-test and 4.11 in post-test. For all other remaining items, the results are as expected, no big changes were observed but the mean values indicate the high degree of agreement. Therefore, it can be said that both the level of knowledge teachers has acquired and the possible attitude changes they can go through in their daily lives based on this theoretical baggage they have acquired.

Domain		Items
Teachers' Level of Environmental Awareness	1	*I am aware of my duties and responsibilities in preventing environmental problems.*
	2	*I think that I am a perceptive and mindful person when it comes to protecting the environment and preventing pollution.*
	3	*I embrace environmental awareness in my daily life.*
	4	*I know about the causes of environmental problems.*
	5	*I'm familiar with the harmful effects of environmental pollution on nature and human health.*
	6	*In the classroom, I do activities for my students to gain environmental awareness.*
Waste Management Awareness Level	7	*I know what the plastic waste symbols mean.*
	8	*I know the recycling potential of plastics.*
	9	*I prefer glass and recyclable materials to avoid waste.*
	10	*I have an idea about the negative effects of garbage on the environment and animal health.*
	11	*I know what greenhouse gases are.*
	12	*I warn the people around me to be careful and not to litter the ground.*
	13	*I have heard of the concept of recycling before.*
	14	*Greenhouse gases are harmful for our world.*
Circular Economy and Project Management	14	*Greenhouse gases are harmful for our world.*
	15	*I have heard of the concept of upcycling before.*
	16	*I have heard of the concept of permaculture before.*
	17	*I throw waste in recycling bins so it can be reused.*
	18	*A carbon footprint is the amount of carbon dioxide released into the environment by a product or activity.*
	19	*The recycling symbol on a material indicates that it has been converted from another material.*
	20	*I know the difference between the concepts of "Recycling" and "Upcycling".*
	21	*The cost of upcycling is high.*
	22	*Thing I can do to prevent environmental problems is very limited.*
	23	*One of the Transformation in Economy is "permaculture".*
	24	*The aim of the Circular Economy is to ensure the recycling of waste only.*
	25	*Evaluation is the last step in the design-oriented thinking.*
	26	*I can distinguish between recycling bins and know what waste material goes where.*
	27	*I know that recycling waste is important to protect the environment and natural resources.*
	28	*Recycling contributes greatly to human health, nature and nation's economy.*
	29	*I know how long it takes for various waste materials to dissolve into nature.*
	30	*My school has recycling garbage cans separate collection of waste such as plastic, paper, and metal etc.*
	31	*I know about national and international institutions and organizations actively engaged in protecting the environment.*

Table 5. *Environmental Literacy Scale of the Program*

EVALUATION OF TRAINING

In general, based on the responses to this attitude scale, it can be projected that teachers have environmental literacy and can transfer the knowledge acquired in the training program to their professional and personal lives. In addition to quantitative data the qualitative data was collected from the teachers. The teachers were asked what they thought this project would contribute to their professional and personal lives. One of the teachers' statements shared below, summarizes the contribution to teachers' lives. The differences in pre- and post-test also can be seen in below statements.

Pre-test: *"I think I will be a more helpful teacher to my students as a conscious environmentalist."*

Post-test: *"The Environmental Literacy Program has been very beneficial for my professional and personal development. Especially, acquiring knowledge about environment provide me to live as an environmentally responsible individual. This program also helped me to develop strategic approaches to consider environmental issues. During the program, I have acquired knowledge and abilities to protect environment and to take action for sustainable future. Moreover, besides environmental issues, I became more conscious about human rights and social justice."*

Additionally, the teachers were asked what they thought this project would contribute to their students. One of the teachers' statements shared below presents the difference between what was expected contribution at the beginning and what was obtained at the end of the program.

Pre-test: *"I think they will go a long way towards being environmentally sensitive individuals."*

Post-test: *"The Environmental Literacy Program provided students to acquire new skills to cope with environmental problem sand to gain awareness of*

EVALUATION OF TRAINING

their responsibilities towards the environment. Through this program, our students learned issues related to environmental ethics, protection of natural resources, sustainability of consumption and environmental communication skills. Also, they learned that each individual have duties to protect the environment."

Evaluation of the Impact of the Project on Students

In order to better comprehend the knowledge level achieved by elementary school students, who are among the primary beneficiaries of the Environmental Literacy Training Program, a pre-test and a post-test were applied to students, in a similar way to teachers. In this section of the report, analyses of pre-test and post-test results generated by students are shared.

The data of the students who completed the pre-test and post-test was matched and it was found that 34 students completed both the pre-test and the post-test. Of these 34 students, 17 (50%) were male and 17 (50%) were female. 44% of the students were from 2nd grade, 38% of them from 3rd grade and 18% of them from 4th grade (Figure 14).

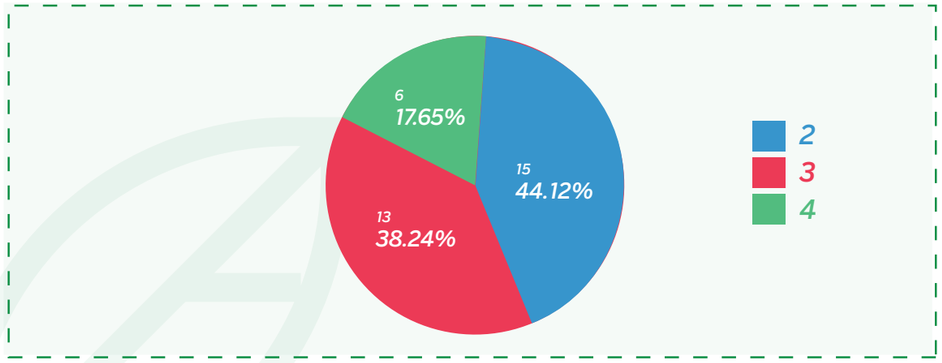

Figure 14. *Pie Chart of Distribution of Students According to Grade Level*

The pre-test and post-test results of 34 students who completed the questionnaires were compared. The students were asked to evaluate their motivation and excitement levels before starting the project and after the end of the project out of 10. It was found that the mean of the students' motivation and excitement level in both the pre-test and the post-test is over than 9. Therefore, it can be said that the students' motivation and excitement during the project is high from the beginning to the end of the project.

Additionally, the 5-point Likert scale that the students answered consists of 18 items. The pre- and post-test include statements about environmental literacy, at the knowledge and attitude levels. The mean scores of student responses to these statements are shown below in a bar chart (Figure 15). There two reversed items underlined in the bar chart.

EVALUATION OF TRAINING

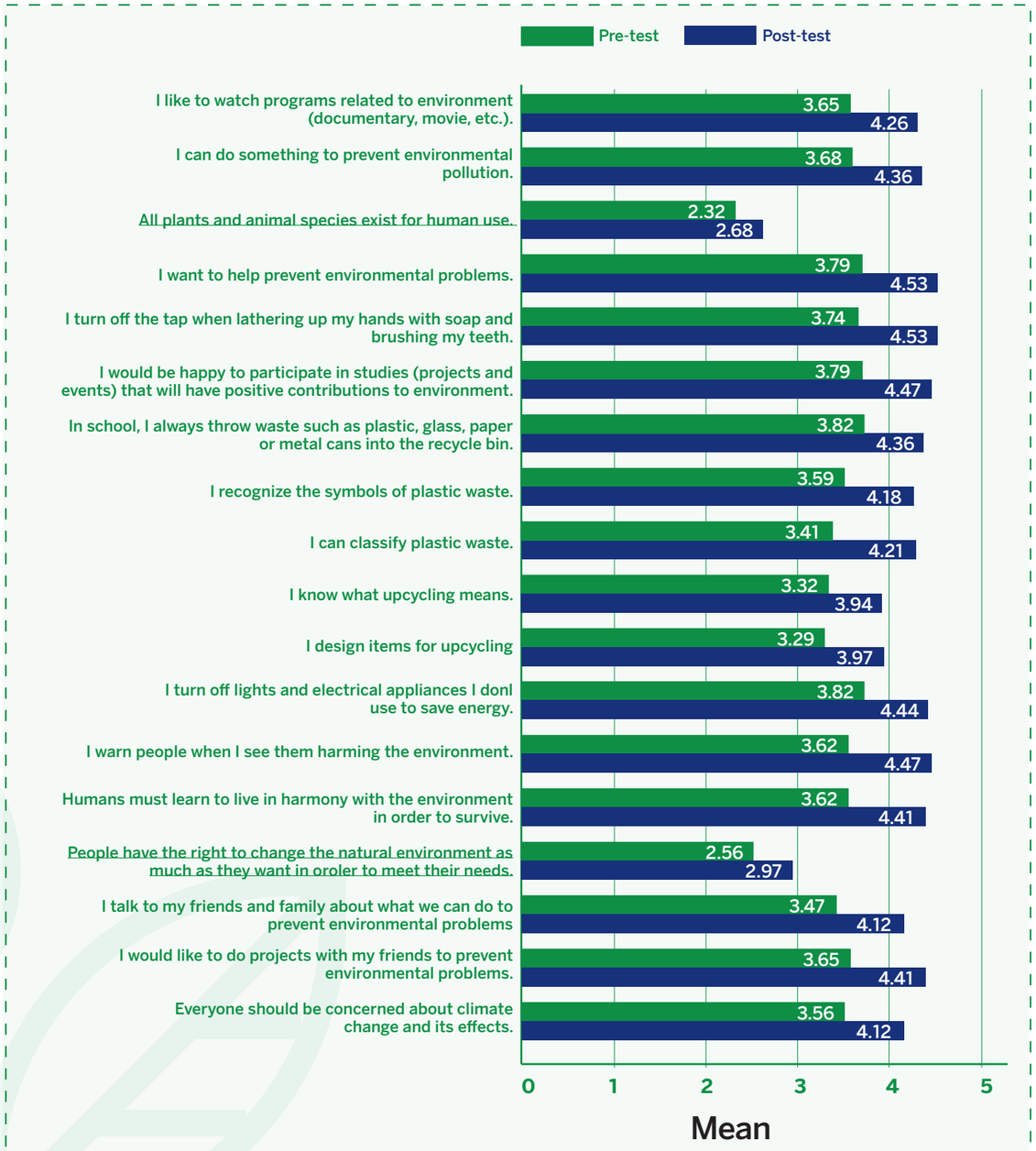

Figure 15. *Bar Chart of Students' Knowledge and Attitudes Scale*

EVALUATION OF TRAINING

When the mean scores in pre-test and post-test were compared, a statistically significant increase can be observed. The total scores of 16 items were calculated by removing two reversed items and the mean scores of pre- and post-tests were compared by using paired sample t-test. The results show that the mean scores of students' knowledge and attitudes at the end of the program ($\mu = 4.30$, $SD = 0.71$) is statistically significantly higher than the mean scores at the beginning of the program ($\mu = 4.30$, $SD = 0.71$) with the medium effect size, $t(33) = 3.61$, $p < .01$, Cohen's $d = .62$.

Moreover, at the end of the post-tests, students were asked what can be done to prevent environmental problems and wanted to write the first three thing that comes to their minds. Students' statements were mostly related to waste management including recycling and upcycling as well as related to saving and protection. Also, some of them pointed out developing design-oriented project and doing awareness and consciousness activities. The examples of students' statements are presented below.

> *"We should not throw plastic waste all over the surroundings. We should throw them in recycle bins. We should find a solution to smoke from factories and cars. We should plant a lot of trees around us."*
>
> *3rd Grade Student*

> *"People may be raised consciousness. More advertisement and posters may be used. The use of products that are harmful for environment such as plastic waste may be reduced."*
>
> *4th Grade Student*

CONCULUSION

As environmental problems become more complex in both the Global South and the Global North, there is now more need than ever to address and control the social problems caused by these and mitigate their damaging impact. In this sense, a comprehensive environmental education approach that looks at environmental problems from a holistic perspective is a promising way to empower members of society to develop possible solutions to environmental problems and take action to protect natural resources and the environment. This may allow the raising of individuals who are actively engaged with environmental problems in their surroundings. In its most general sense, the concept of environmental literacy refers to the ability of individuals to understand and interpret the state of environmental systems and to make necessary interventions and improvements to make those systems sustainable. Environmental literacy in adult education involves developing social practices against environmental and ecological problems and actively participating in these practices. In the world of children, it includes adding to their knowledge about the environment, enabling them to understand the causes of environmental problems, and come up with possible solutions to social problems caused by environmental issues.

According to the findings generated using both quantitative and qualitative techniques, there is an increasing social impact that is not limited to educational environments, also extending from the school to the local through teachers and students. Participating teachers indicated that training had a positive impact on their professional and personal development processes, while emphasizing they had the opportunity to learn concepts they had not heard of before allowing them to brush upon their knowledge of the environment.

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