Determining the Environmental Literacy Levels of Public Library Personnel: Türkiye Example

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Abstract: Public libraries are information institutions with the potential to contribute to the culture of information from the lowest to the highest levels of society. They are leading institutions in facilitating all information exchange processes within society. Examining the link between public libraries and the environment and environmental literacy will also support the improvement of their services. Environmental literacy plays a critical role in promoting sustainable development and raising public awareness about environmental issues. As community-centered institutions, public libraries have the potential to significantly contribute to environmental education and awareness. In this context, this study aims to determine the environmental literacy levels of public library personnel working in Türkiye and to identify the factors affecting these levels. Based on the literature, this study will also determine the role of public libraries in developing environmental literacy skills in society. The study was conducted using a quantitative research design based on survey. Data were collected from public library personnel through a questionnaire (Environmental Literacy Scale for Adults – ELSA). Descriptive and inferential statistical analyses were used to evaluate the collected data and investigate possible relationships between environmental literacy levels and demographic variables such as age, education level, professional experience, and participation in environmental education. The research findings reveal that public library staff generally possess a moderate level of environmental awareness. While participants tended to exhibit positive attitudes toward environmental protection, their levels of environmental knowledge and practical environmental behaviors differed significantly. The results also indicate that higher education levels and previous environmental training positively influence environmental awareness levels. The study highlights the importance of integrating environmental education and sustainability-focused training into professional development programs for public library staff. Strengthening the environmental awareness of library staff can enhance the role of public libraries as centers for environmental awareness, community education, and sustainable development initiatives.

Keywords: Public libraries, Environmental literacy, Library personnel, Sustainability, Türkiye

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1. Introduction

The global climate crisis, the resulting biodiversity loss, and the rapid depletion of all natural resources on Earth necessitate that individuals and societies act more consciously and responsibly towards environmental problems. Two main approaches can be considered for addressing environmental issues. The first is to produce new tools and technologies to solve these problems, which is generally possible for existing problems. The second is to prevent environmental problems from arising through preventative measures, which is only possible through the direct education of individuals. The first step in environmental education is to raise environmental awareness in individuals of all ages. To develop this awareness, it is crucial to first improve individuals levels of environmental consciousness. Improving individuals environmental literacy levels is also necessary, as determining their level of environmental literacy can reveal the importance and value a person or society directly places on environmental issues.

The United Nations (UN), under the Sustainable Development Goals, has issued a global call to action to address the climate crisis and ensure environmental protection. With the increasing importance attributed to environmental sustainability, the number of studies in this field has significantly increased in the literature. Using data covering the period 1995-2025, the relationship between institutional quality and environmental sustainability is highlighted for the E-7 group of countries (China, India, Brazil, Russia, Indonesia, Mexico, and Turkey). Given the increasing weight of the E-7 countries in the world economy and their heterogeneous institutional structures, the decisive role of institutional quality in balancing economic growth and environmental goals has also begun to gain importance (Budak Biçer and Yücel, 2026, p. 2).

The deepening environmental crises have highlighted the need to redefine the social responsibilities of information centers. Today, libraries, as information centers, play a crucial role in supporting lifelong learning and fostering environmental awareness, critical thinking, and sustainable behaviors. As public spaces providing access to information for all citizens, libraries, especially public libraries, also pave the way for social awareness and a sustainable future. Public libraries have, since their inception, been fundamental to building a literate society and have been crucial institutions for individuals participation in community life. Technological advancements have improved the physical size and traditional service concepts of public libraries, and have also transformed the users they serve. Today, public libraries must serve a society composed of individuals who live immersed in digital content and possess a digital environmental culture (Ergün and Güneş, 2022, p. 397).

Public libraries are public institutions that support lifelong learning processes by providing equal and free access to information. Catering to a wide range of users, from school-aged children to adults, and from disabled individuals who have difficulty participating in social life to the elderly, these institutions enable individuals to acquire information according to their own learning pace and interests. Today, environmental problems, climate change, and the depletion of natural resources require responsible cooperation from all segments of society. Public libraries have various advantages in raising awareness and mobilizing the community against these global problems, from education and exhibitions to collections and local collaborations. By building bridges between people, nature, and information, starting at the local level, public libraries can contribute to the development of a sustainable and environmentally friendly culture of living. However, in order to guide the public in general, and their users in particular, library personnel first need to have their environmental awareness and literacy increased. The first step in this is to analyze and determine their current levels of environmental literacy.

2. Literature Review

The term “literacy” added to various words, means possessing the basic information and skills needed in that field (Snavely and Cooper, 1997, p. 12). In this respect, environmental literacy can be defined as individuals knowing environmental concepts and being able to establish relationships between these concepts and events (Kışoğlu et al., 2010). Liang et al. (2018) view environmental literacy as behaviors aimed at minimizing or solving environmental problems through an individual's information and attitudes about the environment and related issues, and the skills acquired. Understanding environmental systems, grasping the cause-and-effect relationships of environmental problems, and actively participating in solution processes are fundamental components of environmental literacy. Environmental literacy requires having the right information, attitudes, and skills for the environment and acting in a way that won’t harm the environment (Koç et al., 2018). In the face of today’s environmental crises, environmental literacy requires individuals not only to be knowledgeable but also to be proactive. It is also a fundamental competency that enables them to become actors who think critically, take responsibility and produce solutions.

The necessary attitudinal and behavioral changes in individuals regarding the environment can be achieved through intensive education, instilling information and sensitivity towards the environment (Zheng, et al., 2020; Karabulut, 2022). While information alone isn’t sufficient to change behavior, there is a significant relationship between environmental information and environmentally conscious behavior. Individuals with high environmental literacy tend to behave

more sensitively in areas such as energy conservation, recycling, and sustainable consumption (Hungrford and Volk, 1990). According to Kinslow et al. (2019), in today's society where environmental problems have become much more complex, this situation can only be dealt with by environmentally conscious individuals. In this case, it can be said that environmental literacy encourages behavioral change at the individual level and transformation at the societal level. According to Faruqe et al. (2022, p. 586), with the developments brought about by the latest advancements in artificial intelligence technologies, the concept of digital environmental literacy has come to the forefront today. Libraries faced various challenges, particularly during the COVID-19 lockdown period such as ensuring service continuity without physical spaces and printed materials. During this time, the importance of sustainable information centers became more widely understood, and libraries with greater environmental literacy, services, and resources emerged (Gomez-Cruz and Echandi-Ruiz, 2026).

A study by Kibert (2000) found that university students, and studies by Sevinç et al. (2010) and Kışoğlu (2009) found that prospective teachers, had moderate levels of environmental literacy. Studies conducted on university students (Kaplowitz and Levine, 2005; Teksöz et al., 2010; Yıldız et al., 2023), prospective teachers (Akçay and Pekel, 2017; Altınöz, 2010; Koç and Karatekin, 2013), teachers (Erbasan, 2018; Karaismailoğlu, 2018), and private sector employees (Küçükbaş Duman and Atabek Yiğit, 2019) generally indicate that participants have high levels of environmental awareness but low levels of environmental information. Lenstra (2014) states that libraries strengthen social capital by collaborating with local and regional communities, emphasizing that public libraries are beneficial for personal development as well as local development. Considering that environmental sustainability begins at the local level, improving the environmental literacy and environmental awareness of public library personnel will benefit both institutionally and regionally.

Environmental literacy encompasses not only possessing environmental information but also the ability to acquire this information from reliable sources and critically evaluate it. Libraries are among the key institutions in helping individuals acquire these skills. By providing access to verified information, libraries strengthen the cognitive dimension of environmental literacy. For example, making Intergovernmental Panel on Climate Change (IPCC) reports available to users through open access increases the public circulation of scientific data and plays a significant role in combating misinformation (IPCC, 2023). In this context, librarians can enhance users ability to critically analyze environmental data by integrating information literacy training with environmental content. As information experts who provide the right information to the right people at the right time, librarians can contribute to strengthening environmental sustainability through environmental literacy, which focuses on informing users about green libraries, open-access resources,

and the environmental impact of library resources (Vyas and Parmar, 2021; Ren and Lu, 2024). Although various studies (Hauke and Werner, 2013; Mulumba and Nakazibwe, 2017; Oyelude and Alabi, 2013) have mentioned that libraries can raise awareness among their users by educating them about environmental issues, this primarily requires qualified personnel and resources, and library personnel themselves need to be aware of this role (Son, 2024). Green libraries, with their qualified personnel are also an important factor in providing sustainable services and diversifying environmentally themed information resources (Kişi, 2025).

Libraries, as lifelong learning centers, contribute to the implementation of environmental protection and sustainable development goals at the local and regional levels through community-based environmental activities, workshops and thematic collections or exhibitions. In this context, the green library approach is a crucial foundation for libraries to integrate environmental sustainability into their institutional practices. The American Library Association (ALA) defines sustainability as one of the core values of libraries and includes environmental responsibility within its professional ethical framework (ALA, 2019). This transformation expands the role of the library profession, making professionals active actors in environmental advocacy and social awareness. Environmental literacy serves as a guiding principle in both service design and institutional governance. However, the green library movement requires librarians with environmental awareness and literacy.

Information centers need to receive support from various economic organizations on a global scale for environmental sustainability and the concept of green libraries. For countries with higher institutional quality, implementing policies aimed at improving environmental quality can lead to the development of high-quality services. Such developments contribute to humanity on a global scale. The development of humanity on a global scale will also lead to the development of information services.

With the goal of creating energy and resource-efficient, environmentally friendly, and user-friendly information centers, the ‘green library movement’ is an approach based on environmental, economic, and social sustainability. It shapes structures that utilize resources and technology effectively, are in harmony with nature and add valen to society. Green libraries, aiming to raise environmental awareness and responsibility in society, emphasize environmentally sensitive and sustainable designs and service approaches. Supporting sustainability not only through energy-efficient, green buildings but also by facilitating access to environmentally relevant information, green libraries are public learning spaces that reduce their environmental impact and encourage individuals and society to establish a more sustainable relationship with nature. Adopting a holistic approach to environmental, economic, and

social sustainability, green libraries facilitate access to information, offer environmental education, and encourage community participation. In this context, educational activities are among the prominent principles of the green library model. Organizing training and events that increase users environmental awareness is a key tool within the green library movement. Green libraries should utilize all available tools and resources, as well as train their experts, to encourage users to think and act sustainably and responsibly. Sustainability, which refers to the long-term viability of a community, a set of social institutions, or a societal practice, can only be achieved through the environmentally conscious activities of individuals (Ertürk, 2025, p. 81). To create an environmentally friendly green library, library personnel need to improve their environmental communication and awareness (Karioja, 2012).

However, the study by Humbhi et al. (2024) showed that, in the current situation, information center specialists don't have sufficient information to educate users about green practices. The findings of the research conducted by Akbulut et al. (2018) in university libraries in Ankara showed that the level of environmental awareness of the participants was higher than the rate of adoption of green practices; and that the vast majority of librarians were willing to participate in environmental-themed training programs. Although librarians have environmental awareness, they are insufficient or indifferent in reflecting it in their daily practices. Gupta et al. (2018) state that libraries should educate their users in particular, and the public in general, about good environmental practices. In their study investigating the role of public libraries in environmental education, Devine and Appleton (2023) emphasized the importance of training programs aimed at accessing environmental information; while Albertyn and Zinn (2022) revealed in their study that the majority of library users believe that librarians should guide users on environmental awareness and literacy. Alarcón-López et al. (2024) emphasize the necessity of using modern technology to improve environmental literacy. They examined the immediate cognitive gains in environmental literacy and the differences in the ability of rural and urban students to adapt to artifical intelligent. The development of these abilities could help improve public libraries that are open to the public (Dwivedi and Al-Banna, 2025).

Public libraries, widespread throughout the country, can also be beneficial in developing environmental awareness at the local and regional levels. Although environmental problems are global, environmental protection fundamentally begins at the local level. Public libraries contribute in various ways at the regional level, such as providing information and educational resources tailored to the needs of academic, economic, and social groups, and increasing community participation. In terms of environmental literacy, public libraries can play a critical role by disseminating information on environmental protection to various user groups. The ability to access and correctly evaluate environmental

information forms the basis of awareness of environmental problems. Raising environmental awareness among library users has become an important issue; however, this first requires determining the level of environmental literacy among public library personnel who serve a wide user base.

3. Research Methodology

3.1. Purpose

The main research question of this study, aiming to determine the level of environmental literacy among public library staff, is defined as follows: "What is the level of environmental literacy among staff working in public libraries?"

The study also examined the relationship between demographic factors and environmental literacy levels, with the second research question being: "Do the environmental literacy levels of library staff differ in the context of specific demographic factors (gender, age, education, marital status)?"

3.2. Population and Sample

During the research process, general articles, books, and other published works related to the subject of the article were obtained from all versions of the Web of Science database (SCI-EXPANDED, SSCI, AHCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI) and the SCOPUS database. Various field indexes and databases were also utilized. The obtained resources were used to examine the analytical part of the study in more detail. The existing literature was thoroughly reviewed to obtain more efficient results. SPSS, Microsoft Word, and Excel software were used to save the documents.

A detailed review of the literature reveals that no academic study has been found that directly examines the roles, contributions, and services provided by professional personnel working in public libraries in Türkiye regarding the development of environmental literacy. Therefore, this research investigates the services and roles of 1301 provincial public libraries operating under the Ministry of Culture and Tourism in Türkiye concerning environmental literacy. Therefore, this study aims to raise awareness by examining the current situation in public libraries in Türkiye and emphasizing the need to determine the role of public libraries in developing individuals' environmental awareness skills. The study examines the environmental awareness levels of public library employees in the context of specific demographic factors such as gender, age, education, marital status, and daily working hours.

According to the Public Libraries Statistics Bulletin (2025) of the General Directorate of Libraries and Publications of the Ministry of Culture and Tourism, there were 1,301 public libraries in Türkiye as of the end of 2025, including different types of libraries such as mobile, children's, shopping mall, museum, and correctional facility libraries. The number of librarians working in public libraries is given as 1,545. Purposive sampling was used in the study, and the main purpose in determining the purposefully selected sample was to choose individuals who could provide more information about the subject under study (Patton, 2002). Based on this point, only public libraries were included in the study.

The study population consisted of public library employees in Turkey. According to calculations using the G*Power program (based on a power analysis with a population size of 1,545, an effect size of 0.5 margin of error of 5%, and a power value of 90% for the point-biserial correlation test), the sample size was determined to be 115 individuals. 174 people participated in the study, but deficiencies were identified in 3 questionnaires. Therefore, 171 individuals were included in the analyses presented in the findings section.

3.3. Data Collection Process

This study, which aims to determine the level of environmental literacy among public library personnel in Turkey, collected data between October 1 and December 31, 2025, using a questionnaire. The questionnaire form was sent by email to public libraries whose email addresses were obtained from the Ministry's website. Because it was geographically accessible, it was delivered by hand to library staff in a city. The pilot study was also conducted face-to-face.

This study utilized the Environmental Literacy Scale for Adults (ELSA), developed by Atabek et al. (2014). It is a newly developed scale. During the development process, it was noted that the literature mostly focuses on determining the environmental attitudes, knowledge, or literacy of students at different educational levels. Therefore, a scale development study was conducted for adults. This scale, which aims to determine the environmental literacy of adult individuals of different ages, genders, and educational levels, rather than a specific group such as students or teachers, contains 20 statements on a five-point Likert scale ranging from "1=strongly disagree" to "5=strongly agree". In the original study, after reviewing studies in the literature for content validity purposes, a pool of items was created with the contributions of expert academics in the field of environment, and a preliminary scale of 32 items was developed. Exploratory Factor Analysis was conducted to determine the construct validity of the scale. At the end of repeated analyses, a scale with 3 factors and 20 items was obtained, representing environmental awareness level,

environmental anxiety level, and environmental consciousness level. The first factor of the scale contains 9 items, the second factor contains 6 items, and the third factor contains 5 items. The lowest possible score on the scale is 20, and the highest is 100. Higher scores indicate a high level of environmental literacy, while lower scores indicate a low level. The developed scale was applied on our study. No study in the literature has been found that applied the scale verbatim. Prior to the application, a pilot study was conducted on 3 people working in a provincial public library. The overall Cronbach Alpha reliability coefficient of the scale was given as 0.881 in the original study, while it was found to be 0.710 in this study. Therefore, it can be said that the scale used in this study has acceptable reliability. Questionnaire was in English in originial study. The Turkish translation of the questionnaire was independently carried out by a bilingual translator and the authors of the study. Subsequently, a group including the authors, the translator, and a Turkish language instructor reviewed the translation for clarity, cultural accuracy, and spelling and punctuation to determine the best wording. Prior to implementation, a pilot study was conducted with three individuals working at a regional library, providing them with brief information and gathering their feedback on clarity. No corrections were deemed necessary. The necessary ethical approval was obtained from the Niğde Ömer Halisdemir University Ethics Committee for the study.

Percentage and frequency analyses were performed on the demographic characteristics of the participants. The mean was used to determine the environmental literacy levels of the participants. To determine whether the demographic characteristics (gender, age, education, marital status) and the responses to statements about environmental literacy showed a normal distribution, skewness (0.112) and kurtosis (0.288) coefficients were examined using values between +1.5 and -1.5 (Tabachnick and Fidell, 2022), and it was found that there was no normal distribution. Therefore, non-parametric tests were applied in the analyses. The Mann Whitney U-Test and Kruskal Wallis H-Test were used to compare measurements between groups in this study.

4. Findings

The degree to which participants agreed with the items in the survey form was examined according to basic demographic variables such as gender, age, and education, and the obtained data were analyzed using the SPSS program. The overall average of the scale items is 4.09, and the analysis results indicate that the participants have a high level of environmental literacy. Also the analysis results indicated that there was a significant difference among the participants according to the variables of gender, age, and education level; however, no significant difference was found according to the participants' marital status and daily working hours.

Table 1: Demographic Features of Participants

		Frequency	Percentage			Frequency	Percentage
Gender	Female	91	53,2	**Age**	Between 20-29	12	7,1
	Male	80	46,8		Between 30-39	62	36,2
	Total	171	100		Between 40-49	78	45,6
Marital Status	Married	96	55,9		Between 50-59	16	9,4
	Single	75	44,1		60 and above	3	1,7
Education	High school	57	33,3	**Daily Working Hours**	Less than 8 hours	5	2,9
	Undergraduate	99	57,9		Between 8-10 hours	101	59,2
	Postgraduate	15	8,8		Between 10-12 hours	65	37,9

Regarding the demographic features of the participants, 53.2% (91 people) were female and 46.8% (80 people) were male; 55.9% (96 people) were married and 44.1% (75 people) were single. The majority of participants were in the 40-49 age range (45.6%), followed by those in the 30-39 age range (36.2%). The majority of participants were university graduates (57.9%), followed by high school graduates (33.3%). The majority of participants worked between 8-10 hours a day (59.2%).

Table 2: Participation in Survey Items

	Item	N	Rank	Standard Deviation
Environmental Literacy	1. I believe that government should support the renewable energy sources (sun, wind, water, geothermal).	171	4,819	0,5604
	2. Environmental education should be given from the beginning of elementary education in order to provide environmental awareness.	171	4,567	0,7970
	3. I, as well as others, have responsibility for the protection of the environment.	171	4,708	0,5167
	4. I'm in favour of using solar power in traffic lights and street lamps in order to keep the future generations life.	171	4,439	0,7750
	5. I'm in favour of using energy sources like solar power and natural gas since the gases given out from stoves are more harmful.	171	3,895	0,9521

	6. I would use recycling boxes if there were any.	171	4,053	0,9778
	7. I would use e-bill in order to protect the environment.	171	4,339	0,6874
	8. I would throw away my garbage if there were nobody there.[1]	171	3,877	1,1693
	9. There is nothing wrong with pouring waste cooking oil into the sink.	171	1,778	0,9688
	10. I think we will not find a place to have picnic within a few generation.	171	4,316	0,8365
	11. I think everybody should sow a tree in his or her life.	171	4,339	0,7758
	12. I think seeds should be kept for the future of life.	171	4,082	0,9102
	13. I would throw old newspapers; empty glass-plastic bottles, and cans to recycling boxes.	171	4,561	0,7034
	14. I think indiscriminate hunting can cause environmental problems.	171	4,269	0,8665
	15. I would warn people if they caused harm to the environment.	171	3,936	1,0854
	16. When I read a newspaper I pay attention to the topics related to the environment.	171	4,081	1,1704
	17. For the protection of environment caused by waste, I watch TV programs that give information about re-use of them.	171	4,053	1,1895
	18. I would like to learn about environmental issues.	171	3,982	1,0543
	19. I would rather buy environmentally friendly items than economic ones.	171	3,971	1,0706
	20. I prefer to use public transportation rather than private transportation to protect the environment.	171	3,877	0,9469

N: Number of Participants

Table 2 shows the degree of agreement with the statements regarding environmental literacy in the survey. The average score for each item is 4.09, indicating that participants generally rated their own level as high. The majority of responses to the scale items had average scores of 4 and above. This indicates that the individuals participating in the study have developed positive attitudes towards environmental awareness, sustainability, and environmental protection. Accordingly, the statements with the highest degree of agreement were, in

[1] In the original scale, this statement, which was the negative, was translated word for word in the Turkish translation. However, in interviews conducted with some participants after the analysis of the findings, they stated that they understood the statement as "If there is no one to collect the garbage (garbage collector, janitor, etc.), I will throw the garbage away myself," and responded accordingly. This fact has been taken into account in the assessments in the findings section.

order: “I believe that government should support the renewable energy sources (sun, wind, water, geothermal)”, “I, as well as others, have responsibility for the protection of the environment” and “Environmental education should be given from the beginning of elementary education in order to provide environmental awareness”. The results indicate that participants strongly support renewable energy policies and have a sense of individual responsibility regarding environmental protection. It can be said that participants believe that they, along with the government and other institutions, are responsible for protecting the environment. Furthermore, the view that environmental education should be given at an early age is quite high. This finding suggests that there is a strong societal acceptance that environmental awareness can be increased through educationThe statements with the lowest degree of agreement were: “There is nothing wrong with pouring waste cooking oil into the sink” and “I would throw away my garbage if there were nobody there.” Standard deviation values are generally low to moderate. The low standard deviations, particularly in items 1 and 3, indicate that participants share a common view on these issues. However, the high standard deviations in some items, such as 16, 17, and 18, reveal differences among participants in terms of monitoring environmental problems and acquiring environmental knowledge. Overall, the research group can be said to have a high level of environmental literacy, particularly strong awareness of renewable energy, recycling, and environmental responsibility. However, it appears that some areas need improvement in translating environmentally friendly behaviors into daily life practices.

Table 3: Mann Whitney U-Test Results According to Gender

	Item	**G**	**N**	**Mean Rank**	**U**	**p**
Environmental Literacy	1. I believe that government should support the renewable energy sources (sun, wind, water, geothermal).	F	91	83,12	3378,0	0,118
		M	80	89,28		
	2. Environmental education should be given from the beginning of elementary education in order to provide environmental awareness.	F	91	86,17	3624,5	0,952
		M	80	85,81		
	3. I, as well as others, have responsibility for the protection of the environment.	F	91	91,34	3213,0	0,045*
		M	80	81,31		
	4. I’m in favour of using solar power in traffic lights and street lamps in order to keep the future generations’ life.	F	91	87,74	3482,0	0,578
		M	80	84,03		

	5. I'm in favour of using energy sources like solar power and natural gas since the gases given out from stoves are more harmful.	F	91	86,05	3635,0	0,987
		M	80	85,94		
	6. I would use recycling boxes if there were any.	F	91	85,45	3589,5	0,868
		M	80	86,63		
	7. I would use e-bill in order to protect the environment.	F	91	88,53	3410,0	0,434
		M	80	83,13		
	8. I would throw away my garbage if there were nobody there.	F	91	92,84	3001,5	0,041*
		M	80	78,22		
	9. There is nothing wrong with pouring waste cooking oil into the sink.	F	91	81,58	3237,5	0,034*
		M	80	91,03		
	10. I think we will not fi nd a place to have picnic within a few generation.	F	91	88,43	3419,0	0,452
		M	80	83,24		
	11. I think everybody should sow a tree in his or her life.	F	91	87,27	3524,0	0,692
		M	80	84,55		
	12. I think seeds should be kept for the future of life.	F	91	83,98	3456,5	0,546
		M	80	88,29		
	13. I would throw old newspapers; empty glass-plastic bottles, and cans to recycling boxes.	F	91	89,67	3306,0	0,211
		M	80	81,83		
	14. I think indiscriminate hunting can cause environmental problems.	F	91	89,52	3320,0	0,280
		M	80	82,01		
	15. I would warn people if they caused harm to the environment.	F	91	79,85	3080,0	0,068
		M	80	93,00		
	16. When I read a newspaper I pay attention to the topics related to the environment.	F	91	88,95	3371,5	0,363
		M	80	82,64		
	17. For the protection of environment caused by waste, I watch TV programs that give information about re-use of them.	F	91	87,59	3495,0	0,627
		M	80	84,19		
	18. I would like to learn about environmental issues.	F	91	81,47	3227,5	0,178
		M	80	91,16		
	19. I would rather buy environmentally friendly items than economic ones.	F	91	87,66	3488,5	0,621
		M	80	84,11		
	20. I prefer to use public transportation rather than private transportation to protect the environment.	F	91	87,14	3536,5	0,737
		M	80	84,71		

G: Gender (F: Female M: Male)
N: Number of Participants

U: Mann Whitney U Value
$p<0.05$

To test whether there was a significant difference between the gender of the participants and their degree of agreement with the statements in the survey form, the Mann-Whitney U test, a non-parametric test, was used, with a significance level of 0.05. According to the values given in Table 3, there is a significant difference between women and men in 3 of 20 statements at the 0.05 significance level. The average scores of women were higher for the statement "I, as well as others, have responsibility for the protection of the environment" ($U=3213.0$ / $p=0.045<0.05$) and "I would throw away my garbage if there were nobody there" ($U=3001.5$ / $p=0.041<0.05$). Therefore, it can be said that women have a higher awareness of their responsibility in protecting the environment. However, while some studies on environmental literacy among students have found no differences based on age, gender, education, or marital status (Akçay and Pekel, 2017; Küçükbaş Duman and Atabek Yiğit, 2019), other studies have found that female students have higher levels of environmental literacy and ecological footprint awareness than male students (Fatemi et al., 2022; Yıldız et al., 2023). The average scores of men were higher for the statement as "There is nothing wrong with pouring waste cooking oil into the sink" ($U=3237.5$ / $p=0.034<0.05$). Because this statement contains negative connotations, the results suggest that male participants may have a lower awareness than female participants regarding the environmental damage caused by waste oils. No significant differences were found in other items. In particular, female and male participants were found to have similar opinions on issues such as support for renewable energy (1), the need for environmental education (2), recycling behaviors (6, 13), preference for environmentally friendly products (19), and the use of public transport (20). Overall, it can be said that the level of environmental literacy is largely similar according to the gender variable; however, female participants exhibit a more sensitive attitude in terms of environmental responsibility, individual environmental behaviors, and awareness of environmentally harmful practices.

According to the study results, there were no significant differences in participants' marital status and daily working hours. Since most studies in the literature have been conducted on students or student teachers, questions about study duration or marital status have not been asked. This study, however, used a scale developed for adults and aimed to determine whether the demographic characteristics of adult participants, which differ from those of students, are related to environmental literacy. It was considered that married participants might be influenced by their spouses' environmental awareness. Some libraries operate overtime, for example, 24/7. Considering the consequences of exceeding daily working hours in libraries, such as increased energy

consumption, the study aimed to understand whether this has an impact on the environmental awareness or consciousness levels of the staff.

Table 4: Kruskal Wallis H-Test Results According to Age

	Item	X^2	p
Environmental Literacy	1. I believe that government should support the renewable energy sources (sun, wind, water, geothermal).	22,234	0,000*
	2. Environmental education should be given from the beginning of elementary education in order to provide environmental awareness.	2,826	0,587
	3. I, as well as others, have responsibility for the protection of the environment.	9,071	0,059
	4. I'm in favour of using solar power in traffic lights and street lamps in order to keep the future generations life.	3,766	0,439
	5. I'm in favour of using energy sources like solar power and natural gas since the gases given out from stoves are more harmful.	14,791	0,005*
	6. I would use recycling boxes if there were any.	22,850	0,000*
	7. I would use e-bill in order to protect the environment.	3,213	0,523
	8. I would throw away my garbage if there were nobody there.[2]	6,417	0,170
	9. There is nothing wrong with pouring waste cooking oil into the sink.	4,361	0,359
	10. I think we will not find a place to have picnic within a few generation.	5,446	0,245
	11. I think everybody should sow a tree in his or her life.	13,548	0,009*
	12. I think seeds should be kept for the future of life.	1,518	0,823
	13. I would throw old newspapers; empty glass-plastic bottles, and cans to recycling boxes.	8,866	0,065
	14. I think indiscriminate hunting can cause environmental problems.	5,736	0,220
	15. I would warn people if they caused harm to the environment.	13,662	0,008*
	16. When I read a newspaper I pay attention to the topics related to the environment.	7,057	0,133

[2] In the original scale, this statement, which was the negative, was translated word for word in the Turkish translation. However, in interviews conducted with some participants after the analysis of the findings, they stated that they understood the statement as "If there is no one to collect the garbage (garbage collector, janitor, etc.), I will throw the garbage away myself," and responded accordingly. This fact has been taken into account in the assessments in the findings section.

	17. For the protection of environment caused by waste, I watch TV programs that give information about re-use of them.	6,852	0,144
	18. I would like to learn about environmental issues.	0,453	0,978
	19. I would rather buy environmentally friendly items than economic ones.	7,249	0,002*
	20. I prefer to use public transportation rather than private transportation to protect the environment.	4,572	0,334

X^2: Chi-Square
$p<0.05$

Table 4 shows that a Kruskal-Wallis H-test, a non-parametric test, was conducted to determine whether there is a relationship between the ages of the participants and their environmental literacy, with a significance level of 0.05. According to the analysis findings, statistically significant differences were found between age groups in some items, while no significant differences were detected in many items. To identify which groups showed significant differences based on the Kruskal-Wallis H-test results, Tamhane's T2 post-hoc test statistics were used due to the differing between-group variances. According to this, there were significant differences ($p=0.000<0.05$ and $p=0.003<0.05$, respectively) between those aged 20-29 and those aged 60 and over in the statements "I believe that government should support the renewable energy sources (sun, wind, water, geothermal)" and "I would warn people if they caused harm to the environment." Participants in the second age group showed a higher level of agreement with these statements. Significant differences were also found in the statements "I'm in favour of using energy sources like solar power and natural gas since the gases given out from stoves are more harmful" and "I would use recycling boxes if there were any." In the statements, there was a significant difference between the 20-29 and 50-59 age groups ($p=0.002<0.05$ and $p=0.000<0.05$, respectively), indicating that participants in the second age group had a higher level of agreement with the statements. Similarly, a significant difference was found between the 20-29 and 30-39 age groups ($p=0.016<0.05$) for the statement "I would rather buy environmentally friendly items than economic ones" and between the 30-39 and 50-59 age groups ($p=0.021<0.05$) for the statement "I think everybody should sow a tree in his or her life" with participants in the second age group having a higher level of agreement with the statements in both cases. This result reveals that symbolic and individual responsibility behaviors towards environmental protection can vary according to age groups, and that, for example, environmentally friendly consumption habits can be affected by age. In contrast, no significant differences were found between age groups in items such as the need for environmental education (2), individual environmental responsibility (3), use of solar energy (4), use of e-invoices (7), the harms of waste oils (9), overfishing

(14), the desire to learn about environmental problems (18), and the use of public transportation (20) ($p>0.05$). This indicates that these environmental attitudes and awareness are at similar levels in different age groups. Overall, it is seen that the age variable has an effect on some dimensions of environmental literacy. In particular, it can be said that there are differences between age groups in terms of support for renewable energy, recycling behaviors, environmentally friendly consumption preferences, and translating environmental sensitivity into behavior. However, it is understood that age groups largely exhibit similar attitudes in terms of environmental awareness and general awareness of environmental problems.

Table 5: Kruskal Wallis H-Test Results According to Education

	Items	**X^2**	**p**
Environmental Literacy	1. I believe that government should support the renewable energy sources (sun, wind, water, geothermal).	0,404	0,817
	2. Environmental education should be given from the beginning of elementary education in order to provide environmental awareness.	4,191	0,123
	3. I, as well as others, have responsibility for the protection of the environment.	0,537	0,765
	4. I'm in favour of using solar power in traffic lights and street lamps in order to keep the future generations life.	1,183	0,554
	5. I'm in favour of using energy sources like solar power and natural gas since the gases given out from stoves are more harmful.	0,720	0,698
	6. I would use recycling boxes if there were any.	1,960	0,045*
	7. I would use e-bill in order to protect the environment.	2,382	0,304
	8. I would throw away my garbage if there were nobody there.[3]	1,207	0,547
	9. There is nothing wrong with pouring waste cooking oil into the sink.	5,850	0,044*
	10. I think we will not find a place to have picnic within a few generation.	0,575	0,750
	11. I think everybody should sow a tree in his or her life.	0,340	0,843
	12. I think seeds should be kept for the future of life.	0,137	0,934

[3] In the original scale, this statement, which was the negative, was translated word for word in the Turkish translation. However, in interviews conducted with some participants after the analysis of the findings, they stated that they understood the statement as "If there is no one to collect the garbage (garbage collector, janitor, etc.), I will throw the garbage away myself," and responded accordingly. This fact has been taken into account in the assessments in the findings section.

	13. I would throw old newspapers; empty glass-plastic bottles, and cans to recycling boxes.	0,357	0,837
	14. I think indiscriminate hunting can cause environmental problems.	0,81	0,960
	15. I would warn people if they caused harm to the environment.	2,785	0,248
	16. When I read a newspaper I pay attention to the topics related to the environment.	0,651	0,722
	17. For the protection of environment caused by waste, I watch TV programs that give information about re-use of them.	0,279	0,870
	18. I would like to learn about environmental issues.	3,455	0,178
	19. I would rather buy environmentally friendly items than economic ones.	0,478	0,787
	20. I prefer to use public transportation rather than private transportation to protect the environment.	1,027	0,598

X^2: Chi-Square
$p<0.05$

Table 5 shows that a Kruskal-Wallis H-test, a non-parametric test, was conducted to determine whether there is a relationship between participants' educational status and environmental literacy, with a significance level of 0.05. As seen in the Table 5, a significant difference was observed in statement 6 as "I would use recycling boxes if there were any" and statement 9 as "There is nothing wrong with pouring waste cooking oil into the sink" ($p=0.045<0.05$ and $p=0.044<0.05$, respectively). To determine which groups showed significant differences based on the Kruskal-Wallis H-test results, the Tukey test, a post-hoc test, was used since no significant variances were found. Accordingly, a significant difference was found between high school and university graduate participants in statements 6 and 9. University graduates scored higher in statement 6, while high school graduates scored higher in statement 9. Based on these results, it can be said that participants with higher education levels attach more importance to recycling, while participants with lower education levels have lower awareness of the harm that waste oils cause to water resources. On the other hand, no significant differences were found based on education level in items such as support for renewable energy (1), necessity of environmental education (2), awareness of environmental responsibility (3), environmentally friendly energy use (5), use of e-invoices (7), necessity of planting trees (11), recycling behaviors (13), environmental impacts of overhunting (14), and preference for using public transportation (20). This indicates that basic awareness and attitudes regarding environmental literacy developed similarly across different education groups. Overall, it appears that the education variable has a limited effect on environmental literacy. While differences based on education level emerged particularly in recycling behaviors and awareness of

environmentally harmful practices, general attitudes towards environmental awareness and environmental responsibility were largely similar across education groups.

When the findings obtained within the scope of the research are evaluated in general, it is seen that the participants have a high level of environmental literacy. In particular, it was determined that the participants exhibited positive attitudes towards supporting renewable energy sources, providing environmental education at an early age, adopting recycling practices, and individual environmental responsibility. Participants stated that they were sensitive to environmental problems; it was revealed that their awareness of individual and social responsibility towards the protection of the environment was strong. In addition, the low level of negative attitudes towards behaviors that harm the environment indicates that environmental awareness has developed.

5. Discussion and Conclusion

A significant factor contributing to environmental problems is the lack of information, attitudes, awareness, and behavior among individuals. Changes in individual and organizational behavior in coping with environmental challenges come with increased awareness and environmental literacy among individuals regarding sustainability. High environmental awareness can lead individuals to more responsible environmental behaviors. Environmental awareness and literacy can help in making informed decisions about environmental issues and problems.

Studies aimed at raising environmental awareness and measuring the role and sustainability of libraries in this regard are increasing (Khalid and Batool, 2020; Sunday and Dada, 2022; Tribelhorn, 2023). While various studies are being conducted in Turkey, incorporating findings from studies on different samples into future plans will benefit the future of libraries. Like all members of society, library personnel also have a responsibility towards the environment. Showing how to access accurate information with minimal environmental impact is among the responsibilities of information professionals. In this context, public libraries hold an important position in raising environmental awareness, particularly among users and generally among the public. By providing free services, public libraries offer access to information for disadvantaged groups, guarantee individuals right to access information, support lifelong learning, and strengthen social equality; they are fundamental public institutions.

This study, which aimed to understand the level of environmental literacy among employees of public libraries in Turkey, evaluated the participants

degree of agreement with the relevant statements. The statement with the highest average score was "I believe that government should support the renewable energy sources (sun, wind, water, geothermal)." The degree of agreement with this statement was 4.819, significantly above the average. It can be said that participants viewed the support of clean energy by public institutions, especially those in government administration, as a duty or even an obligation. The second statement with the highest average score (4.708) was "I, as well as others, have responsibility for the protection of the environment" suggesting that public library personnel believe that individuals, as well as institutions, have responsibilities. While no direct study on environmental literacy among librarians has been found, Erbasan's (2018) study on teachers indicated that participants had high levels of environmental attitudes but moderate levels of environmental literacy. Studies on students (Kahyaoğlu and Özgen, 2012; Teksöz et al., 2010) show that participants have an environmentally focused way of thinking and positive environmental awareness. According to the findings of the study, the overall average of the scale items is 4.09, and it can be said that the library personnel participating in this study evaluated their environmental literacy levels as high.

Regarding the degree to which employees agree with statements about environmental literacy, the study found that marital status and daily working hours didn't create a significant difference; however, gender, age, and education level showed differences in some items. In this respect, the results of this study are consistent with some studies on different groups (Demiralay, 2008; Usluel, 2007; Yıldız et al., 2023), but differ from others (Akçay and Pekel, 2017; Karadeniz Bayrak, 2014). For example, according to the results of the study by Yıldız et al. (2023) on environmental literacy and ecological footprint awareness of health sciences faculty students, women have higher average scale scores than men. In the studies conducted by Demiralay (2008) and Usluel (2007) on student teachers, it was found that there were differences according to age and class, and that the literacy level increased as age and class increased. In contrast, in the studies conducted by Akçay and Pekel (2017) and also Karadeniz Bayrak (2014) on student teachers, no difference was observed according to gender or class in terms of environmental awareness and environmental literacy.

When examining statements showing significant differences, it was observed that women had higher average scores on the statements "I, as well as others, have responsibility for the protection of the environment" and "I would throw away my garbage if there were nobody there." This suggests that women feel personally more responsible for environmental protection. It appears that women have a higher level of awareness, particularly regarding their sense of responsibility to protect the environment and their engagement in environmentally conscious behaviors. Conversely, it is noteworthy that male

participants may have a lower level of awareness regarding certain practices that could harm the environment.

Regarding education level, participants with lower education levels stated that there was no harm in pouring used cooking oil down the sink, while participants with higher education levels stated that recycling bins should be used. This finding indicates that environmental awareness increases proportionally with education level. Therefore, significant differences were identified based on education level in some areas such as recycling behaviors and awareness of environmentally harmful practices, and this result shows that education is a supportive element in developing environmentally conscious behaviors. Although it is not possible to obtain direct information from participants about the reasons for this situation since the survey form did not contain open-ended questions, it is beneficial to consider the impact of individual or institutional differences. Therefore, future studies could use different research techniques such as interviews or focus groups to obtain face-to-face information from participants and make a more accurate assessment of these results.

When examining the relationship between participants ages and environmental literacy, differences were observed between the youngest (20-29 years) and oldest (60 years and older) groups in their statements regarding "the government should support renewable energy sources" and "people who harm the environment should be warned." The older group of participants had higher rates for both statements, indicating that they acted with the intention of warning those around them. While this cannot be attributed to a single cause or factor, the influence of cultural structure is evident. In many societies, including Turkey, old age, as a culturally significant social status, is associated with moral guidance, going beyond the mere transmission of experience. Therefore, older individuals may feel more entitled to offer advice or warnings to others.

Considering the results obtained from the research findings, it was observed that the participants generally had a moderate level of environmental awareness. However, it can be said that they had some shortcomings in integrating this awareness into their daily workflows and library services. Looking at the statements that the participants agreed with the least, it can be said that they were not very willing to use public transportation to protect the environment and to dispose of their own trash even if no one was around. Unfortunately, in this case, negative reflections of past social culture and the inability to instill the role of a conscious citizen in individuals can be seen.

This study should be continued in future years with larger sample groups in different types of libraries (university, research libraries, etc.). While this study is expected to contribute to research on environmental literacy factors in public libraries, similar studies in different libraries would be more beneficial. This

research can be further developed, some limitations can be addressed, resource constraints can be overcome, and the institutional culture can be shifted towards sustainable development. Future academic studies suggest that universities, including their information centers/libraries, should explicitly incorporate sustainability goals into their academic missions and adopt clearer, more implementable, and measurable strategies.

Improving foreign language proficiency is crucial in strengthening the reading culture in public libraries. Foreign language proficiency directly impacts the quality of service provided by staff in Turkish public libraries, but it is not the sole determining factor. In other words, low foreign language proficiency may be limiting in some areas, but it doesn't mean it can't change anything. Libraries in Türkiye largely operate in line with the policies of the Ministry of Culture and Tourism. While staff may sometimes struggle to keep up with international green library trends, they can also take initiative based on local needs. Innovation isn't learned solely from foreign sources. Turkish language training, seminars, and publications from professional associations also contribute. A lack of foreign language skills can slow down the pace of development, but it doesn't make innovation impossible.

It is an undeniable fact that library staff in Türkiye will increasingly encounter and use artificial intelligence applications in their social and professional lives due to the impact of developing technology. In this process, improving the knowledge and skills of staff regarding artificial intelligence applications is a necessity (Andersdotter, 2023). It is no longer sufficient for library staff to simply know how to use computers. They also need to learn how to correctly use artificial intelligence models to access accurate information and be able to teach this to users. For this purpose, the development of advanced chatbot systems that can answer user questions 24/7 is essential. Artificial intelligence should not be seen as a force replacing the librarian, but rather as a multiplier that enhances their abilities. The faster and healthier this adaptation process is managed, the stronger libraries will remain as information centers in the digital age.

While this study is expected to contribute to research on environmental awareness in libraries, it should not be forgotten that environmental awareness can also be increased through activities such as education, courses, and projects. Indeed, Fatemi et al. (2022) states that increasing green knowledge through education also increases environmental awareness. It would be beneficial to replicate this study in different types of libraries, as there may be differences in working environments between academic and public libraries. Furthermore, developing an environmental literacy scale focusing on library staff would be useful in order to reveal the role of libraries in promoting environmental literacy.

6. Limitations and Future Research Directions

Although the study is quite comprehensive, it would be beneficial to examine different research examples in this field in the future. Examining the social and environmental impacts of studies is important for developing a deeper understanding of future research impacts. With the contribution of evolving technologies, a detailed examination of the impact of artificial intelligence on these studies would be beneficial.

Furthermore, with the continuous development of artificial intelligence through technological advancements and its increasingly powerful contributions to humanity, the future focus of AI should be on enabling librarians to concentrate on environmental protection and the reduction of environmental damage. For example, prioritizing AI in information centers can reduce unnecessary paper printing and excessive storage by analyzing how often certain books are actually used. At the same time, user behavior can be closely analyzed to guide users towards digital resources. With the increase in digital resources, information centers can also be transformed into awareness centers. AI-powered recommendation systems can suggest books, articles, and events related to the environment, climate, and sustainability to users. This also increases user awareness. Logistical processes can also be optimized in terms of resource transfer. The use of AI in book transportation, distribution, and return processes can identify the shortest and least carbon-emission routes.

All digitalization activities carried out in information centers should be strategically managed. Digitizing everything isn't always environmentally friendly; however, artificial intelligence can offer a balanced approach by analyzing which materials are more sustainable to digitize. Where artificial intelligence is limited, the professional experience of information experts should be relied upon.

Installing smart energy systems in information centers can optimize lighting, heating, and cooling based on real-time usage data. For example, energy consumption can be automatically reduced during off-peak hours. This can yield significant benefits, especially for information centers that handle large amounts of data. Smart energy systems can dynamically manage energy consumption using sensors, IoT devices, and real-time analytics software. This reduces operational costs and contributes to sustainability goals.

To maximize user benefit from information centers, interactive learning spaces should be created. These shouldn't just be bookshelves; they should include small group areas for conversation practice, discussion corners, or language café-style gatherings. Information centers can provide access to language

learning apps, offer online course subscriptions, or provide users with interactive language learning software. Weekly conversation clubs and beginner-intermediate-advanced level groups can be planned. With this approach, information centers can transform from passive reading areas into active learning and social interaction centers. Especially in language learning, it's crucial for users not only to have access to resources but also to experience the language firsthand. Furthermore, information centers can contribute not only to individual learning but also to community building. Through regular events, users can learn from each other, gain motivation to practice, and build social connections. For young people, students, and immigrant communities in particular, such centers can play a significant role in both education and social integration.

In short, a well-designed public library can be much more than a quiet reading area. It can become a social center where people truly learn by using the language. From a language learning perspective, conversation clubs, interactive activities, digital tools, and community-focused spaces allow users to experience the language not only theoretically but also actively in daily life. Thus, libraries can transcend being mere institutions providing access to information and become important community centers supporting cultural exchange, social participation, and lifelong learning.

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