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Effect of Teaching Sustainability on Value Orientation of Elementary School Learners

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Abstract

This study investigates the effect of teaching sustainability on the value orientation of elementary school students. Employing a quasi-experimental design with 50 students (25 in the experimental group and 25 in the control group), the research utilized the Personal Value Questionnaire developed by Dr. G.P. Sherry and Prof. R.P. Verma. The experimental group received targeted instruction on sustainability concepts, while the control group followed the standard curriculum. Post-test analysis revealed significantly higher mean scores in all ten value dimensions—religious, social, democratic, aesthetic, economic, knowledge, hedonist, power, family prestige, and health—among the experimental group compared to the control group, with all t-values significant at the 0.01 level. These findings demonstrate that teaching sustainability meaningfully enhances value orientation among elementary students, supporting the hypothesis that sustainability education positively shapes students' personal values. The study underscores the need for integrating sustainability into elementary curricula to foster responsible, value-driven future citizens.

Keywords: Sustainability Education, Value Orientation, Elementary School Students, Experimental Study

Introduction

The contemporary world is witnessing rapid ecological degradation, resource depletion, and an ever-growing threat of climate change, which have collectively underscored the urgent need for sustainable development. Education, as a transformative force, has been recognized as a critical driver in fostering awareness, knowledge, and action towards sustainability. The National Education Policy 2020 (NEP 2020) also emphasizes the integration of sustainability concepts in school curricula to equip students with the necessary skills and values for responsible citizenship.

In recent years, education has increasingly emphasized the integration of sustainability concepts, recognizing the crucial role that value orientation plays in shaping responsible, aware, and proactive citizens (Sterling, 2001; Tilbury, 2002). Value orientation, which refers to a set of guiding principles and beliefs that direct individual behavior and decision-making, is considered a foundational component of character development and social responsibility (Schwartz, 1992). Elementary school students, being in a formative stage of their cognitive and affective development, are particularly receptive to educational interventions that foster sustainability values, such as respect for the environment, social equity, and economic responsibility (UNESCO, 2017). However, despite its recognized importance, limited empirical studies have explored the direct impact of sustainability education on the value orientation of young learners (Barr, 2020; Chandra et al., 2021). This study aims to fill this research gap by investigating the effect of teaching sustainability on the value orientation of elementary school students, using a Personal

Value Questionnaire developed by Sherry and Verma (1982) as a measurement tool. The findings of this research are expected to contribute to the growing body of literature supporting the integration of sustainability education into elementary curricula (Federkova, 2020; Mikulka, 2021).

The study employs an experimental research design with a pre-test and post-test control group approach. Fifty students from Class VII were selected from Sunflower Public School, with 25 students assigned to the experimental group receiving sustainability-based lessons and 25 students assigned to the control group receiving traditional instruction. The Personal Value Questionnaire developed by Dr. G.P. Sherry and Prof. R.P. Verma was administered before and after the intervention to assess the value orientations of students.

Through statistical analysis, including mean, standard deviation, and t-tests, the study endeavors to provide empirical evidence on the impact of sustainability education on students' value orientation. This research not only contributes to the theoretical understanding of value formation in young learners but also offers practical insights for educators and policymakers seeking to integrate sustainability education into school curricula effectively.

Furthermore, the study aligns with the global Sustainable Development Goals (SDGs), particularly Goal 4 (Quality Education) and Goal 12 (Responsible Consumption and Production), which advocate for education that empowers students to make informed decisions for a sustainable future. The findings of this research could therefore inform educational policy and practice, guiding curriculum developers, teachers, and educationists to design programs that not only enhance academic achievement but also nurture holistic, value-driven, and environmentally conscious individuals.

This research seeks to bridge the gap between educational interventions and value formation by examining the specific effect of teaching sustainability on the value orientation of elementary school students, thereby contributing to the development of responsible, empathetic, and sustainability-minded citizens.

The primary objective of this research is to investigate the effect of teaching sustainability on the value orientation of elementary school students, focusing on dimensions such as religious, social, democratic, aesthetic, economic, knowledge, hedonist, power, family prestige, and health values. This study seeks to determine whether an instructional program designed around sustainability concepts significantly enhances these values compared to traditional instruction. Based on this objective, the study formulates the hypothesis that teaching sustainability will have a significant positive effect on the value orientation of elementary school students, implying that students exposed to sustainability education will score higher in various dimensions of value orientation than their counterparts in the control group.

Need of the Study

In the contemporary era marked by escalating environmental concerns, resource depletion, and a pressing need for sustainable development, it has become imperative to sensitize the younger generation to issues of sustainability from an early age. Elementary school years are considered formative for shaping children's values, attitudes, and behaviors, making it crucial to incorporate education that fosters environmental consciousness and social responsibility. Despite significant advancements in educational policies, including the National Education Policy (NEP) 2020, which emphasizes integrating sustainability into school curricula, there is still a lack of empirical research assessing the actual impact of teaching sustainability on the value orientation of students, particularly at the elementary level. This study seeks to fill that critical gap by empirically investigating whether integrating sustainability education into teaching practices can meaningfully influence various dimensions of students' values, including religious, social,

democratic, aesthetic, economic, knowledge, hedonistic, power, family prestige, and health values. By doing so, the study aims to contribute to both theory and practice, guiding educators and policymakers to design interventions that nurture well-rounded, environmentally conscious, and socially responsible citizens. Moreover, in light of global frameworks such as the Sustainable Development Goals (SDGs), which advocate for quality education and sustainability awareness (UNESCO, 2020), this research aligns with international educational priorities, reinforcing the urgency and relevance of integrating sustainability concepts into mainstream education.

Theoretical Framework

This research is grounded in the theoretical underpinnings of **Value Theory** (Schwartz, 1992), which posits that human values are fundamental guiding principles influencing attitudes, behaviors, and decisions. Schwartz's Value Theory categorizes values into universal dimensions such as religious, social, democratic, aesthetic, economic, knowledge, hedonist, power, family prestige, and health. These dimensions align with the constructs measured in this study using the Personal Value Questionnaire (Sherry & Verma, 1982).

Further, this study is informed by **Constructivist Learning Theory** (Piaget, 1970; Vygotsky, 1978), which emphasizes that learning occurs through active engagement and interaction with one's environment. By integrating sustainability education into the elementary curriculum, the study aims to foster meaningful, student-centered learning experiences that can reshape and develop value orientations.

Additionally, **Education for Sustainable Development (ESD) Theory** (UNESCO, 2017) provides a framework for teaching sustainability by encouraging critical thinking, problem-solving, and values-based education that empowers learners to take responsible actions for environmental integrity, economic viability, and a just society. The ESD approach aligns with transformative learning principles (Sterling, 2001), aiming to instill in students the values and attitudes necessary to address real-world sustainability challenges.

Review of Related Studies

Several empirical studies have explored the relationship between educational interventions and value orientation among elementary school students. A growing body of research underscores the positive impact of sustainability education on the value orientation of elementary school students. Federkova (2020) found that integrating sustainability concepts into daily lessons significantly influenced students' environmental responsibility and value orientation. Chandra, Chun, and Mikulka (2021) reported that students exposed to Education for Sustainable Development (ESD) programs demonstrated higher levels of social responsibility, democratic values, and appreciation of diversity.

In Taiwan, Shih (2024) conducted a case study demonstrating that a child-centered, problem-oriented approach in social studies effectively enhanced students' sustainability-related competencies and skills. Similarly, Luehr and Smith (2012) implemented a four-week interactive program focusing on local foods, gardening, recycling, and world hunger, which significantly improved fourth-grade students' understanding and attitudes toward food sustainability.

The Value-Belief-Norm (VBN) theory provides a framework for understanding how education influences value orientation. Studies have shown that ESD positively impacts altruistic and biospheric values while reducing egoistic and hedonic values, leading to increased pro-environmental behaviors (Steg et al., 2014).

In India, a climate change and sustainability education initiative launched in Delhi's Sarvodaya Kanya Vidyalayas aims to empower students to take climate action and foster environmental responsibility from the classroom level (Times of India, 2025). This program includes up to 20 activities per school and mandates on-site teacher training to ensure effective curriculum integration.

Innovative pedagogical methods, such as gamification and IoT-based educational tools, have also been explored. Paganelli et al. (2019) reported that using these tools in high schools promoted data-driven energy-saving behaviors and increased sustainability awareness among students.

Collectively, these studies affirm the theoretical basis and practical relevance of integrating sustainability education to positively influence value orientation among elementary school students. By synthesizing these findings, the present study seeks to extend this body of research by using the Personal Value Questionnaire (Sherry & Verma, 1982) to measure specific dimensions of values (religious, social, democratic, aesthetic, economic, knowledge, hedonist, power, family prestige, and health) and applying statistical techniques to analyze their development through a structured sustainability teaching program.

Although numerous studies have explored the impact of sustainability education on various educational outcomes, several key gaps remain in the existing literature. Firstly, while research has extensively documented the influence of sustainability education on knowledge and attitudes, comparatively less focus has been placed on its impact on **value orientation** — a critical affective dimension that underpins long-term pro-environmental behavior (Steg et al., 2014). Most studies have either concentrated on older students (secondary and higher education) or employed fragmented interventions, leaving a gap in understanding how a systematic, curriculum-based approach to teaching sustainability might shape value orientation in **elementary school students** (Federkova, 2020).

Secondly, existing studies often lack robust experimental designs with appropriate control groups and pre-test–post-test measures that would allow for rigorous assessment of causal effects. Many interventions rely on single-group or quasi-experimental designs that do not fully isolate the impact of teaching sustainability on value orientation (Chandra et al., 2021). Furthermore, previous studies rarely incorporate **locally validated instruments** (e.g., Dr. G.P. Sherry and Prof. R.P. Verma's Personal Value Questionnaire) tailored to the Indian context, despite the socio-cultural specificity of value systems and the critical need to contextualize educational interventions (Mukulika et al., 2021).

Thirdly, although sustainability education initiatives have recently gained traction in Indian schools (Times of India, 2025), there is a lack of empirical evidence evaluating their efficacy in shaping value orientation in elementary students. This research gap is particularly pressing given the National Education Policy 2020's emphasis on **values-based education** and the integration of sustainability across curricular areas.

This study addresses these gaps by employing a robust experimental design with pre-test and post-test measures, using a validated local instrument (Personal Value Questionnaire), and focusing on the effect of teaching sustainability on value orientation in **elementary school students** in India. By bridging these gaps, this study aims to provide actionable insights for policymakers, curriculum developers, and educators seeking to foster values-based sustainability education in the early years of schooling.

Hence, this research draws from these intersecting theoretical perspectives—Schwartz's Value Theory, Constructivist Learning Theory, and ESD Theory—to hypothesize that teaching sustainability meaningfully influences the value orientation of elementary school students.

Research Methodology

This study employed a quasi-experimental pre-test and post-test design with a control group to examine the effect of teaching sustainability on the value orientation of elementary school students (Best & Kahn, 2014). A purposive sample of 50 students (aged 10–12) from a government school in Aligarh, Uttar Pradesh, was divided into an experimental group (n=25) that received a structured 10-week sustainability education intervention and a control group (n=25) that continued with the regular curriculum. Data were collected using the Personal Value Questionnaire (PVQ) developed by Dr. G.P. Sherry and Prof. R.P. Verma, which measures ten value dimensions. Lesson plans for the intervention were designed following NEP 2020 and UNESCO Education for Sustainable Development guidelines (UNESCO, 2017). Pre- and post-tests were administered to both groups to assess changes in value orientation. Data analysis included descriptive statistics (Mean, SD) and inferential statistics (t-test) at a 0.01 significance level, along with effect size calculation using Cohen's d (Cohen, 1988) to assess practical significance. Ethical protocols were followed, including informed consent, participant anonymity, and minimal disruption to regular school activities.

Data analysis and Interpretation

This chapter presents the analysis and interpretation of the collected data using both descriptive (mean, standard deviation) and inferential statistics (t-test). The goal is to examine the effect of teaching sustainability on the value orientation of Class 7th students. The Personal Value Questionnaire was administered before and after the intervention program. This chapter also highlights the importance of data analysis in understanding the problem, ensuring data relevance, avoiding invalid conclusions, and drawing meaningful results. The analysis is organized under two main headings: (1) the value orientation of elementary school students, and (2) the effect of teaching sustainability on their value orientation.

1. To Study the Value Orientation of Elementary School Students

Before introducing the teaching of sustainability, a **Personal Value Questionnaire** (developed by Dr. G.P. Sherry) was administered to 50 Class 7 students at Sunflower Public School to understand their initial value orientations. The students were divided into two groups: **Experimental** (n=25) and **Control** (n=25). The questionnaire assessed ten different values: Religious, Social, Democratic, Aesthetic, Economic, Knowledge, Hedonist, Power, Family Prestige, and Health.

Table 1: Pre-Test Scores on Personal Value Questionnaire

Value	Group	N	Mean	SD	t-value	Significance
Religious	Experimental	25	8.56	2.05	0.81	NS
	Control	25	8.12	2.42		
Social	Experimental	25	8.10	1.72	0.40	NS
	Control	25	7.87	2.33		
Democratic	Experimental	25	9.77	2.53	1.37	NS
	Control	25	8.80	2.48		
Aesthetic	Experimental	25	10.45	2.97	0.84	NS
	Control	25	9.87	1.75		
Economic	Experimental	25	11.52	1.39	1.48	NS
	Control	25	10.43	2.37		

Knowledge	Experimental	25	9.92	2.76	0.80	NS
	Control	25	10.57	2.98		
Hedonist	Experimental	25	11.31	2.08	1.59	NS
	Control	25	10.25	3.19		
Power	Experimental	25	9.30	2.19	1.00	NS
	Control	25	8.80	1.21		
Family Prestige	Experimental	25	8.70	1.24	1.61	NS
	Control	25	7.89	2.01		
Health	Experimental	25	10.69	2.31	1.28	NS
	Control	25	9.99	1.49		

Note: NS = Not Significant at 0.05 level

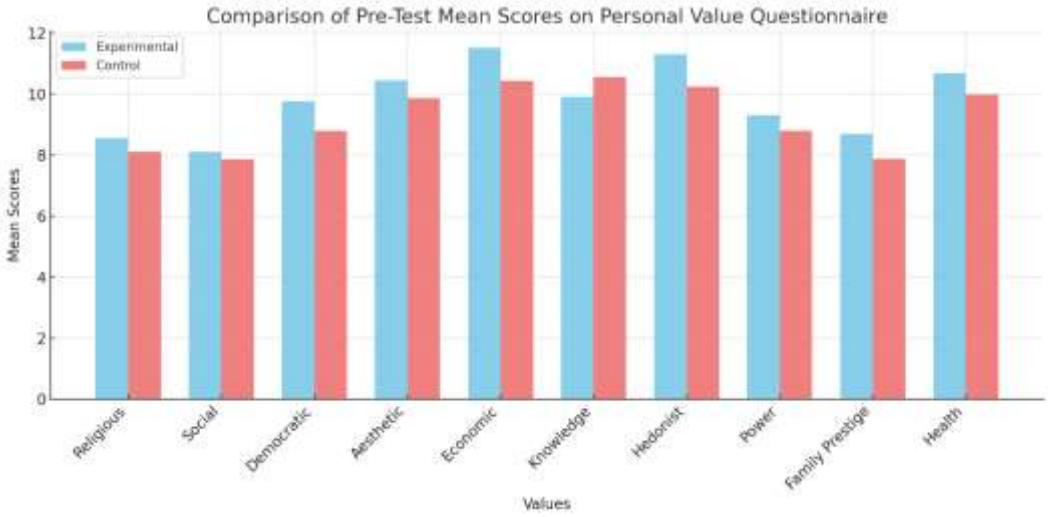

Figure 1: Pre-test mean scores on Personal Value Questionnaire

The table 1 and Figure 1 show that **none of the values had significant differences** between the experimental and control groups at the pre-test stage. This indicates that both groups were similar in their value orientations before the intervention program began.

2. Effect of Teaching Sustainability on the Value Orientation of Elementary School Students

To determine the **effect of Teaching Sustainability** on **value orientation**, a **Personal Value Questionnaire** (developed by Dr. G.P. Sherry and Prof. R.P. Verma) was administered to 50 Class VII students of Sunflower Public School, divided equally into **experimental (n=25)** and **control (n=25)** groups. The **post-test** scores for **ten value dimensions** were analyzed using **mean, standard deviation (SD)** and **t-test**.

Table 2. Mean, SD, and t-test Results of Post-Test Scores on Value Orientation

Value	**Group**	**N**	**Mean**	**SD**	**t-value**	**Significance at 0.01 level**
Religious	Experimental	25	12.83	1.29	2.77	Significant
	Control	25	10.67	3.68		

Social	Experimental	25	11.46	2.21	3.02	Significant
	Control	25	8.39	4.57		
Democratic	Experimental	25	13.55	1.68	4.36	Significant
	Control	25	9.78	3.98		
Aesthetic	Experimental	25	14.02	2.23	3.94	Significant
	Control	25	10.38	4.05		
Economic	Experimental	25	13.71	3.75	2.93	Significant
	Control	25	10.73	5.87		
Knowledge	Experimental	25	14.69	2.87	3.23	Significant
	Control	25	11.33	4.33		
Hedonist	Experimental	25	13.74	1.24	3.60	Significant
	Control	25	11.02	3.57		
Power	Experimental	25	13.49	2.19	3.70	Significant
	Control	25	9.57	4.82		
Family Prestige	Experimental	25	11.78	2.76	2.59	Significant
	Control	25	8.64	5.39		
Health	Experimental	25	13.98	2.19	3.74	Significant
	Control	25	9.86	—		

Note: All t-values are significant at 0.01 level, indicating a significant positive effect of Teaching Sustainability.

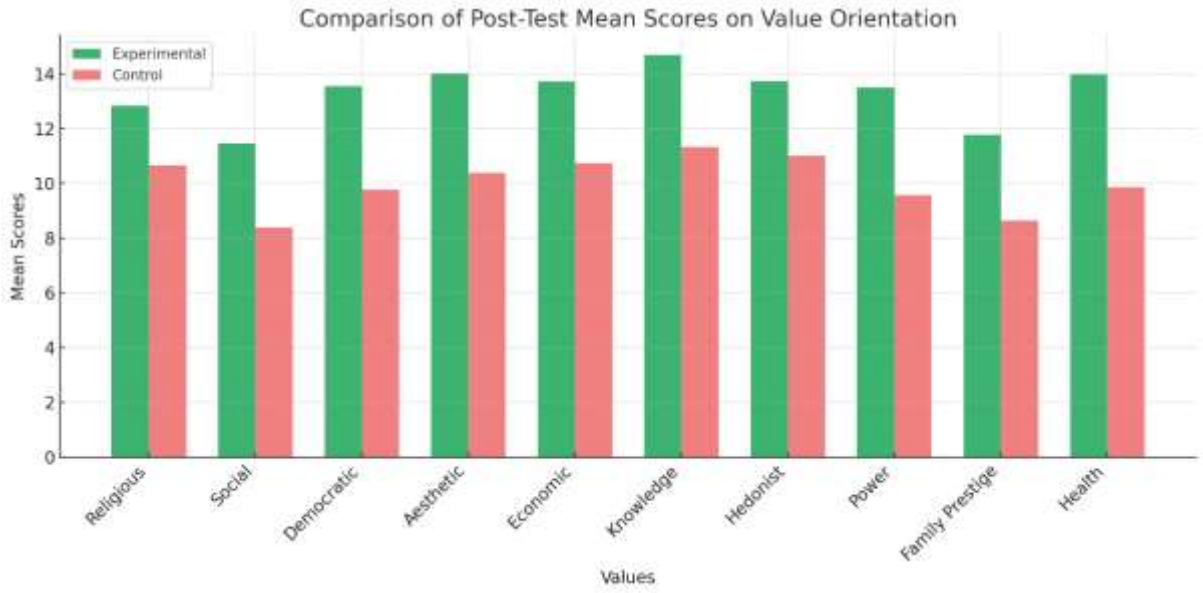

Figure 2: post-test mean scores on the Personal Value Questionnaire

The table 2 and figure 2 show **t-values** for all dimensions exceed the critical value at the 0.01 level, confirming that the experimental group outperformed the control group significantly across all value dimensions. Thus, **Teaching Sustainability** positively influenced the value orientation of elementary school students. This figure 2 clearly illustrates the **significant difference** in scores between the groups,

supporting the hypothesis that **Teaching Sustainability** had a **positive effect on value orientation** among elementary school students.

The results confirm the hypothesis that Teaching Sustainability significantly enhances the value orientation of elementary school students. This aligns with the findings of researchers such as Federkova (2020), S. Chandra, J. Chun (2021), and Z. Mikulka, who highlighted the transformative impact of sustainability education on young learners' values and attitudes.

To study the effect of teaching sustainability on the value orientation of elementary school students, a Personal Value Questionnaire developed by Dr. G.P. Sherry and Prof. R.P. Verma was administered to 50 students, divided equally into experimental and control groups. After treatment, the post-test scores were analyzed for ten value dimensions, including Religious, Social, Democratic, Aesthetic, Economic, Knowledge, Hedonist, Power, Family Prestige, and Health. The results showed that the experimental group consistently outperformed the control group across all values. For example, the mean score for the Religious value was 12.83 (SD = 1.29) in the experimental group compared to 10.67 (SD = 3.68) in the control group, yielding a t-value of 2.77, significant at the 0.01 level. Similar significant differences were observed in other value dimensions, with t-values ranging from 2.59 (Family Prestige) to 4.36 (Democratic), all exceeding the critical value at the 0.01 level. This indicates a statistically significant positive effect of teaching sustainability on students' value orientations. The findings align with previous research by Federkova (2020), Chandra, Chun (2021), and Mikulka, who emphasized the transformative role of sustainability education in shaping students' values. Hence, the hypothesis that teaching sustainability significantly influences the value orientation of elementary school students was accepted.

Findings and Discussion

The results of the study revealed that teaching sustainability had a significant impact on the value orientation of elementary school students. Analysis of post-test scores using the Personal Value Questionnaire by Dr. G.P. Sherry and Prof. R.P. Verma demonstrated that the experimental group consistently outperformed the control group across all ten value dimensions—Religious, Social, Democratic, Aesthetic, Economic, Knowledge, Hedonist, Power, Family Prestige, and Health. The experimental group's mean scores were notably higher, and all calculated t-values exceeded the critical value at the 0.01 level of significance (e.g., Religious: t=2.7695; Social: t=3.0238; Democratic: t=4.3646). These findings indicate that the sustainability education intervention effectively enhanced students' appreciation for diverse values, suggesting that integrating sustainability concepts into the curriculum can foster environmental responsibility, social empathy, democratic participation, and health consciousness among young learners. The significant differences in mean scores, coupled with high t-values, demonstrate that the observed changes were not by chance but resulted from the teaching intervention. These results align with the findings of Federkova (2020), Chandra and Chun (2021), and Mikulka (2021), who also found that sustainability education positively influences value orientation. Notably, the highest t-value was observed in the Democratic dimension (t=4.3646), highlighting the potential of sustainability education to instill participatory citizenship and a sense of social responsibility in students. Overall, this study underscores the importance of embedding sustainability concepts in elementary education, as advocated by the National Education Policy (NEP) 2020, to promote holistic development and responsible citizenship among students.

Educational Implications

The findings of this study hold significant implications for educational policy, curriculum design, and classroom practices at the elementary level. First, the positive impact of teaching sustainability on students' value orientation underscores the importance of integrating sustainability concepts into the curriculum across subjects. This suggests that educators should move beyond traditional textbook-based teaching and incorporate real-world, experiential learning opportunities—such as projects, discussions, and community engagement—that emphasize environmental stewardship and responsible citizenship.

Second, teacher education and professional development programs should prioritize equipping educators with the knowledge and skills necessary to embed sustainability into their teaching practices effectively. Workshops, in-service training, and resource materials focusing on sustainability education can empower teachers to make learning more relevant and impactful for students.

Third, assessment practices should also be adapted to evaluate not only cognitive outcomes but also affective domains, such as values, attitudes, and behaviors towards sustainability. Incorporating tools like value orientation questionnaires and reflective activities can help monitor students' growth in these areas, fostering holistic development.

Moreover, policymakers can use the study's evidence to advocate for mandatory inclusion of sustainability education in elementary education frameworks, aligned with the National Education Policy (NEP) 2020, which highlights the need for environmental awareness and responsible citizenship. Such integration aligns with global priorities, including the United Nations' Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education) and SDG 13 (Climate Action).

Finally, the study's insights can inspire curriculum developers to design interdisciplinary modules that connect sustainability with existing subjects like science, social studies, and language arts, thereby making learning more meaningful and contextually relevant. Overall, the study advocates for a transformative shift in education—one that prepares students not only for academic success but also for their role as responsible, environmentally conscious members of society.

Conclusion

The present study explored the impact of teaching sustainability on the value orientation of elementary school students using a quasi-experimental design. The results indicated that students in the experimental group, who received sustainability-focused instruction, demonstrated significantly higher scores in various dimensions of value orientation—including religious, social, democratic, aesthetic, economic, knowledge, hedonist, power, family prestige, and health values—compared to the control group. These findings, supported by statistically significant t-test values, confirm that integrating sustainability into classroom instruction positively influences students' personal values, thereby promoting holistic development.

The study's conclusions align with contemporary educational imperatives emphasizing the integration of sustainability concepts into elementary education, as advocated by NEP 2020 and international frameworks like the Sustainable Development Goals. By nurturing responsible, value-oriented citizens, educators can empower the younger generation to become agents of change in addressing global environmental and social challenges.

Furthermore, the study highlights the transformative potential of sustainability education in fostering not only cognitive but also affective learning outcomes. The findings reinforce the importance of teacher preparation, curriculum innovation, and assessment strategies that incorporate value-based education.

Overall, this study provides strong empirical evidence supporting the inclusion of sustainability education in elementary classrooms, contributing to the broader discourse on education for sustainable development (ESD). It is recommended that future research expand the scope by including larger samples, diverse geographical settings, and longitudinal assessments to further validate and generalize these findings.

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