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# Environmental Attitudes of Future Early Education Teachers: Internal Structure

**Vincentas LAMANAUSKAS** [1,*]
**Rita MAKARSKAITĖ-PETKEVIČIENĖ** [2]

[1] PhD, (HP), Professor, Chief-Researcher, Vilnius University Šiauliai Academy, Institute of Education, Lithuania; http://orcid.org/0000-0002-4130-7899; vincentas.lamanauskas@sa.vu.lt
[2] PhD, Associate Professor, Vilnius University, Institute of Educational Sciences, Vilnius, Lithuania; https://orcid.org/0000-0003-1653-8094; rita.makarskaite-petkeviciene@fsf.vu.lt
* corresponding author: vincentas.lamanauskas@sa.vu.lt

**Abstract:** *Taking into consideration the complexity of current environmental problems, the scale of human activity's impact on the environment, uncertainties in assessing the risks, long-term and indirect consequences of this activity, the importance and necessity of environmental education becomes obvious and undeniable. An extremely important area is the environmental attitudes of teachers who work with preschool and primary school children and have been role models for them for many years, and their formation during university studies.*
*The study analysed the environmental attitudes of preservice preschool, pre-primary and primary education teachers, their structure and significance for education. Using mixed methodology and data collection from 136 university students, six main components were identified: environmental awareness, attitude, habits, concerns, position, and citizenship. The study revealed that the most significant components are awareness, attitude, and habits, forming the basic structural block of environmental attitudes. The least significant was citizenship, although it is important for long-term changes.*
*The results demonstrated that learners have a high level of awareness, understand the importance of nature conservation, and are inclined to sustainable consumption, however, active participation in environmental activities remains limited. The study also revealed that ecological habits, such as waste sorting, support for renewable energy or conscious consumption, are significant for the formation of sustainable behaviour.*
*Factor analysis showed that the first three components are closely related, promoting the practical application of knowledge and values. The secondary block of components (concern, position, and citizenship) is more related to value attitudes and societal transformation. The study emphasises the need to strengthen environmental education in university study programmes, in order to form more active student citizenship and motivation in environmental activities. These results are important in preparing future teachers to effectively shape environmental awareness in the younger generation and contribute to long-term sustainability goals.*

**Keywords:** *environmental education, factor analysis, teacher training, attitude structure, university students.*

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## Introduction

In recent years, both in the European Union and in Lithuania, increasing attention has been paid to environmental education. Each of us has a unique role to play in the area of environmental education. Children participate in more environmental activities individually, involving friends and family, the sooner they learn about these issues. Educating students about environmental preservation fosters the growth of responsible citizens. In addition to learning about the environment in school, kids also learn about other topics that are crucial to environmental preservation.

Childhood is distinguished as a relevant age period for the formation of environmental attitudes and environmentally friendly behaviour because the primary school age is characterised by important cognitive changes and the expanding social world of the child, as well as great parental influence (Šorytė & Pakalniškienė, 2021). The value attitudes and practical skills formed in children in a preschool institution are the foundation on which they will build their lives in the future. It has been found that the following methods are particularly suitable for developing environmental attitudes in preschool age: discussions, raising problematic issues, trips, campaigns, etc. (Beišienė & Lukavičienė, 2015). Around age 7, children's behavior and attitudes toward the environment begin to take shape. They then increase until age 10, level off until age 14, and then start to decline once more. While attitudes about the environment remain flexible until early adulthood, environmental behavior evolves from childhood to early adolescence and starts to solidify around the age of ten (Otto et al., 2019). From the perspective of environmental psychology, the environmentally friendly behaviour of young people (adolescents) and the factors determining it have also been systematically studied, i.e., environmental values or the perceived need to preserve nature and its resources (Balundė et al., 2021). Young people's attitudes, behaviors, and sense of responsibility all reflect their relationship to the environment. Youth environmental organizations should prioritize acquiring experience that contributes to sustainable development in addition to expanding knowledge (Bøhlerengen & Wiium, 2022).

As one of the most crucial elements of teaching natural science, it is clear that environmental education in primary schools needs to be strengthened (Lamanauskas, 2009). According to the findings of an Indonesian survey, the majority of educators concurred that incorporating environmental education within the curriculum is crucial for students' learning, particularly for those in primary school. Nevertheless, there are still issues with this integration, like a lack of time (Sukma et al., 2020). However,

little has changed in classroom practice despite the importance of environmental education being acknowledged (Stanišić & Maksić, 2014). Yeşilyurt et al. (2020) and Kuckienė & Makarskaitė-Petkevičienė (2006) both emphasized the value of natural science knowledge in environmental education. The action research study that the latter Turkish researchers presented demonstrated that teaching environmental knowledge raises primary school learners' understanding of environmental issues. Measures, such as the effect of spherical movies on primary school learners' environmental education by teaching them about vulnerable species, were disclosed by Fokides and Kefalinou (2020).

The study examines the need for environmental education that reflects global environmental problems such as climate change, waste management, and sustainability. These themes are relevant in many countries and the findings of the study can be applied to other cultural and educational settings. The insights on the six components of environmental attitudes (awareness, attitude, habits, concern, position, and citizenship) are universal and can help shape global strategies in teacher education. It is rare in the international literature to find studies that examine in depth the environmental attitudes of pre-service preschool and primary teachers. This study fills this gap by highlighting how the preparation of early education professionals can contribute to long-term sustainability goals. The study highlights the importance of environmental citizenship, although this component is identified as the least significant. This raises important questions for the international scientific community about the role of motivation, social support, and educational measures in enhancing citizenship. This study contributes to the international debate on teacher professional development in the field of environmental protection by revealing that the right awareness, attitudes, and habits can increase teachers' ability to integrate environmental topics into their teaching. There is considerable international debate on teacher education programs that promote sustainability and environmental awareness. This study offers concrete recommendations to strengthen university studies, for example by including more courses related to the environment and by encouraging active student involvement in practical activities.

However, the environmental attitudes of teachers who work with preschool and primary school children and have been role models for them for many years, are no less important. Preservice teachers' environmental consciousness should be taken into consideration because their choices as future experts may have an impact on both the environment and the education of the next generation. However, it is also helpful for teachers to sense the

current trends in students' attitudes toward the environment so that they can emphasize one or more sustainable education goals in line with the subject study program. The main aim of the study was to find out what environmental attitudes future preschool, pre-primary and primary school teachers have developed. Two research questions were formulated in this study.

What is the environmental position of preservice early education teachers?

What is the internal structure of the environmental attitudes of preservice early education teachers?

## Research methodology

### *General characteristics*

The study was carried out as a pilot project utilizing a mixed qualitative and quantitative research methodology. The research was performed in the period of January and March of 2023. The research is predicated on the idea that student views and evaluations research is crucial because it enables the identification of present issues, the clarification of existing ones, and the prediction of potential for study improvement. A published article presents the findings of the qualitative analysis (Lamanauskas & Makarskaitė, 2023).

### *Sample*

Preschool, pre-primary, and primary education preservice early education teachers (in total 136) participated in the study. Students studying Childhood Pedagogy ($N$ = 110) and Preschool Education Pedagogy ($N$ = 26) from Vilnius ($N$ = 121) and Klaipėda ($N$ = 15) universities made up the research sample. Table 1 shows the arrangement of students by academic year.

**Table 1** *The Arrangement of Students by Study Year [n (%)]*

| **Year** | ***n*** | **%** |
|---|---|---|
| First | 43 | 31.6 |
| Second | 72 | 52.9 |
| Third | 12 | 8.8 |
| Fourth | 9 | 6.6 |
| Total | 136 | 100.0 |

In a quantitative pilot study, it is therefore believed that this type of sample is very representative and enables the drawing of pertinent findings/results. Utilizing pre-made questionnaires, the student survey was

carried out in classrooms. Every student was made aware of the study's goals, and participation was entirely non-compulsory and anonymous. Students gave their verbal agreement to take part in the study. All the ethical guidelines were strictly followed. In addition, the students were reasoned on how their data would be used and that students have the freedom to leave at any time (without any consequences on their status).

***Instrument***

A 22-statement scale was used in the study. The statements were evaluated using an interval Likert scale, where 1 means "I completely disagree", 5 means– "I completely agree". The array of 22 statements was evaluated in terms of content by two experts. The reliability (internal consistency) of the statements was assessed. It is known that reliability is usually identified as a criterion for the quality of the instruments, that is, the accuracy and stability of measurements (Meidus, 2004). Internal consistency is interpreted as Cronbach's alpha coefficient. If Cronbach's alpha is .70 or more, the scale or group of questions/statements is considered to be consistent (Aiken, 2002). The Cronbach's alpha for the group of statements used in the study is .815.

***Data analysis***

Descriptive statistics were used to analyse the study's quantitative data. The statements' mean, standard deviation, and significance index were computed. The analysed statements were arranged according to their significance index (*SI*). The significance index varies within the limits ($0 \leq SI \leq 1$). The closer the *SI* value is to 1, the more important and significant the statement is for the respondent, or the respondent agrees more with the statement. During the analysis, the interval scale was converted into a ratio scale.

22 statements have been factorised. Varimax rotation with Kaiser Normalization and the main component approach were used to do a factor analysis. Reducing the number of variables is the primary purpose of factor analysis. The Kaiser Criterion, which states that factors be analysed if their Eigen values are equal to or greater than one, was used to find out the number of factors. Factor analysis is unquestionably appropriate for data derived from the sample. The Kaiser-Meyer-Olkin (*KMO*) test and Bartlett's Test of Sphericity were used to complete whether the data set was suitable for the factor analysis. Tables 2 and 3 show sample appropriateness for factor analysis outcomes.

**Table 2** *KMO and Barlett's Test Results*

| | | | |
|---|---|---|---|
| Kaiser-Meyer-Olkin (KMO) test | | .743 | |
| Bartlett`s Test of Sphericity | Chi-square ($\chi^2$) | 845.531 | |
| | *df* | 231 | |
| | *p* | .0001 | |

The values are rather high, as seen in Tables 1 and 2 (Tria, 2024; Nasledov, 2005). Bartlett's test of sphericity demonstrates that the data are correlated and that the correlation matrix is not equal to 1, making them appropriate for factor analysis. Factor analysis is applicable for the data, according to the Kaiser, Meyer, and Olkin (*KMO*) test (*KMO* =.743).

**Table 3** *Reliability of the Array of Statements*

| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | Number of statements |
|---|---|---|
| .815 | .814 | 22 |

According to some researchers, a well-designed construct should have a Cronbach's alpha coefficient of at least.7 (Garson, 2010) and greater than 0.6 (Yaffee, 2003). The variance of the responses to the several questions is comparable in this instance since the Cronbach's alpha coefficient is greater than .7 and the Spearman-Brown's enhanced reliability coefficient is near to it. Considering suggestions, factor loading was used to incorporate the variable, with each variable's loading not less than .40 (Ferguson & Cox, 1993). The statistical software SPSS was used to analyse the data.

## Research results

### *Descriptive results*

After analysing the data obtained, the significance indices of the statements were calculated, and the statements were ranked. Table 4 presents the results.

**Table 4** *Respondents' Position on Environmental Protection (N = 136)*

| Statements | *SI* | *SD* |
|---|---|---|
| It is important for me to protect nature | .878 | 0.132 |
| I'm in favor of using renewable energy sources | .878 | 0.145 |
| I like being in nature because I feel relaxed | .876 | 0.155 |
| I take my own shopping bag when I shop at a store | .869 | 0.204 |
| I think that environmental problems will only get worse in the future | .867 | 0.171 |
| Not just for the benefit of human health, but also for the benefit of bacteria, viruses, fungi, plants, and animals, nature must be preserved | .856 | 0.191 |
| As an individual, I can contribute significantly to environmental protection | .851 | 0.175 |
| Recycled resources should be mandated for industry, even if they could be more expensive to produce than new raw materials | .849 | 0.180 |
| I think that people in developed countries should adopt a more conservative lifestyle that will help solve environmental problems | .825 | 0.202 |
| When I'm not using an electrical appliance, I switch it off | .819 | 0.242 |
| I reduce the volume of packaging before throwing it away | .779 | 0.237 |
| Instead of owning a car, I prefer to use public transportation or ride a bike whenever I can | .766 | 0.262 |
| To help safeguard the environment, I have been mindful of my consumption patterns | .759 | 0.202 |
| In winter, I try not to heat my house more than necessary | .724 | 0.287 |
| I am regularly concerned about the waste that comes to my house to be recycled | .691 | 0.226 |
| I prefer recyclable products compared to non-recyclable ones | .659 | 0.248 |
| I prefer biologically degradable products compared to non-degradable ones | .634 | 0.248 |
| For things that are more environmentally friendly, I am willing to spend more | .630 | 0.235 |
| Science and technology development will eliminate environmental problems | .599 | 0.183 |
| I always caution people about damaging the environment | .586 | 0.246 |
| I read articles related to environmental protection | .512 | 0.251 |

| | | |
|---|---|---|
| I actively participate in environmental protection activities | .452 | 0.228 |

*SI* – significance index, *SD* – standard deviation

As can be seen in Table 2, the *SI* was distributed in the interval .45 – .87. The top five statements at the upper value included: *It is important for me to protect nature; I support the use of renewable sources; I like being in nature because I feel relaxed; I take my own shopping bag when I shop at a store; I think that environmental problems will only get worse in the future.* The first two statements, having the highest significance index, can be related to knowledge and understanding. The pleasure of being in nature because it is a place for relaxation, although it shows a pragmatic relationship with nature, nevertheless conforms to the search and necessity of today's person for harmony with himself and the environment. Having a shopping bag when shopping talks about sustainable consumption habits. The statement about the understanding that environmental problems will only get worse in the future also has one of the highest significance indices. In the context of the pandemic and the war in Ukraine, a different perception of environmental protection could hardly have been expected.

Given that students agreed to the statement that nature must be protected for the sake of all living organisms, no matter what it is, it can be assumed that those who participated in the survey understand that there are no unnecessary organisms in nature and that there are connections between them. And if those connections are severed or somehow damaged, the order of living nature will be violated or disrupted. The statement with a high *SI*, *As an individual, I can greatly contribute to environmental protection,* speaks of the presence of initiative and responsibility, and environmental citizenship.

Even if the cost of production would be higher than for new raw materials, the industry's use of recycled materials is acceptable to the study's participants. One of the European Union's goals is a circular economy, where raw materials are used more efficiently, and waste is reduced.

When *I'm not using an electrical appliance, I switch it off, I reduce the volume of packaging before throwing it away* – the statements are focused on consumption habits. Environmentally friendly consumer behaviour is a strategic task not only for Lithuania but also for the whole world in the face of climate change and the ecological crisis.

The *SI* of the statement, *Instead of owning a car, I prefer to use public transportation or ride a bike whenever I can*, hardly corresponds to the real situation because a large part of students do not drive or do not have a car. It is easier for them to agree with this statement than for those who have cars and drive them every day. As well as another statement about home heating can be

somewhat distant from everyday life for students because the majority of them live in rented accommodation, and the temperature in them does not depend on the people living there.

Health researchers have also noticed that students pay more attention to what they consume, analyse, for example, their food choices. This means that the ecological awareness of the young generation increases.

The table below presents three statements about waste recycling. Sorting, waste recycling, and choosing to buy a product with recyclable packaging indicate students' ecological awareness, and search for harmony with the environment. At the same time, science and technology are expected to help tackle environmental problems. It is desirable to believe that current students have noticed decisive steps toward sustainable environmental protection in the city, in their place of residence, over the past few years.

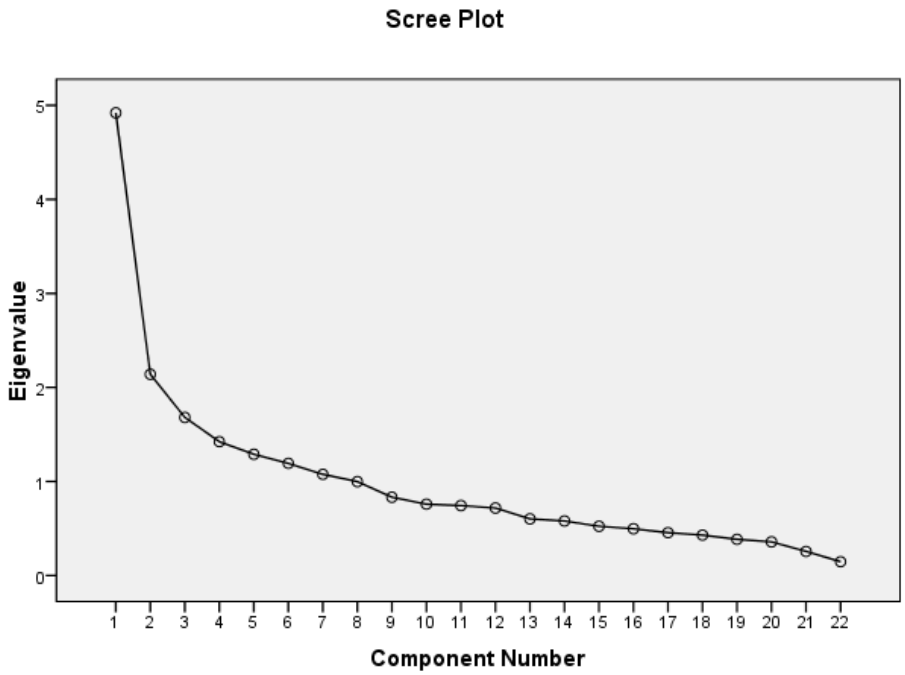
Students read articles on environmental topics, do not tolerate environmental polluters or those who otherwise harm nature, and involve themselves in active environmental activity. Although the SI of the latter statements is much lower.

***Factor analysis results***

Using Varimax rotation with Kaiser Normalization and the main component approach, a factor analysis of 22 statements (environmental attitudes) was conducted. The objective of factor analysis was to decrease the number of primary variables. The Kaiser Criterion, which states that factors be analysed if their Eigen values are equal to or greater than one, was used to find out the number of factors.

The factors of 22 statements were extracted using Eigen Value Statistics. In total, 6 factors were extracted, which explain 57.48% of common variance.

**Figure 1** *Scree Plot*




The first six components are shown to be the best expressed in Figure 1. As a result, the other components' real values are falling (towards 1 or less). Initial variable communalities, or initial variable variation parts, are shown in Table 13 and are accounted for by common factors. The original variables' communalities are higher than.20, indicating that the chosen principle components preserved an acceptable amount of information about the variable.

**Table 5** *Communalities*

| | Initial | Extraction |
|---|---|---|
| T1 | 1,000 | .692 |
| T2 | 1,000 | .595 |
| T3 | 1,000 | .575 |
| T4 | 1,000 | .617 |
| T5 | 1,000 | .642 |
| T6 | 1,000 | .619 |
| T7 | 1,000 | .676 |
| T8 | 1,000 | .482 |
| T9 | 1,000 | .565 |
| T10 | 1,000 | .366 |
| T11 | 1,000 | .429 |
| T12 | 1,000 | .574 |
| T13 | 1,000 | .718 |
| T14 | 1,000 | .527 |
| T15 | 1,000 | .599 |
| T16 | 1,000 | .706 |
| T17 | 1,000 | .706 |
| T18 | 1,000 | .452 |
| T19 | 1,000 | .574 |
| T20 | 1,000 | .522 |
| T21 | 1,000 | .491 |
| T22 | 1,000 | .517 |

*Note*. Extraction Method: Principal Component Analysis.

A total of 6 variable variances is introduced in Table 6.

**Table 6** *Total Variance Explained*

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 4.920 | 22.364 | 22.364 | 4.920 | 22.364 | 22.364 | 2.974 | 13.520 | 13.520 |
| 2 | 2.140 | 9.727 | 32.091 | 2.140 | 9.727 | 32.091 | 2.746 | 12.481 | 26.001 |
| 3 | 1.681 | 7.640 | 39.732 | 1.681 | 7.640 | 39.732 | 1.798 | 8.172 | 34.173 |
| 4 | 1.423 | 6.468 | 46.200 | 1.423 | 6.468 | 46.200 | 1.771 | 8.049 | 42.222 |
| 5 | 1.289 | 5.859 | 52.059 | 1.289 | 5.859 | 52.059 | 1.727 | 7.849 | 50.071 |
| 6 | 1.192 | 5.420 | 57.479 | 1.192 | 5.420 | 57.479 | 1.630 | 7.408 | 57.479 |

*Note*. Extraction Method: Principal Component Analysis

It is clear that the largest portion of shared variance is explained by the first two components (13.52%, 12.48%). A lesser portion of the common variance can be explained by the other four components.

An additional factor analysis method was carried out. Following the rotation process, six extracted factor loadings are shown in Table 7, along with factor significance indices that illustrate the distribution of the statements into factors. It was possible to identify the most and least important elements by using significance indices.

**Table 7** *Results from the Factor Analysis of the Environmental Attitude Statements*

| | **FACTOR 1**<br>***Environmental concern*** | **Factor loadings** | ***SI* and *SD*** |
|---|---|---|---|
| S4 | I think that environmental problems will only get worse in the future | .747 | *SI* = .73<br>*SD* = 0.15 |
| S5 | Recycled resources should be mandated for industry, even if they could be more expensive to produce than new raw materials | .701 | |
| S17 | I prefer recyclable products compared to non-recyclable ones | .673 | |
| S15 | To help safeguard the environment, I have been mindful of my consumption patterns | .634 | |
| S16 | I prefer biologically degradable products compared to non-degradable ones | .621 | |
| S20 | I am willing to pay more for environmentally friendly products | .429 | |
| *Internal consistency* | | Cronbach's Alpha | .80 |
| | **FACTOR 2**<br>***Environmental citizenship*** | **Factor loadings** | ***SI* and *SD*** |

| | | | |
|---|---|---|---|
| S19 | I always caution people about damaging the environment | .715 | *SI* = .67<br>*SD* = 0.13 |
| S22 | I read articles related to environmental protection | .636 | |
| S20 | For things that are more environmentally friendly, I am willing to spend more | .569 | |
| S21 | I actively participate in environmental protection activities | .560 | |
| S18 | Instead of owning a car, I prefer to use public transportation or ride a bike whenever I can | .470 | |
| S2 | It is important for me to protect nature | .437 | |
| S1 | I like being in nature because I feel relaxed | .423 | |
| *Internal consistency* | | Cronbach's Alpha | .70 |

| | **FACTOR 3**<br>***Environmental awareness*** | **Factor loadings** | ***SI* and *SD*** |
|---|---|---|---|
| S3 | Not just for the benefit of human health, but also for the benefit of bacteria, viruses, fungi, plants, and animals, nature must be preserved | .682 | *SI* = .87<br>*SD* = 0.10 |
| S2 | It is important for me to protect nature | .578 | |
| S12 | I take my own shopping bag when I shop at a store | .532 | |
| S9 | I'm in favor of using renewable energy sources | .503 | |
| S1 | I like being in nature because I feel relaxed | .402 | |
| *Internal consistency* | | Cronbach's Alpha | .58 |
| | **FACTOR 4**<br>***Environmental attitude*** | **Factor loadings** | ***SI* and *SD*** |
| S7 | I think that people in developed countries should adopt a more conservative lifestyle that will help solve environmental problems | .790 | SI = .83<br>SD = 0.16 |
| S6 | As an individual, I can contribute significantly to environmental protection | .762 | |
| *Internal consistency* | | Cronbach's Alpha | .60 |
| | **FACTOR 5**<br>***Environmental position*** | **Factor loadings** | ***SI* and *SD*** |
| S9 | I support the use of renewable energy sources | .403 | *SI* = .72<br>*SD* = 0.12 |
| S8 | Science and technology development will eliminate environmental problems | .660 | |
| S11 | I am regularly concerned about the waste that comes to my house to be recycled | .432 | |
| *Internal consistency* | | Cronbach's Alpha | .36 |

| | **FACTOR 6**<br>***Environmentally friendly habits*** | **Factor loadings** | ***SI* and *SD*** |
|---|---|---|---|
| S12 | I take my own shopping bag when I shop at a store | .484 | *SI* = .80<br>*SD* = 0.17 |
| S13 | When I'm not using an electrical appliance, I switch it off | .773 | |
| S14 | In winter, I try not to heat my house more than necessary | .630 | |
| *Internal consistency* | | Cronbach's Alpha | .50 |
| Extraction Method: Principal Component Analysis.<br>Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 14 iterations. | | | |

*Note.* (*SI* – significance index, *SD* – standard deviation)

Table 7 shows that six important components can be distinguished in the structure of environmental attitudes. The most significant factor is (*SI* =.87) Environmental awareness, and the least significant factor is *SI* = .67) Environmental citizenship. In general, it can be stated that all factors are quite significant because the significance index of all of them is bigger than 50%. Environmental awareness and environmental attitude are closely related since both of them are essential parts of human interaction with the environment and have a significant influence on sustainable behaviour. On the other hand, it is determined by the mutual complementarity of these components shaping human actions in the field of environmental protection. Environmental awareness primarily includes a person's knowledge, understanding and perception of the state of the environment, ecological problems, and their causes and consequences. The basis of an environmental attitude is a person's values, attitudes, and beliefs about how one should behave with regard to the environment. This is basically a certain emotional or moral response to knowledge acquired through environmental awareness. Thus, the results clearly show that in the structure of environmental attitudes, these two elements are the most important because awareness forms an attitude, and an adequate attitude encourages and determines the corresponding actions. As a result, environmental habits are formed. The results of the study showed that the third component – namely, Environmental habits – is also significantly important (*SI* = .80). Environmental habits act as a link between awareness and attitude, helping to transfer knowledge and values into everyday practice. It can be reasonably stated that a three-component block – Environmental awareness, Environmental attitude, and Environmental habits- emerges in the structure of environmental attitudes.

Judging by the results of the study, one can state that the second block (triad) consists of three components, although their significance is somewhat

lower. These are Environmental concern (*SI* = .73), Environmental position (*SI* = .72), and Environmental citizenship (*SI* = .67). The significance of the first two components of this block is essentially very similar, and the significance of the third component is the lowest. This result is quite justified since the Environmental citizenship component is often considered the least significant in the structure of environmental attitudes due to its complexity, intangibility, and greater requirements for active participation in environmental activities. A high level of awareness, motivation, and organisational skills is necessary for the expression of this component, and its impact is long-term and less visible. Usually, it is more easily applicable to individual actions that seem more directly effective and more achievable.

Thus, it is obvious that Environmental awareness is a basic element without which the other components (attitude, habits, etc.) cannot be formed or function effectively. However, even with a lot of knowledge (higher awareness), without a positive attitude, behaviour will not always change in the desired direction. Moreover, although an environmental position is important in terms of values, it does not necessarily turn into behaviour. Although Environmental citizenship is the least significant, having assessed the research results, and the least practised, it has great significance for systemic long-term changes.

## Discussion

The main aim of the research was to analyse what environmental attitudes future preschool, pre-primary and primary school teachers have developed. Six structural factors were identified: environmental awareness (*SI* = .87), environmental attitude (*SI* = .83), environmental habits (*SI* = .80), environmental concern (*SI* = .73), environmental position (*SI* = .72), and environmental citizenship (*SI* = .67). Environmental attitudes are an extremely important area. Human relations with the environment and the impact of such relations on the environment remain and will remain a determining factor in the future because the deterioration of the environmental condition is both a local and global problem, causing increasing concern. Teachers in the education process not only transmit environmental knowledge but also form cognitive and emotional values. However, such formation is not necessarily correct. Researchers emphasise that the main aim of environmental education is to develop public attitudes, commitments and motivation (Sinan et al., 2022), moreover, such education is especially important at an early age (Lamanauskas, 2022), it is simply necessary to educate the younger generation, which would be able to solve future problems (Yoleri, 2012). The improvement of students' environmental

awareness undoubtedly depends on the competences of teachers in this area (Benjamin & Adu, 2019; Beatrix, 2021).

The conducted environmental attitude structure analysis of the future teachers showed that the most meaningful factor is environmental awareness. Environmental awareness is usually an understanding and responsible attitude towards the environment and its preservation. It is quite understandable that people having high environmental awareness contribute significantly more to environmental protection, choose a more sustainable lifestyle themselves, etc. A study conducted in Turkey also showed that the environmental awareness of future teachers is high (Ergin, 2019). On the other hand, studies also show insufficient environmental awareness, and a lack of awareness of future teachers (Oncu & Unluer, 2015).

No less important is the environmental attitude of future teachers. The environmental attitude of teachers is important because they can help shape future generations with high environmental awareness and responsibility. Teachers have every opportunity to integrate environmental topics (environmental issues in a general sense) into a teaching process, as well as organise classes, in which students can implement environmentally friendly activities themselves. The study conducted showed a relatively high significance of this factor in the structure of environmental attitudes (*SI* = .83). Researchers agree that this component is significant in the preparation of teachers in the field of environmental protection. At the same time, it is noticed that appropriate training of teachers in environmental education issues, played an important role in changing their attitudes (Petkou et al., 2021). Although the environmental attitudes of students (and their attitudes on the whole) depending on study programs were not compared in the study, however, similar studies show that significant differences exist. For example, a research by Öz Aydın et al. (2013) compared the attitude of preschool, pre-primary school, and primary school teachers towards the environment and found that preschool teachers received the lowest scores. In addition, the attitudes of preservice early education teachers in the area of environmental protection differ depending on whether they study environmental courses at university. According to the study's findings, third-year students who took environmental education classes fared better than first-year students who had not yet completed any environmental courses (Alim, 2014). Teachers' environmental habits are actions and practices by which they seek to reduce their impact (often negative) on the environment and thus promote a sustainable lifestyle. The results of the study show that this factor is also quite significant. This is important because habits can have a positive impact not only on environmental awareness and behaviour of the teachers themselves

but also on their students. Researchers recommend that teachers always participate in activities related to caring for the environment (Husin et al., 2020).

It is understandable that emotional and psychological attitude manifests itself as an environmental concern. Namely, caring for the environment and its preservation, which includes awareness of the existence and seriousness of environmental problems on the one hand, and the expressed desire and aspiration to contribute to their solution. In the structure of environmental attitudes, this factor is also significant. It manifests itself through understanding environmental problems, the need to review personal habits, and readiness for lifestyle changes. It is obvious that social and environmental problems are among the most important problems of today's society (García-Morís & Martínez-Medina, 2022). However, concern alone does not solve the problems. It is necessary to restructure current goals, habits and lifestyles (Juraitė, 2002).

The results of the research showed that the weakest factor in the structure of environmental attitudes is environmental citizenship. It is not enough to just know, have certain habits or express concern. It is crucial to have the capacity and the desire to engage in public activities that promote sustainability and the environment. To put it another way, from environmental knowledge and understanding to involvement, in order to impact the solution of environmental issues.

In general, the essential components are distinguished in the structure of environmental attitudes, however their significance is different. Research conducted in Turkey showed that teachers' attitudes to environmental issues affect their beliefs about the effectiveness of environmental education and even the teacher's success in this regard (Tanık Önal, 2020). There is no doubt that environmental (ecological) education is one of the essential integral components of early childhood science education (Lamanauskas, 2010). The study performed largely coincides with the work of other researchers, revealing a high level of environmental attitudes among future primary school teachers (Aznar-Díaz et al., 2019). Environmental attitudes help define teachers' overall attitudes and commitments to environmental and sustainability education at an early age. This, in turn, forms the basis for high-quality and sustainable early childhood environmental education, and promotes teachers' commitments in this area. This can help ensure that teachers promote environmental awareness from childhood.

The results of the study propose that the arrangement of the elements of the attitude structure is justified, especially if the significance is assessed in terms of practical influence and everyday behaviour formation. However, if

the significance is defined as the impact on systemic and long-term changes or the long-term transformation of society, environmental citizenship and environmental position could be and should be assessed higher, i.e., their significance should be higher. This shows a certain educational space for the formation of environmental attitudes of preservice early education teachers.

The study examines the environmental attitudes of preservice early education teachers in detail, identifying six key components: environmental awareness, attitudes, habits, concerns, position, and citizenship. This provides a clear framework for how environmental attitudes are formed and influence early education, highlighting the fundamental role of awareness, attitudes, and habits. The study highlights the need to strengthen environmental education in university curricula to develop knowledge and promote active civic participation. This finding is particularly relevant to the current environmental challenges. The study unequivocally demonstrates how preservice teachers' environmental attitudes can influence the next generation by influencing their behavior and attitudes toward the environment at a young age. The results of this study have implications not only for the theoretical understanding of the formation of environmental attitudes but also for their practical application in promoting environmental protection and sustainability in educational institutions. It can help teacher education institutions develop more effective educational methods and strategies that will contribute to raising environmental awareness in society. There is no doubt that the study brings new insights into the effectiveness of environmental education and provides data-based recommendations for improving this process in teacher education.

### *Limitations*

The study unavoidably has some important limitations. Although 136 students from two universities participated in the research, the sample is limited geographically and institutionally. This limits the possibility of generalising the results to all preservice teachers in Lithuania or other countries. Potential differences between different demographic groups (e.g. regional differences, gender, socio-economic status) are not considered. The study identified environmental citizenship as the least significant component but did not analyse in detail why this is the case.

This would be worth exploring in the future. Although the environmental awareness and attitude components were highly significant, it is not clear how these factors relate to long-term behavioural changes. The study did not cover how the structure of environmental attitudes changes over time, which could also be a promising area for research. These limitations suggest that while the study provides reasonable insights into the

environmental attitudes of pre-service teachers, its findings should be viewed critically in the light of potential methodological and contextual limitations. Future research could increase the sample size and explore in more detail the specific factors that contribute to the setting-up of environmental attitudes.

## Conclusions and implications

The study identified six main structural components: environmental awareness, environmental attitude, environmental habits, environmental concern, environmental position, and environmental citizenship. The significance of all six components is generally high. The most significant are the first three components – environmental awareness, attitude and habits, which create the basic structural block of environmental attitudes. It can be argued that they contribute most to sustainable behaviour and practical implementation of attitudes. Environmental citizenship, although the least significant, has an important long-term value because it is related to societal transformation and systemic changes. In general, it can be stated that the environmental attitudes of university students are high, and awareness, attitude, and habits indicate their increasing attention to environmental problems.

It is also needful to assess the lack of data on how environmental attitudes are distributed among different student groups (by study programmes, courses, and other criteria). The conducted study did not include possible relations between students' personal values and their active citizenship in the field of environmental protection. The study did not analyse what specific factors determine the low significance of environmental citizenship: whether it is motivation, knowledge, social support, or other aspects. This could be a direction for further research, namely, to analyse the influence of different teacher training programmes on environmental attitudes, for example, comparing the attitudes of students who study environmental courses with those who have not studied such courses. A study on how teachers' environmental attitudes change during their careers and how this affects their students' environmental awareness, would also be meaningful. It is likely that this would help to better understand the importance of environmental attitudes, improve university study programmes, and increase civic engagement in the field of environmental protection.

## Declaration of interest

The authors declare no competing interest.

## Ethics declaration

The authors declared that the highest ethical standards were followed while the study was conducted. This study was approved by the SMC "Scientia Educologica" Review Board (15 January 2023, No. 23-01-E. Informed consents were obtained from the research participants.

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