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Raising Climate Heroes: Ecological Game Camp—A Mixed-Methods Study on Experiential Climate Education in Children and Adults

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Abstract

This mixed-method study explores the impact of the *Raising Climate Heroes: Ecological Game Camp* on climate change knowledge, awareness, behavior, and emotional engagement among primary school students and adult participants. Designed with experiential and game-based learning approaches, the program aimed to enhance environmental literacy through interactive, nature-centered activities. The quantitative findings from pre- and post-tests revealed significant increases in climate-related knowledge, awareness, climate-friendly behavior, hope, and reductions in climate anxiety. All measurement tools demonstrated high internal consistency (α = 0.809–0.914), indicating strong reliability across both age groups. Qualitative data, analyzed using descriptive thematic analysis, showed high levels of participant satisfaction. The adults emphasized educational gains, professional relevance, and appreciation of academic facilitation. The children focused on enjoyment, outdoor experiences, and social interaction. Activities such as ecological experiments, composting, and collaborative cooking were most favored. The results suggest that combining cognitive and emotional elements through play and hands-on learning can effectively promote pro-environmental attitudes. This study contributes to the literature by demonstrating how climate education can be both engaging and transformative for diverse learner groups.

Keywords: climate education; environmental awareness; experiential learning; eco-anxiety; game-based pedagogy; children and adults; sustainability education

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1. Introduction

Climate change is no longer merely an environmental concern; it has evolved into a multidimensional global crisis that profoundly affects human health, economic development, and social stability. Scientific evidence unequivocally demonstrates that anthropogenic greenhouse gas emissions—particularly carbon dioxide and methane—have significantly increased since the Industrial Revolution, thereby accelerating global warming [1,2]. Reports issued by the Intergovernmental Panel on Climate Change (IPCC) emphasize that this escalation in atmospheric warming is linked to a variety of detrimental outcomes, including intensified heatwaves, extreme weather events, rising sea levels, reduced agricultural productivity, and biodiversity loss [3,4].

Beyond its environmental consequences, climate change exerts serious pressure on the social and economic fabric of societies. Critical sectors such as water security, food supply, healthcare systems, and coastal infrastructure are increasingly at risk [5–8]. The

World Health Organization (WHO) projects that climate-related health issues may lead to approximately five million additional deaths between 2030 and 2050, with anticipated economic damages ranging from USD 2 to 4 billion annually [8]. These vulnerabilities are especially pronounced in developing countries, where rural livelihoods are heavily dependent on natural environmental conditions [9,10].

Turkey, due to its geographic location and semi-arid climate, is among the countries most vulnerable to the adverse effects of climate change. Limited water resources, widespread dependence on agriculture, and exposure to increasingly frequent extreme weather events—such as droughts, heatwaves, flash floods, and forest fires—exacerbate the environmental, economic, and social challenges faced by the country [11,12].

In light of these realities, it has become evident that combating climate change requires not only technological solutions but also significant shifts in public environmental consciousness and behavior. Environmental education has thus emerged as a strategic mechanism for promoting sustainability and fostering proactive engagement with environmental issues [13]. Research in the field suggests that effective environmental education must go beyond cognitive knowledge transmission and instead incorporate affective and behavioral dimensions to cultivate environmental responsibility and long-term commitment [14–16].

Pedagogically, game-based learning approaches have gained prominence in environmental education, particularly in programs designed for children. Games offer a developmentally appropriate means of engaging students, enabling them to explore abstract and complex environmental topics through concrete, experiential, and enjoyable interactions [17–19]. Numerous empirical studies have demonstrated that game-based environmental education can enhance children's environmental awareness, promote climate-related concern, and foster pro-environmental behavior [20–22].

However, in the context of Turkey, especially at the primary education level, the implementation of game-based and interdisciplinary environmental education programs remains limited due to several factors, including the predominance of exam-oriented curricula, insufficient integration of interdisciplinary approaches in national education policies, a lack of initial teacher training in environmental education, a scarcity of dedicated teaching materials and resources, and limited research and structural support to inform and guide program development. There is a growing need for innovative, practice-oriented strategies that can foster environmental consciousness from an early age [23–26].

In response to this need, the project entitled *Raising Climate Heroes: Ecological Game Camp* has been developed as an interdisciplinary, experiential, and game-based environmental education model tailored for children. Grounded in the premise that environmental education should address not only cognitive learning but also awareness, behavior, and emotional engagement, this project seeks to operationalize theoretical frameworks into practice. By integrating gamification into instructional processes and emphasizing student-centered experiential learning, this study aims to contribute an original and scalable model to the field of environmental education and address a notable gap in the existing literature.

Research Aim

This study aims to assess the impact of the *Raising Climate Heroes: Ecological Game Camp* program on both children and adults in terms of cognitive, behavioral, and emotional dimensions related to climate change. Employing a mixed-method design, the research integrates quantitative measurements and qualitative insights to provide a holistic evaluation of the program's effectiveness.

The quantitative component focuses on changes in participants' levels of

- Global warming knowledge and perception;
- Climate change awareness and understanding;

- Climate-friendly behavior;
- Climate change anxiety;
- Hope for preventing climate change (including individual, social, and existential aspects);
- Perception and evaluation of global warming (causes, consequences, and preventive actions);
- Awareness of renewable energy.

All constructs were assessed using validated instruments demonstrating high internal consistency (Cronbach's α ranging from 0.809 to 0.914 for both children and adults).

The qualitative component explores participants' experiences, reflections, and perceived outcomes of the program through open-ended interviews and written responses. This allows for a deeper understanding of how game-based, interdisciplinary environmental education fosters personal engagement, emotional connection, and potential behavioral transformation in the context of climate change education.

2. Materials and Methods

2.1. Research Design

This study was conducted using a convergent mixed-methods design [27], combining quantitative and qualitative data to provide a comprehensive understanding of the effects of the *Climate Heroes are Growing: Ecological Game Camp* project. A pre-test–post-test design without a control group was employed to measure changes in participants' knowledge, awareness, and attitudes regarding climate change. While this one-group pre-test–post-test design is often classified as pre-experimental and limits causal inference (e.g., potential internal validity threats such as maturation and history effects) [28], it remains an appropriate and pragmatic choice given practical constraints. Specifically, the immersive and context-dependent nature of the camp made the implementation of a randomized or nonequivalent control group infeasible. The integration of qualitative interviews further enabled in-depth exploration of participants' perspectives before and after the intervention, offering methodological triangulation that enhances the robustness and credibility of the results [29,30].

2.2. Participants

This study involved two distinct participant groups:

- **Child group:** 30 students from the 4th and 5th grades of primary school;
- **Adult group:** 30 participants comprising in-service teachers and teacher candidates.

Participants were selected through criterion sampling, a purposive sampling method commonly used in mixed-method studies [31]. The inclusion criteria were as follows: (1) for the teacher group (n = 30), applications were reviewed based on multiple criteria, including gender balance, voluntary motivation expressed in the application form, diversity of schools and regions, absence of prior participation in similar projects, variation in professional experience (0–5 years, 6–10 years, 11+ years), representation from different academic departments (for teacher candidates), equal distribution between teachers and teacher candidates, and absence of health issues preventing participation; and (2) for the student group (n = 30), selection was similarly based on criteria such as being a 4th or 5th grade student, ensuring diversity in socio-economic backgrounds and academic performance, maintaining gender balance, no prior participation in similar projects, inclusion of students from different schools and towns, and absence of health issues preventing participation.

Both teachers/teacher candidates (n = 30) and students (n = 30) were selected from a larger pool of applicants who voluntarily completed an electronic application form. Ultimately, 30 out of 55 students who met the inclusion criteria (grade level, parental consent, and voluntary participation) were enrolled. The adult group consisted of both in-service teachers and teacher candidates. A total of 35 individuals were invited. Five were

excluded because they did not meet the inclusion criteria (working with younger learners or being a teacher candidate in relevant programs). The final sample included 30 adults (21 females and 9 males), whose demographic distribution is presented in Tables 1 and 2.

The descriptive characteristics of the participants are shown in tables below:

Table 1. Distribution of adult participants by descriptive characteristics.

	Groups	Frequency (*n*)	Percentage (%)
Gender	Male	9	30.0
	Female	21	70.0
Age	20–25	18	60.0
	26 and above	12	40.0
Marital Status	Married	7	23.3
	Single	23	76.7
Education Level	Undergraduate	23	76.7
	Graduate	7	23.3

Table 2. Distribution of child participants by descriptive characteristics.

	Groups	Frequency (*n*)	Percentage (%)
Gender	Male	20	66.7
	Female	10	33.3
Age	9–10 years	28	93.3
	11–12 years	2	6.7
Education Level	Primary school	28	93.3
	Secondary school	2	6.7

In line with the inclusion criteria, students who had previously participated in similar projects were excluded. While participants had encountered general environmental topics within the national primary school curriculum (e.g., science and social studies courses), they had not been exposed to structured climate education or interdisciplinary environmental programs. Thus, their participation in this study provided an opportunity to engage with climate education in a more systematic and experiential manner for the first time.

2.3. Data Collection Instruments

This study employed a total of six data collection instruments to comprehensively assess participants' knowledge, perceptions, emotional orientations, and experiential reflections concerning climate change. The instruments were selected based on their validity, contextual relevance, and developmental appropriateness for both children and adult participants.

1. **Global Warming Knowledge and Perception Scale:** Adapted from Mahanoğlu's [32] master's thesis, this scale evaluates students' factual understanding and perceptual interpretations of global warming. It was reviewed and revised for cognitive appropriateness among primary school students.
2. **Climate Change Awareness and Knowledge Scale:** Derived from Arslanyılmaz [33], this instrument assesses both cognitive and affective awareness regarding climate change. It was applied with context-sensitive adjustments for both age groups.
3. **Hope Towards Preventing Climate Change Scale:** Developed and validated by Gezer and İlhan [34], this scale captures participants' hopeful attitudes toward contributing

to climate change mitigation. The scale showed strong applicability for both children and adults.

4. **Climate Change Anxiety Scale:** Developed by Oguntayo et al. [35] and adapted to Turkish by İlhan, Gezer, and Şahin [36], this instrument measures participants' psychological concern and anxiety about climate change. Its psychometric properties are well-supported in Turkish samples.
5. **Global Warming Perception and Evaluation Scale (GWPE):** the scale, developed by Deniz, İnel, and Sezer [37], consists of 21 items and four dimensions.
6. **Renewable Energy Awareness Scale (REAS):** Developed and validated by Mutlu and Köseoğlu [38], this scale captures participants' awareness about renewable energy sources. The 32-item scale is easy to complete and to administer.
7. **Pre-and post-structured interview forms:** these forms enabled qualitative insights into participants' evolving perspectives on ecological issues and their experiences throughout the program.
8. All instruments underwent content validation by a panel of experts in environmental education and educational assessment prior to their use in the field.

2.4. Data Collection Process

Quantitative pre-tests were administered prior to the beginning of the project, and post-tests were conducted at its conclusion. Simultaneously, qualitative interviews were held in two phases: before the project started and after its completion. All data were collected within the scope of a 10-day ecological education camp, ensuring a consistent timeframe for observation and evaluation.

The administration of the quantitative instruments required approximately 20–25 min per participant for adults. For children, however, the completion time was somewhat longer, typically 30–35 min, due to differences in reading speed, comprehension, and the need for additional clarification. The semi-structured interviews were conducted with a subset of participants and generally lasted between 30 and 40 min, allowing sufficient time for participants to elaborate on their experiences and reflections while maintaining focus on the guiding questions.

2.5. Ethical Considerations

Ethical approval for this study was obtained from Muş Alparslan University Ethics Board, and informed consent was secured from all adult participants and the legal guardians of child participants. Participation was voluntary, and all data were anonymized for confidentiality.

2.6. Data Analysis

2.6.1. Quantitative Analysis

Quantitative data obtained from the pre-test and post-test implementations of the scales were analyzed using IBM SPSS Statistics 26.0. Descriptive statistics (mean, standard deviation) were computed to assess overall tendencies in responses. In addition, the reliability of all measurement instruments was evaluated using Cronbach's Alpha coefficients, separately for the child and adult samples.

The results demonstrated high internal consistency across all instruments:

- **Global Warming Knowledge and Perception Scale**: $\alpha = 0.821$ (adults); 0.809 (children);
- **Climate Change Awareness and Knowledge Scale**: $\alpha = 0.842$ (adults); 0.863 (children);
- **Climate-Friendly Behavior Scale**: $\alpha = 0.840$ (adults); 0.833 (children);
- **Climate Change Anxiety Scale**: $\alpha = 0.879$ (adults); 0.845 (children).
- **Hope Towards Preventing Climate Change Scale**:

- Total score: α = 0.914 (adults); 0.903 (children);
- Individual hope: α = 0.872 (adults); 0.899 (children);
- Social hope: α = 0.902 (adults); 0.876 (children);
- Hope vs. despair: α = 0.896 (adults); 0.888 (children).

- **Global Warming Perception and Evaluation Scale (GWPE)**:
  - Total score: α = 0.882 (adults); 0.884 (children);
  - Causes: α = 0.871 (adults); 0.870 (children);
  - Consequences: α = 0.828 (adults); 0.843 (children);
  - Prevention: α = 0.851 (adults); 0.863 (children).
- **Renewable Energy Awareness Scale (REAS)**: α = 0.823 (adults); 0.833 (children).

These findings indicate that the applied measurement tools demonstrated **strong reliability** for both groups, ensuring the accuracy and consistency of the quantitative results.

2.6.2. Qualitative Analysis

Qualitative data were derived from semi-structured interviews conducted both before and after the intervention, as well as open-ended written feedback collected at the conclusion of the camp. These data were analyzed using the descriptive analysis method, a widely accepted qualitative technique that enables systematic summarization and interpretation of participants' expressed views in alignment with predetermined themes [39]. Descriptive analysis was employed to systematically summarize and interpret participants' qualitative responses by identifying key themes and patterns, while preserving the original meanings expressed by participants [39].

The analysis process followed several steps [31,39]:

1. **Transcription** of all interview and written responses verbatim.
2. **Categorization** of responses under thematic codes that reflected the core aims of the project (e.g., ecological awareness, climate responsibility, behavioral intentions).
3. **Presentation** of findings by directly quoting participants to preserve the authenticity of their experiences.
4. **Interpretation** of emerging patterns and contrasts between pre- and post-program reflections.

To ensure credibility and trustworthiness of the analysis, coding was reviewed by two independent researchers, and member checking was employed for a subset of participants.

The integration of quantitative outcomes with qualitative narratives provided a richer understanding of the intervention's multidimensional effects and allowed for triangulation of findings.

2.7. Implementation Process

In line with the aforementioned general objectives, the project was carried out in two main phases. In the first phase, the project program was implemented for teachers and teacher candidates. During this phase, the project activities were conducted by the trainers, and these activities were subsequently evaluated to identify areas for improvement. Based on the evaluations, revisions were made to enhance the effectiveness and quality of the activities. In the second phase, the teachers and teacher candidates implemented the activities together with the project trainers for groups of 4th and 5th grade students. This collaborative process enabled participants to both observe and practice the activities, thereby contributing to their professional development.

In order to implement comprehensive information and activities related to climate and the environment within the scope of the project, the dimensions of climate change were

identified based on a review of the relevant literature. The project activities were structured around the main themes outlined in Figure 1.

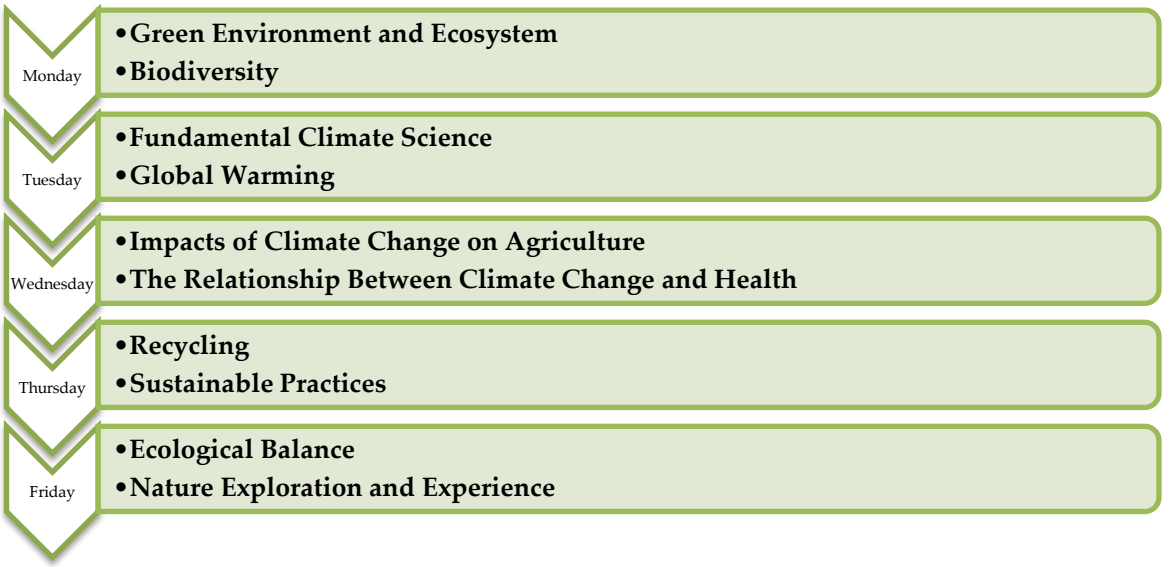

Figure 1. Thematic areas of the project activities.

Curriculum Design

The curriculum was designed based on experiential and game-based learning principles to foster both cognitive and behavioral engagement with climate change. Activities such as interactive workshops, waste-sorting games, and energy-saving simulations provided direct knowledge of climate change impacts, while nature walks and ecological games encouraged affective connection with the environment. More general activities, such as cooking with locally sourced seasonal products, were included to highlight sustainable consumption and to link climate issues to daily practices. This holistic integration of scientific knowledge with meaningful, hands-on experiences is consistent with best practices in environmental education, which emphasize connecting abstract concepts to real-life contexts to strengthen pro-environmental attitudes and behaviors [13,22,34]. Details of the implemented activity program, together with a representative sample of the activity plan, are included in the Appendices A and B.

3. Findings

3.1. Quantitative Findings

3.1.1. Pre-Test Comparisons Between Adults and Children

Independent samples *t*-tests revealed statistically significant differences between adults and children across several variables at the pre-test stage (see Table 3). The adults scored significantly higher in global warming knowledge (M = 20.40, SD = 2.46) compared to the children (M = 15.23, SD = 2.36), t(58) = 8.31, $p < 0.001$, Cohen's d = 2.15. Conversely, the children scored significantly higher in climate-friendly behavior (M = 49.93, SD = 7.47) than the adults (M = 30.40, SD = 8.92), t(58) = −9.20, $p < 0.001$, Cohen's d = 2.38. Significant differences were also found in hope (total), individual hope, social hope, and all subdimensions of the Global Warming Perception and Evaluation Scale (GWPE), with large effect sizes, favoring either adults or children depending on the construct.

Table 3. Pre-test differences between adults and children.

Measure	Adults Mean (SD)	Children Mean (SD)	t-Value	*p*-Value	Cohen's d
Global Warming Knowledge	20.40 (2.46)	15.23 (2.36)	8.31	<0.001	2.15
Climate-Friendly Behavior	30.40 (8.92)	49.93 (7.47)	−9.20	<0.001	2.38
Hope (Total)	40.10 (3.81)	34.67 (7.35)	3.60	0.001	0.93
Individual Hope	12.33 (1.85)	9.93 (3.12)	3.63	0.001	0.94
Social Hope	21.13 (3.96)	17.03 (4.29)	3.85	<0.001	0.99
GWPE (Total)	20.30 (4.60)	28.40 (5.93)	−5.91	<0.001	1.53
GWPE: Causes	7.03 (1.54)	9.67 (1.97)	−5.76	<0.001	1.49
GWPE: Consequences	5.87 (1.91)	8.53 (2.61)	−4.52	<0.001	1.17
GWPE: Prevention	7.40 (1.94)	10.20 (2.46)	−4.90	<0.001	1.27

The differences observed between adults and children can be explained by developmental, educational, and contextual factors. Adults, who were primarily teachers and teacher candidates, scored significantly higher in global warming knowledge, which is consistent with their higher educational attainment and prior exposure to formal instruction on scientific and environmental topics. Their professional responsibilities and teaching experience likely contributed to more structured cognitive awareness of climate issues [13]. Conversely, children exhibited higher levels of climate-friendly behavior, which may be attributed to their developmental stage, as younger learners often demonstrate stronger affective and behavioral engagement with experiential and game-based activities [40,41]. Research also suggests that environmental attitudes and pro-environmental behaviors are more readily shaped in childhood through direct, meaningful experiences in nature and education [41]. Differences in hope and perceptions may likewise reflect the contrasting life experiences of adults and children: while adults may approach climate issues with a more critical and knowledge-based perspective, children may express hope and behavioral intent more openly, guided by imagination, optimism, and social learning [22,42].

3.1.2. Post-Test Comparisons Between Adults and Children

Post-intervention comparisons showed that the adults retained significantly higher scores in global warming knowledge, hope (total), individual hope, and social hope, while children continued to score significantly higher in climate-friendly behavior and global warming perception and evaluation dimensions (see Table 4). These findings confirm the differential impact of the intervention on the two participant groups.

Table 4. Post-test differences between adults and children.

Measure	Adults Mean (SD)	Children Mean (SD)	t-Value	*p*-Value	Cohen's d
Global Warming Knowledge	21.27 (2.27)	17.37 (3.67)	4.95	<0.001	1.28
Climate-Friendly Behavior	29.60 (6.83)	55.10 (11.04)	−10.76	<0.001	2.78
Hope (Total)	42.77 (5.27)	38.90 (9.10)	2.02	0.050	0.52
Individual Hope	13.47 (1.85)	11.10 (3.25)	3.46	0.001	0.89
Social Hope	21.57 (2.98)	18.53 (5.22)	2.76	0.008	0.71
GWPE (Total)	21.23 (5.69)	25.43 (6.43)	−2.68	0.010	0.69
GWPE: Causes	6.90 (1.69)	8.63 (2.51)	−3.14	0.003	0.81
GWPE: Consequences	6.00 (1.53)	7.47 (1.91)	−3.29	0.002	0.85

3.1.3. Pre-Post Comparisons Within Adults

Paired samples t-tests conducted within the adult group revealed statistically significant improvements following the intervention. Notable increases were observed in total hope (t(29) = −2.40, p = 0.023, d = 0.59), individual hope (t(29) = −2.16, p = 0.039, d = 0.61), and renewable energy awareness (t(29) = −4.90, p < 0.001, d = 1.13), the latter showing a large effect size (see Table 5). Other variables, including knowledge, climate change awareness, climate-friendly behavior, climate anxiety, and GWPE scores, did not exhibit statistically significant changes.

Table 5. Pre-post differences within adults.

Measure	Pre-Test Mean (SD)	Post-Test Mean (SD)	t-Value	*p*-Value	Cohen's d
Hope (Total)	40.10 (3.81)	42.77 (5.27)	−2.40	0.023	0.59
Individual Hope	12.33 (1.85)	13.47 (1.85)	−2.16	0.039	0.61
Renewable Energy Awareness	60.87 (15.45)	76.20 (10.50)	−4.90	<0.001	1.13

3.1.4. Pre-Post Comparisons Within Children

The paired samples t-tests for the child group indicated statistically significant improvements in several areas. Post-test scores (see in Table 6) were significantly higher in global warming knowledge (t(29) = −2.78, p = 0.009, d = 0.71), climate change awareness (t(29) = −2.38, p = 0.024, d = 0.69), climate-friendly behavior (t(29) = −2.29, p = 0.029, d = 0.56), total hope (t(29) = −2.06, p = 0.049, d = 0.52), and renewable energy awareness (t(29) = −2.80, p = 0.009, d = 0.51). No significant changes were observed in climate anxiety or GWPE scores and subdimensions, though some results approached significance.

Table 6. Pre-post differences within children.

Measure	Pre-Test Mean (SD)	Post-Test Mean (SD)	t-Value	*p*-Value	Cohen's d
Global Warming Knowledge	15.23 (2.36)	17.37 (3.67)	−2.78	0.009	0.71
Climate Change Awareness	12.33 (2.35)	14.53 (4.02)	−2.38	0.024	0.69
Climate-Friendly Behavior	49.93 (7.47)	55.10 (11.04)	−2.29	0.029	0.56
Hope (Total)	34.67 (7.35)	38.90 (9.10)	−2.06	0.049	0.52
Renewable Energy Awareness	60.80 (9.16)	69.87 (15.77)	−2.80	0.009	0.51

3.2. Qualitative Findings

This section presents the analysis of the preliminary interview responses collected from both adult and child participants regarding their expectations from the project. The data were analyzed using a descriptive analysis method to extract themes and sub-themes, which were then supported with direct quotations from participants.

3.2.1. Adults' Expectations from the Project

Based on the statements provided by adult participants, six main themes were identified and presented in Table 7 along with their frequencies:

Table 7. Adults' expectations from the project.

Theme	Frequency (f)
Awareness and Consciousness-Raising	9
Educational Contribution and Teaching Practices	7
Personal Development and Sense of Responsibility	5
Sustainability and Ecological Living	4
Social Contribution and Widespread Impact	3
Creative and Enjoyable Methods	3

The most frequently mentioned theme was 'Awareness and Consciousness-Raising'. Participants also expressed strong expectations for integrating educational content into their teaching practices, highlighting the pedagogical potential of the project. Thematic explanations and supporting quotations are given below.

Theme 1: Awareness and Consciousness-Raising

A majority of participants expected to gain awareness about climate change, global warming, and ecological balance:

"I think I will learn things I didn't know or misunderstood about the climate." (A8)

"Formation of awareness that affects daily life." (A18)

"To gain awareness about climate change." (A20)

Theme 2: Educational Contribution and Teaching Practices

Participants noted that they expected the project to provide new insights and tools that could enhance their teaching practices:

"To gain experiences that I can adapt to my teaching." (A5)

"To implement these practices in my own lessons." (A11)

Theme 3: Personal Development and Sense of Responsibility

Some participants highlighted the importance of developing a personal sense of responsibility towards environmental issues:

"To become more responsible and conscious as an individual." (A4)

Theme 4: Sustainability and Ecological Living

Participants expressed interest in sustainable living and practical eco-friendly habits:

"To be more aware of sustainability and apply it to my daily life." (A10)

Theme 5: Social Contribution and Widespread Impact

A few participants emphasized the societal value of the project and its potential for broader influence:

"I want to inspire others around me to be more environmentally conscious." (A12)

Theme 6: Creative and Enjoyable Methods

Participants appreciated the project's use of engaging and creative pedagogical methods:

"The project activities seem fun and inspiring." (A14)

3.2.2. Children's Expectations from the Project

The responses from the child participants were grouped into five main themes based on the descriptive analysis. Table 8 presents these themes and their frequencies:

Table 8. Children's expectations from the project.

Theme	Frequency (f)
Playing Fun Games and Having Fun	11
Learning about Nature and Environment	10
Making New Friends and Socializing	6
Doing Outdoor Activities	5
Trying New Experiences	4

The most frequently expressed expectation among children was to engage in fun games. However, a significant number of children also highlighted their curiosity to learn about nature and environmental issues. Below are some exemplary responses categorized under each theme.

Theme 1: Playing Fun Games and Having Fun

Children often emphasized their excitement about playing games:

"To play games and have lots of fun." (C2)

"To join fun activities." (C9)

Theme 2: Learning about Nature and Environment

A number of children stated that they hoped to learn more about the environment:

"To learn how to protect the environment and nature." (C5)

"To understand climate change." (C8)

Theme 3: Making New Friends and Socializing

Socialization and friendship were also key expectations:

"To make friends and play with them." (C1)

"To meet new people and have fun." (C7)

Theme 4: Doing Outdoor Activities

Many children were excited about outdoor experiences:

"I want to be outside and do fun things." (C4)

"To play outside games." (C6)

Theme 5: Trying New Experiences

Children also mentioned their curiosity about trying something new:

"To do things I haven't done before." (C3)

"To learn new games and knowledge." (C10)

Perception of Project Usefulness

Participants were asked the question: "Do you think this project will be beneficial?" The analyses of the responses are as follows:

All participants in the adult group (100%) stated that they believed the project would be beneficial. This indicates a high level of confidence and motivation among adults regarding the project.

In the children's group, 93.3% (28 participants) answered 'Yes', while 6.7% (two participants) responded 'Partially'. This suggests that the vast majority of children viewed the project positively, though a small number expressed some hesitation or were not fully convinced.

Overall, the general trend in both groups is highly positive. The complete consensus among adults highlights the project's perceived value. The minor 'partial' perception among

children indicates that project implementers may need to include more concrete, interactive, and engaging elements to fully capture children's interest and address any uncertainties.

3.2.3. Analysis of Final Interview Questions

Following the completion of the project, participants were asked two main questions regarding the project experience: "Did the project meet your expectations?" and "Was the project beneficial?" The responses to these questions are illustrated in Figure 2 below.

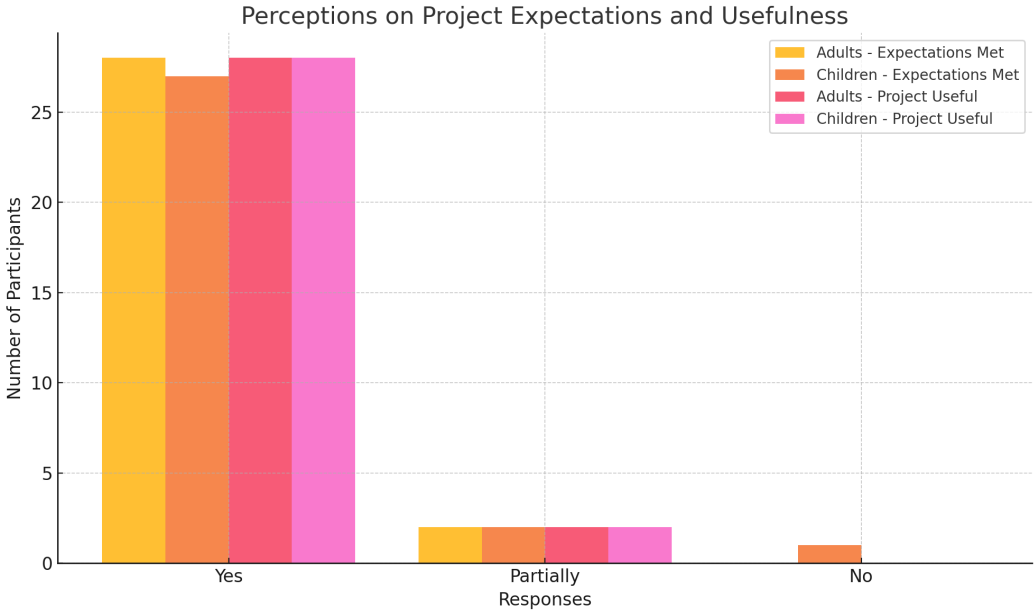

Figure 2. Participant responses to whether the project met their expectations and was useful.

Participants' Reflections on the Project: Adults and Children

Adults' Reflections on the Project

Following the completion of the project, both the adult and child participants were asked to share their views. The responses were analyzed using descriptive analysis. The findings related to adult participants are presented below in Table 9.

Table 9. Adult participants' views of the project.

Theme	Frequency (f)
Educational Gains and Knowledge Acquisition	14
Engagement, Flow, and Project Planning	11
Emotional Satisfaction and Gratitude	6
Awareness and Conceptual Clarifications	5
Applicability of Activities and Professional Reflections	4
Academic Contribution and Interaction	4
Desire for Continuation	2

Selected Participant Quotes:

1. **Educational Gains and Knowledge Acquisition (f = 14)**

Most participants reported that they acquired valuable and scientifically accurate information throughout the project. The content was perceived as comprehensive and up-to-date.

"I learned new and useful information. I realized that some of my previous knowledge was incorrect and I corrected it." (P11)

"I became informed about aspects of global climate that I previously knew nothing about." (P8)

2. **Engagement, Flow, and Project Planning (f = 11)**

The participants noted that the activities were engaging, dynamic, and never tedious. The smooth and enjoyable progression of events was attributed to effective planning.

"It was very fluent, fast-paced, and filled with content." (P6)

"The project was both fun and educational; it was extremely well-planned." (P16)

3. **Emotional Satisfaction and Gratitude (f = 6)**

The participants expressed emotional contentment and appreciation toward the project and its organizers.

"I would like to thank the organizers of the project." (P8)

"It was a wonderful experience; I sincerely thank you." (P23)

4. **Awareness and Conceptual Clarifications (f = 5)**

Some participants acknowledged that the project helped correct their misconceptions and significantly enhanced their awareness.

"We had misconceptions, and I'm happy that I managed to correct them." (P3)

"We realized that what we thought we knew was actually incomplete." (P4)

5. **Practical Applicability of Activities and Professional Reflections (f = 4)**

Several participants expressed a strong intention to implement the activities they learned in their own teaching practices. The project was perceived as a valuable professional development opportunity.

"I am eager to apply the activities we performed here with my students as soon as possible." (P22)

"This project enabled me to gain numerous awareness-raising and classroom-applicable practices." (P10)

6. **Academic Contribution and Interactive Learning (f = 4)**

Participants emphasized the significance of receiving direct instruction from university professors, describing it as a unique and enriching experience.

"It was my first time receiving lessons from professors. This made me very happy." (P18)

"We had the opportunity to benefit from the experiences of various academics during the project." (P17)

7. **Desire for Continuation (f = 2)**

Some participants explicitly stated their wish for the project to be continued in the future.

"If the project continues, I would like to participate again." (P21)

"I hope there will be a follow-up to this project." (P8)

These findings suggest that the adult participants perceived the project as well-structured, informative, and engaging. The dominant themes indicate cognitive enrichment, conceptual clarity, emotional satisfaction, and professional applicability. Furthermore, the

positive emotional expressions and desire for project continuity demonstrate the overall success and sustainability potential of the intervention.

Adults' Most Enjoyed Activities in the Project

The adults were asked to indicate the activities they enjoyed most throughout the project. The responses are visually summarized in Figure 3 below.

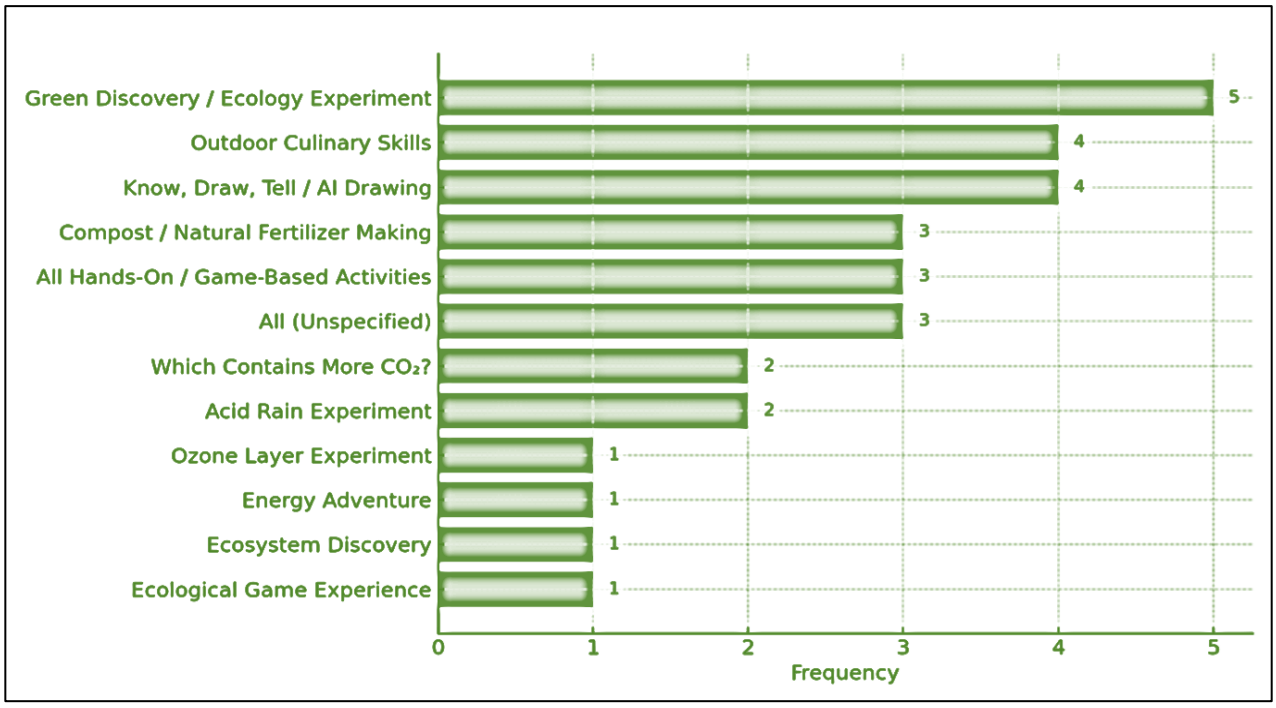

Figure 3. Adults' favorite activities.

According to the responses, "Green Discovery/Ecology Experiment" (f = 5) was the most favored activity, followed by "Outdoor Cooking Skills" and "Know, Draw, Tell" (f = 4), "Composting and Natural Fertilizer Making, Game-Based Activities" (f = 3), and other activities, such as "Acid Rain Experiment" and "Which Contains More CO_2?" (f = 2). Less frequently mentioned but still appreciated activities included "Ozone Layer Experiment," "Energy Adventure," "Ecosystem Exploration," and "Ecological Game Experience" (f = 1).

As for the least liked activities, the majority (f = 29) reported 'None'. Only one participant expressed a dislike for the theoretical classroom sessions. This indicates a strong preference for hands-on and experiential activities.

Children's Reflections on the Project

Children's Views of the Project

The responses of the child participants to the question 'What are your thoughts about the project?' were analyzed using descriptive analysis, a qualitative research method. This analysis aimed to uncover children's emotions, perceptions, and experiences related to the project. Themes were identified from the responses, each with corresponding frequency values (see in Table 10) and supported by direct quotes.

1. **Positive and Impressive Perception of the Project (f = 23)**

This was the most frequently mentioned theme. Children described the project using emotional and positive expressions such as 'beautiful,' 'wonderful,' 'I loved it,' and 'amazing.'

"I loved it." (C3)

"It was super beautiful." (C24)

"It was very nice." (C7)

"It was a highly beneficial project for us." (C30)

2. **Fun, Games, and Enjoyable Activities (f = 10)**

Children appreciated engaging and hands-on activities such as playing games and cooking.

"We cook, play games—it's really nice." (C20)

"We had fun; it was great." (C14)

3. **Friendship and Social Interaction (f = 4)**

Participants emphasized building friendships and enjoying social interactions.

"I loved it and made new friends." (C27)

"Fun, friendship, love, respect. So, so beautiful." (C2)

4. **Food, Trips, and Physical Comfort (f = 3)**

Some children highlighted aspects such as being given food, going on trips, and being well cared for.

"They give us food, take us on trips, and we play games." (C22)

"Nice school, they give us food and lessons." (C21)

5. **Trust and Satisfaction Toward Teachers (f = 3)**

Children expressed positive feelings towards the teachers and guides in the project.

"The teachers are nice." (C13)

"They treat us well and help us." (C25)

6. **Learning and Knowledge Acquisition (f = 4)**

A few participants pointed out the educational aspect of the project.

"It was really nice; I had fun and learned a lot." (C26)

"The project was great—we learned so many things." (C28)

7. **Emotional Bonding and Reluctance to Leave (f = 1)**

One child explicitly stated their emotional attachment to the project and unwillingness to leave.

"I love this place; I don't want it to close." (C16)

The findings show that children's responses were deeply emotional, genuine, and intuitive. The dominant theme was a highly positive perception of the project. Concrete elements such as games, friendship, teacher support, food, and trips played a key role in shaping their experience. While the learning dimension was less dominant than in the adult responses, it was still meaningfully present—indicating that the project succeeded in balancing both educational and entertaining aspects.

Table 10. Children's views of the project.

Theme	Frequency (f)
Positive and Impressive Perception of the Project	23
Fun, Games, and Enjoyable Activities	10
Friendship and Social Interaction	4
Food, Trips, and Physical Comfort	3
Trust and Satisfaction Toward Teachers	3
Learning and Knowledge Acquisition	4
Emotional Bonding and Reluctance to Leave	1

Children's Most Enjoyed Activities in the Project

Children were asked to indicate the activities they enjoyed most throughout the project. The responses are visually summarized in Figure 4 below.

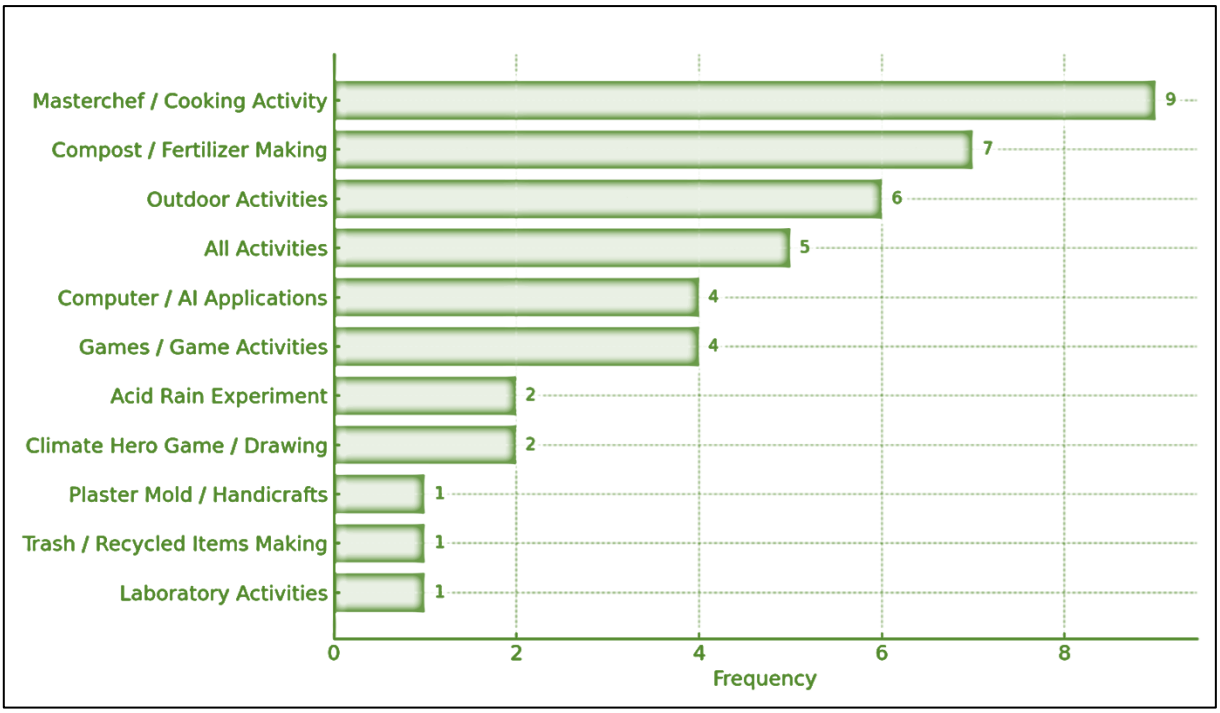

Figure 4. Favorite activities of child participants.

Upon examining the figure, it is evident that the most frequently favored activity was the "Masterchef/Cooking Activity" (f = 9), which emerged as the most prominent choice. Its popularity may be attributed to its hands-on, enjoyable, and familiar format, which appears to have left a strong impression on the participants. The "Compost/Fertilizer Making" activity (f = 7) also garnered considerable attention, likely due to its connection with nature and its focus on productive engagement. The "Outdoor Activities" theme (f = 6) stood out as well, suggesting that open-air experiences that involve physical movement and play were particularly appealing to children.

The category "All Activities" (f = 5) indicates that several children expressed overall satisfaction with the project, finding it difficult to single out a specific favorite. Other well-received activities included "Computer/AI Applications" (f = 4), reflecting interest in technology-integrated content, and "Games/Game-Based Activities" (f = 4), highlighting the importance of playful, socially engaging experiences.

Additional activities mentioned, although by fewer participants, included "Acid Rain Experiment," "Climate Hero Game/Drawing," "Plaster Mold/Handicrafts," "Trash/Recycled Items Making," and "Laboratory Activities". While these were less frequently cited, they still contributed to the richness and diversity of the overall program.

When asked about their least favorite activities, the majority of children (n = 25) responded with "None." Four children stated that they did not enjoy the tests, and one participant expressed a dislike for the "Trash/Recycled Items Making" activity.

These findings indicate that the activities most appreciated by children were those that were practical, enjoyable, creative, and rich in opportunities for social interaction. Rather than perceiving the project as a conventional knowledge-delivery initiative, children appeared to engage with it as a dynamic and experiential learning process. This suggests

that the project was effectively designed, in alignment with the developmental needs and interests of the target age group.

Comparison of Activities Liked by Adult and Child Participants

Table 11 below provides a comparison of the favorite activities as reported by both adult and child participants. The comparison reveals overlapping interests, as well as preferences unique to each group.

Table 11. Comparison of activities liked by adults and children.

Activity Theme	Adults	Children	Comment
Outdoor Cooking/Masterchef	4	9	Highly favored by both groups, though more dominant among children.
Compost/Fertilizer Making	3	7	Nature-based production activities were more popular among children.
Know, Draw, Tell/AI Drawing	4	4	Equally appealing to both groups.
Games/Fun Activities	3	4	Slightly more appealing to children, but also enjoyed by adults.
Acid Rain Experiment	2	2	Scientific experiments were appreciated by both groups.
Outdoor Activities	0	6	Only children mentioned this theme directly. Outdoor settings had strong appeal.
All/General Satisfaction	3	5	Both groups reported overall satisfaction with all activities.

As shown in the table, scientific applications (e.g., the acid rain experiment), game-based activities, and interactive methods such as "Know, Draw, Tell" were commonly favored by both groups. Children placed greater value on outdoor activities that emphasize nature, movement, and freedom. In contrast, adults appeared to appreciate structured knowledge transfer, particularly when delivered through gamified and experimental methods.

Overall, participants preferred outdoor and nature-related activities more than indoor alternatives. These findings suggest that future projects may benefit from placing greater emphasis on outdoor and experiential learning environments tailored to both age groups.

4. Discussion

The findings of this study demonstrate that the "Raising Climate Heroes: Ecological Game Camp" program significantly impacted both adult and child participants across multiple dimensions, corroborating existing research on experiential and game-based environmental education. The quantitative analyses revealed statistically significant improvements, notably in areas of environmental knowledge, pro-environmental behaviors, and dimensions of climate-related hope. These outcomes align with previous literature emphasizing the transformative potential inherent in interactive, interdisciplinary, and experiential learning settings [20,22,43,44].

Specifically, the adult participants exhibited a notable enhancement in overall hope levels ($t = -2.397$, $p < 0.05$, $d = 0.588$), particularly in the individual hope subdomain. Additionally, adults demonstrated significantly increased awareness regarding renewable energy ($t = -4.904$, $p < 0.001$, $d = 1.131$). These results echo Ojala's [45] findings, which underscore the significance of emotional engagement and solution-oriented pedagogical approaches for fostering climate optimism and empowering individuals to envision feasible solutions to environmental issues.

Similarly, child participants showed considerable improvements in environmental knowledge ($t = -2.782$, $p < 0.01$, $d = 0.708$), awareness ($t = -2.378$, $p < 0.05$, $d = 0.690$), and pro-environmental behaviors ($t = -2.291$, $p < 0.05$, $d = 0.558$). These findings indicate that the program successfully facilitated not only cognitive advancement but also behavioral shifts among younger learners, reinforcing the concept that environmental education must extend beyond mere information dissemination and actively cultivate affective and behavioral transformations [14,15,45].

Post-intervention differences indicate that the camp exerted a differential impact on adults and children. Adults retained significantly higher scores in global warming knowledge and both dimensions of hope (individual and social), which aligns with the literature suggesting that adult learners, particularly teachers, benefit more in terms of conceptual understanding and future-oriented efficacy beliefs when exposed to structured environmental education programs [13,22]. Their educational background and professional experience may have facilitated deeper integration of knowledge with personal and social hope for climate action.

Conversely, children consistently scored higher in climate-friendly behavior and global warming perception and evaluation. This finding is consistent with developmental research indicating that children are more likely to translate environmental learning into everyday behaviors and emotional engagement, particularly when learning is experiential and play-based [40,41]. Previous studies have also shown that early environmental interventions can foster strong pro-environmental orientations, as affective and behavioral dispositions are more malleable at younger ages [41,46].

Taken together, these results demonstrate that the camp contributed to reinforcing adults' cognitive and motivational dimensions of climate education, while simultaneously strengthening children's behavioral and perceptual engagement with environmental issues. This complementary impact highlights the importance of designing climate education interventions that are sensitive to the developmental and contextual needs of different participant groups.

The qualitative findings supported and enriched these quantitative outcomes. Adult participants consistently emphasized the educational value, effective program execution, and emotional satisfaction derived from the intervention, reflecting a comprehensive and meaningful educational experience. These reflections align closely with existing literature advocating for project-based, interdisciplinary, and participatory pedagogical methods as effective strategies for adult environmental education [13,16,47].

Children's qualitative responses were characterized by enthusiasm and emotional engagement, with dominant themes including enjoyment, interactive games, socialization, and outdoor cooking activities. Such preferences resonate strongly with Vygotsky's [17] sociocultural theory, highlighting the critical role of active participation, social interaction, and experiential context in cognitive development. Furthermore, children's explicit preference for outdoor, nature-based activities underscores the importance of incorporating physical space and autonomy into environmental education designed for younger audiences, as supported by previous research [48,49].

Comparative analyses across age groups revealed universal preferences for game-based and experimental activities, such as the acid rain experiment and AI-assisted art creation. However, distinctive preferences emerged, with children expressing a stronger inclination towards outdoor and exploratory activities, whereas adults prioritized structured knowledge acquisition and interactions with subject-matter experts. This differentiation suggests the necessity for adaptive instructional designs tailored explicitly to diverse developmental stages and psychological profiles, reinforcing the recommendations from earlier pedagogical studies [50,51].

The integration of qualitative and quantitative data provides a cohesive and comprehensive narrative, reinforcing the assertion that experiential, playful, and interdisciplinary educational approaches substantially enhance the outcomes of climate change education. Nevertheless, certain affective domains, such as climate anxiety, did not demonstrate significant shifts within the intervention's limited duration, highlighting the critical need for longitudinal studies and sustained educational engagements to effect deeper emotional and psychological change [52,53].

It is important to consider the role of students' prior exposure to general environmental instruction in shaping their baseline levels of pro-environmental knowledge and attitudes. Although such curricular content may have contributed to relatively higher initial awareness, the significant increases observed between the pre-test and post-test suggest that the camp program had an additional and substantial effect. The qualitative findings further confirmed that the experiential and game-based structure of the camp provided participants with novel insights and deeper engagement that extended beyond their prior classroom-based exposure.

While the present findings demonstrate meaningful short-term improvements in participants' knowledge, attitudes, and behaviors, the absence of a longitudinal follow-up limits our ability to assess the durability of these outcomes. Research on environmental and climate education suggests that repeated exposure and reinforcement are often necessary to sustain learning gains and translate them into long-term behavioral change [46,54]. Accordingly, interventions such as the Ecological Game Camp may need to be offered periodically—for instance, once or twice annually—to consolidate knowledge, maintain motivation, and prevent the decay of climate-related awareness. From a policy perspective, incorporating game-based and experiential programs into school curricula and community-based initiatives could provide systematic reinforcement, ensuring that climate literacy and pro-environmental behaviors are continuously nurtured across age groups.

Overall, this study adds robust evidence supporting the efficacy of immersive, multimodal environmental education interventions. Such programs are demonstrably effective not only in promoting environmental knowledge and awareness but also in fostering enduring pro-environmental behaviors and emotional resilience, which are essential components in effectively addressing climate change.

5. Conclusions

This study aimed to assess the impact of an interdisciplinary, game-based environmental education program—*Raising Climate Heroes: Ecological Game Camp*—on both children's and adults' knowledge, awareness, emotional engagement, and pro-environmental behaviors related to climate change. The findings clearly demonstrate that integrating experiential, playful, and contextually meaningful learning strategies can significantly enhance environmental education outcomes across different age groups.

The quantitative results indicated statistically significant improvements in knowledge acquisition, awareness levels, hope, and climate-related anxiety management among participants, supported by the high internal consistency of the applied measurement tools. These findings align with contemporary research advocating for more holistic and affective dimensions of climate education [55,56].

The qualitative data revealed that the participants perceived the program as engaging, informative, and emotionally rewarding. The adults emphasized educational enrichment, conceptual clarity, and professional applicability, while the children appreciated fun, outdoor activities, and teacher interaction—underscoring the importance of age-appropriate and affective pedagogical design [21,57].

The integration of outdoor learning, playful exploration, and interdisciplinary content contributed to sustained motivation and perceived relevance, especially among younger participants. These outcomes strongly support the growing call within the environmental education literature to move beyond traditional cognitive frameworks toward embodied, emotionally resonant, and action-oriented learning models [14,58].

Overall, this study offers empirical evidence for the effectiveness of immersive, game-based environmental education programs in fostering meaningful engagement with climate issues. It contributes to the literature by highlighting the value of experiential pedagogies in enhancing environmental literacy and promoting behavioral change. Future research should explore the long-term impact of such interventions and their scalability across diverse educational contexts.

Implications for Practice

1. **Scalability of game-based curricula**: our results and those of Fernández Galeote et al.'s [59] suggest that combining screen-based and experiential games is effective, though scaling beyond pilot initiatives remains a challenge.
2. **Building emotional resilience**: the rise in hope levels and emotional satisfaction indicate that integrating hopeful narratives is essential alongside scientific content [60].
3. **Integrating uncertainty**: incorporating explicit moments of reflection and exploration in games provides learners with tools to navigate the inherent uncertainties of climate issues [61].
4. **Adapting design to demographics**: curriculum designers should customize game mechanics and contexts—emphasizing outdoor, communal play for children and structured, thematic content for adults.

Scalability and policy implications: To enable system-level adoption, the intervention can be scaled via a train-the-trainer model for teachers, supported by a standards-aligned curriculum toolkit (activity plans, rubrics, inclusion/safety checklists) developed within this project (see Section 3: *Curriculum Development*). A phased rollout (pilot schools → regional hubs → national implementation), combined with hybrid delivery (school-based integration, community programs, and seasonal camps; see Section 4: *Implementation*) and local partnerships (municipalities/NGOs) would enhance both feasibility and equity. Finally, a minimalist monitoring and evaluation package—using pre/post and delayed post measures alongside fidelity logs—would allow governments to track long-term learning, behavioral change, and inclusivity. The inclusion of the curriculum and sample activity plan in the Appendices A and B ensures replicability, making this model adaptable for broader public policy initiatives in environmental and climate change education.

Limitations and Future Directions

Despite a robust mixed-methods approach, this evaluation was limited by the absence of a long-term follow-up to assess sustained behavioral change and emotional resilience. Future research should adopt longitudinal designs to track enduring learning gains, ecological behavior adoption, and well-being. Replication across varied socio-cultural settings and digital environments—including VR-based initiatives such as "Meltdown" [62])—would also be valuable. Finally, active co-design with participants could further enhance engagement by directly addressing learners' lived experiences and uncertainties.

One limitation of this study is that participants' prior exposure to general environmental topics in the school curriculum or other programs may have influenced their baseline levels of pro-environmental knowledge and attitudes. While this was partly mitigated by the pre-test design and the exclusion of participants with prior project-based environmental education experience, future studies could further control for prior instruction when evaluating intervention effects.

A key limitation of this study is the relatively small sample size, comprising 30 children and 30 adults, recruited from a single educational and cultural context. While the mixed-methods design allowed for a nuanced and in-depth exploration of participants' knowledge, attitudes, and behaviors, the limited number of participants constrains the extent to which the findings can be generalized to broader populations. Therefore, the results should be interpreted as exploratory, providing preliminary insights rather than definitive conclusions. To strengthen external validity, future studies should aim to include larger and more diverse samples across multiple regions and socio-cultural contexts, thereby enhancing the generalizability and robustness of the findings.

Although this study provides valuable insights into the potential of experiential climate education, it should be noted that no control group was included. This limitation stemmed from both ethical considerations—since it was not feasible to exclude willing participants from such an educational opportunity—and logistical constraints related to the unique setting and limited participant pool of the camp. Nevertheless, the use of a convergent mixed-methods design, integrating both quantitative and qualitative data, allowed for triangulation and thereby enhanced the credibility and robustness of the findings despite the absence of a control group. Future research should consider incorporating control or comparison groups in different educational contexts to more rigorously evaluate causal effects and strengthen the generalizability of the findings.

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Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Ethics Committee of Muş Alparslan University, with the protocol code 143802—03/06/2024.

Informed Consent Statement: Informed consent was obtained from all participants involved in this study. Written informed consent has been obtained from the participants to publish this paper.

Data Availability Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Appendix A. Weekly Activity Program of the Ecological Game Camp

Time	Monday	Tuesday	Wednesday	Thursday	Friday
07:00–08:30	Transportation	Transportation	Transportation	Transportation	Transportation
09:00	Opening Ceremony Activities (Venue: Congress Center)	Fundamentals of Climate Science	The Impact of Climate Change on Agriculture	Climate Heroes and Recycling	Ecological Game Camp Begins
09:45	Break	Break	Break	Break	Break
10:00	Implementation of Pre-Test Activities	Climate Graphs Activity	Climate-Friendly Agriculture: Climate Change Game	Recycling Art Workshop	Green Discovery: Ecological Experience
10:45	Break	Break	Break	Break	Break
11:00	Week 1—Icebreaker Activity 1: "Living Statue Introductions" (Drama Session) Week 2—Icebreaker Activity 2: "Mixed Costume Friends" (with the second group)	Climate Adventure: Paper Plane Race	Exploring Climate Issues through Educational Games	Recycling Heroes	Outdoor Cooking Skills: The Nature Chef Adventure-Masterchef
12:00–13:00	Lunch	Lunch	Lunch	Lunch	Lunch
13:00	Importance of Biodiversity and Ecosystems	Global Warming and Environmental Awareness	Climate and Health Connections	Exploring Sustainable Practices	Green Discovery: Ecological Experience
13:45	Break	Break	Break	Break	Break
14:00	"Living Things" Bingo	Individual and Social Responsibilities on Global Warming	Healthy Air Chase	Energy Adventure: Saving the Green Planet	Ecological Game Design Competition
14:45	Break	Break	Break	Break	Break
15:00	Ecosystem Exploration	Which Produces More CO_2?	Digital Storytelling on Climate Change	Environmental Heroes: Waste Battle	Ecological Game Camp Heroes (Week 2: Ecological Game Heroes' Activities)
15:45	Break	Break	Break	Break	Break
16:00	Green Soil Treasure	Heat Race	Climate Jumping Adventure	Creating a Climate Hero Cartoon with Powtoon	Closing Ceremony Activities Week 2: Planting Trees for the "Climate Heroes Memory" Activity
17:30	Daily Assessment and Evaluation Activities	Daily Assessment and Evaluation Activities	17:00—Acid Rain: How It Deteriorates Our Artistic Creations	Daily Assessment and Evaluation Activities	Daily Assessment and Evaluation Activities
18:00	Transportation	Transportation	Transportation	Transportation	Transportation

Appendix B. Sample Activity Plan: Outdoor Cooking Skills: The Nature Chef Adventure-Masterchef

Section	Description
Activity Title	Outdoor Cooking Skills: The Nature Chef Adventure-Masterchef
Objective	To learn and apply basic culinary skills in nature while fostering teamwork and creativity through preparing meals in a collaborative setting.
Contribution to Project Goals	This activity integrates experiential learning with teamwork and creativity, contributing to the project's objectives of enhancing environmental awareness and practical skill development.
Activity Number	28
Materials Required	• Portable camp stoves• Edible plants, mushrooms, and fruits collected from nature• Basic cooking utensils (pots, pans, plates, cutlery sets)
Methodology	Computational thinking, observation of nature and wildlife, and educational gaming strategies.

Activity Procedure

1. **Ingredient Collection Phase**
   - **Teams (two or more) are formed, and each receives a collection bag.**
   - **Within a limited timeframe, teams gather edible plants, mushrooms, and fruits from the surrounding environment.**
2. **Chef Selection**
   - **Each team designates one member as the "Nature Chef."**
   - **The chef creates a menu from the collected ingredients, including preparation and presentation methods**.
3. **Team Preparation**
   - **Teams collaborate to prepare dishes according to the chef's menu.**
   - **Each team uses its own campfire or portable stove.**
4. **Cooking and Presentation**
   - **Meals are cooked within the given timeframe.**
   - **Dishes are presented aesthetically for evaluation.**
5. **Jury Evaluation**
   - **A jury panel tastes and evaluates the dishes.**
   - **Evaluation criteria: taste, presentation, and creativity.**
6. **Winner Selection and Award**
   - **The team with the highest score is awarded the "Nature Chef Prize."**
   - **The award may consist of a symbolic natural gift (e.g., a plant or environmentally meaningful material).**

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