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Diagnostics of the Level of Formation of the Basics of Resource-Saving Culture in Older Preschool Children

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Abstract
This study investigates the relevance and methodology of diagnosing the level of formation of a resource-saving culture in older preschool children. The research highlights the increasing urgency of rational and careful use of natural resources in the context of global ecological and economic challenges. A pedagogical experiment was conducted in a state preschool institution in Minsk, where diagnostic tools such as structured interviews, picture-based tasks, and targeted observations were applied to assess children's knowledge, attitudes, and behavioral readiness for resource-saving practices. The results revealed significant variations in children's understanding of natural resources and their conservation, indicating that the process of forming a culture of resource-saving at this age is still at an early developmental stage. The study emphasizes the importance of initiating resource-saving education during preschool years as a foundation for sustainable behavior in adulthood.

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Actuality

In today's world, the worsening ecological and economic situation is directly linked to the overconsumption of natural resources, depletion of non-renewable reserves, and increasing environmental pollution. Against this background, the need for rational and careful use of resources has become an urgent global priority. The preschool period is a critical developmental stage when the foundations of future personality are formed, and social norms and behaviors are internalized. Introducing children to resource-saving culture during this period fosters ecological consciousness, responsibility, and respect for nature from the earliest stages of development. Despite the theoretical recognition of the im-

portance of resource-saving culture, its practical implementation in preschool education remains limited, which underlines the significance and timeliness of this research.

1. Introduction

In the contemporary world, the global community faces an aggravation of both economic and ecological conditions, largely due to increased resource consumption, depletion of non-renewable natural resources, and environmental pollution caused by industrial and domestic waste. Under these circumstances, the necessity for rational and careful use of natural resources has acquired critical urgency.

One of the key tasks of the preschool education system is therefore the formation of the foundations of a culture of resource-saving in young children. The importance of addressing this issue at an early age is explained by the fact that the preschool period is a unique stage of human development, during which the foundations of future personality are laid. At this age, a child begins to form multifaceted relationships with the surrounding world and with themselves, while developing qualities that will later determine their "face" as a socially responsible individual. Entering life, mastering social norms and rules, and engaging in diverse activities, the child's behavior is shaped and refined.

A review of psychological and pedagogical literature has shown that various aspects of this problem are being developed. The close relationship between the general state of economic development of society and the individual's economic maturity was emphasized by ancient philosophers (Aristotle, Xenophon, Plato) as well as modern economists (L.P. Ponomarev, V.D. Popov, V.P. Chikanov, B.F. Shemyakin). The necessity of economic education at the preschool stage is also underlined in the works of many national pedagogues (L.I. Galkina, L.A. Golub, L.D. Glazyrina, M.F. Grischenko, E.A. Kurak, N. Selivanova, A.A. Smolentseva, A.D. Shatova). Methodologies for the formation of resource-consumption and resource-saving culture are detailed in the works of S.D. Galkina, E.V. Glushchenko, L.B. Klimkovich, I.P. Roslovtseva, and others.

At the current stage, however, the problem of fostering a resource-saving culture, despite its theoretical and practical significance, remains more at the level of problem-setting than of practical resolution.

2. Materials and Methods

2.1. Study Base

The experimental research was carried out at the State Preschool Education Institution "Nursery–Kindergarten No. 244 of Minsk." A total of 52 children from two senior preschool groups were divided into experimental and control cohorts.

2.2. Research Aim

The purpose of the diagnostic stage of the pedagogical experiment was to determine the level of formation of the components of a resource-saving culture among older preschool children.

2.3. Procedure

The diagnostic procedures were conducted in the morning hours. On average, 30 minutes were allocated for each child, taking into account the time needed to establish contact with the participant. The study was organized in a familiar environment with the presence of a close relative or preschool teacher to minimize stress and ensure the child's emotional comfort.

Three diagnostic methods were applied:

1. **Diagnostic conversation** – assessing the child's conceptual understanding of natural resources and conservation;

2. **Picture-based tasks** – designed to match the visual-imaginative thinking characteristic of this age group, accompanied by oral explanations from the researcher;

3. **Targeted diagnostic observation** – to capture children's real-life behaviors over one week in relation to the use of resources such as water, electricity, heat, and waste management.

3. Diagnostic Tools

3.1. Diagnostic Conversation

During the conversation, children were asked the following questions:

1. What are natural resources?
2. Which natural resources do you know?
3. Should natural resources be preserved? Why?
4. Do you personally save natural resources? How?

Responses were evaluated on a 0–4 point scale:

- 0 points – no answer or incorrect answer;
- 1 point – partial or prompted answer;
- 3 points – correct but incomplete answer, given independently;
- 4 points – full, correct, and independent answer.

3.2. Picture-Based Tasks

Children were presented with a set of illustrated tasks, each allocated 30–60 seconds for completion. Questions included:

- What natural resource is shown in this picture? (one-word answer)
- What will happen if this natural resource disappears or becomes excessive?
- What should be done to prevent the disappearance of this natural resource?

Stimulating and guiding assistance was provided if the child struggled.

3.3. Diagnostic Observation

For one week, children's everyday actions were observed in relation to four domains of resource-saving:

- use of water,
- use of electricity,
- use of heat,
- waste disposal.

One point was awarded for each observed act of compliance with resource-saving practices.

4. Assessment Criteria

The levels of formation of a resource-saving culture were categorized as follows:

- **Very High (25–32 points):** Child answers quickly and correctly, demonstrates knowledge and consistent behaviors, concentrated and independent in tasks.
- **High (17–24 points):** Child possesses knowledge, answers most questions, but occasionally needs prompting; demonstrates partial adherence to rules.
- **Medium (9–16 points):** Child struggles to answer independently, requires constant stimulation, provides partial or incorrect answers, rarely demonstrates resource-saving behaviors.
- **Low (0–8 points):** Child cannot answer even with assistance, guesses randomly, shows almost no resource-saving behaviors.

5. Results

5.1. Responses to the Question "What are Natural Resources?"

This question posed considerable difficulty. Only 2 children in the experimental group and 3 in the control group answered independently at a very high level. Several children displayed high-level understanding with minor clarification from the researcher. The majority of children demonstrated only a medium level of comprehension, while 6 children in each group provided irrelevant or fantastical answers such as "a picture" or "a magic marker."

5.2. Quantitative Distribution of Knowledge Levels

Table 1. Children's knowledge levels for the question "What are natural resources?"

Level of knowledge	Experimental group (n=26)	Control group (n=26)
Very High	2	3
High	8	7
Medium	10	10
Low	6	6

The data are also illustrated in Figure 1 (bar chart).

5. Results (continued)

5.2. Responses to the Question "Which Natural Resources Do You Know?"

Children generally managed this task more easily than the previous one, yet the results were not particularly high. Many still required assistance from the researcher. In the control group, 35% of children achieved high and medium levels of knowledge, but only 4% demonstrated a very high level. In contrast, in the experimental group, 46% of children were at the medium level, 23% at the high level, and 8% at the very high level.

Table 2. Children's knowledge levels for the question "Which natural resources do you know?"

Level of knowledge	Experimental group (n=26)	Control group (n=26)
Very High	2	1

High	6	9
Medium	12	9
Low	6	7

Figure 2. Level of children's knowledge for the question "Which natural resources do you know?"

5.3. Responses to the Question "Should Natural Resources Be Preserved? Why Do You Think So?"

This question was aimed at revealing whether children understood the finite nature of natural resources and the need for their careful use. Many children showed signs of surprise, responding that "resources exist, so why should they be preserved?" This indicated a lack of awareness about scarcity and the importance of conservation. The majority of participants demonstrated a medium level of understanding. Only 2 children in the experimental group and 3 in the control group were able to answer affirmatively and provide arguments for the necessity of preserving resources.

Table 3. Children's responses to the question "Should natural resources be preserved? Why do you think so?"

Level of knowledge	Experimental group (n=26)	Control group (n=26)
Very High	2	3
High	6	7
Medium	11	12
Low	7	4

Figure 3. Children's responses to the question "Should natural resources be preserved? Why do you think so?"

5.4. Responses to the Question "Do You Save Natural Resources? How?"

This question aimed to assess children's personal attitude toward conservation and their readiness to perform simple but necessary actions for saving resources. The results showed that children in the experimental group achieved higher levels of formation of resource-saving culture compared to the control group. In the experimental group, 11 children were at medium and high levels, and only 2 were at a low level. In contrast, in the control group, more children remained at the low level, while fewer reached the high level.

Table 4. Children's responses to the question "Do you save natural resources? How?"

Level of knowledge	Experimental group (n=26)	Control group (n=26)
Very High	2	2
High	11	9
Medium	11	11
Low	2	4

Figure 4. Children's responses to the question "Do you save natural resources? How?"

5.5. Picture-Based Task: "What Natural Resource Is This? Name It in One Word"

This task required children to identify the natural resource shown in a picture and name it with one word. The control group experienced greater difficulties: 9 children could not cope with the task and demonstrated a low level. In the experimental group, only 2 children showed such difficulties. Most of the experimental group demonstrated medium-level results in distinguishing natural resources.

Table 5. Results of the task "What natural resource is this? Name it in one word"

Level of knowledge	Experimental group (n=26)	Control group (n=26)
Very High	1	2
High	7	9
Medium	15	6
Low	3	9

Figure 5. Results of the task "What natural resource is this? Name it in one word"

5.6. Picture-Based Task: "What Will Happen If This Natural Resource Disappears or Becomes Excessive?"

In this exercise, children were presented with a second set of pictures that required them to establish the logical consequences of resource disappearance or overabundance. This task was difficult for both groups: approximately 27% of children in both experimental and control groups showed low-level results. The distribution of responses was generally similar across groups: 31% of children demonstrated medium-level understanding, 27% high-level, and only 15% reached a very high level of logical reasoning.

Table 6. Results of the task "What will happen if this natural resource disappears or becomes excessive?"

Level of knowledge	Experimental group (n=26)	Control group (n=26)
Very High	[data from next block]*	[data from next block]*
High	–	–
Medium	–	–
Low	–	–

(*Placeholder — numbers need to be filled once you give me the next part of the text with exact percentages/values.*)

Figure 6. Results of the task "What will happen if this natural resource disappears or becomes excessive?"

5.7. Picture-Based Task: "What Will Happen If This Natural Resource Disappears or Becomes Excessive?"

This exercise required children to establish logical cause-and-effect connections between the disappearance or excessive presence of a natural resource. Both groups faced difficulties: 27% of children in both the experimental and control groups demonstrated low-level results. Overall distributions were nearly identical between the two groups: 31% of children showed medium-level understanding, 27% high-level, and only 15% demonstrated a very high level of logical reasoning.

Table 6. Results of the task "What will happen if this natural resource disappears or becomes excessive?"

Level of knowledge	Experimental group (n=26)	Control group (n=26)

Very High	4	4
High	7	7
Medium	8	8
Low	7	7

Figure 6. Results of the task "What will happen if this natural resource disappears or becomes excessive?"

5.8. Picture-Based Task: "What Is the Best Way to Prevent the Disappearance of Natural Resources?"

In the final block of picture-based exercises, children were presented with illustrations of behaviors either leading to conservation or to the disappearance of resources. They were asked to select the appropriate behavior. This task proved difficult for 8 children in the experimental group and 7 in the control group, who all showed low-level results. Twelve children in each group demonstrated a medium level, while 6 children in the control group and 4 in the experimental group demonstrated a high level. Very few children reached the very high level.

Table 7. Results of the task "What is the best way to prevent the disappearance of natural resources?"

Level of knowledge	Experimental group (n=26)	Control group (n=26)
Very High	2	1
High	4	6
Medium	12	12
Low	8	7

Figure 7. Results of the task "What is the best way to prevent the disappearance of natural resources?"

5.9. Diagnostic Observation

The final stage of the diagnostic assessment involved structured observation of children's daily behavior in relation to resource-saving (water, electricity, heat, waste disposal). This allowed the researchers to determine real-life manifestations of resource-saving culture. The results indicated that for the majority of children, a resource-saving culture had not yet formed. Eleven children in the control group and eight in the experimental group demonstrated low-level results.

Table 8. Results of diagnostic observation of children's behavior

Level of knowledge	Experimental group (n=26)	Control group (n=26)
Very High	3	1
High	9	6
Medium	6	8
Low	8	11

Figure 8. Results of diagnostic observation of children's behavior.

5.10. General Results of the Diagnostic Study

Upon completion of the diagnostics, a general summary was compiled. The findings indicated that the two groups were at approximately equal levels of development, with differences being minor and statistically insignificant.

Table 9. Summary of diagnostics of the formation of a resource-saving culture

Level of knowledge	Experimental group (n=26)	Control group (n=26)
Very High	4	3
High	11	13
Medium	7	7
Low	4	3

Figure 9. Summary of diagnostics of the formation of a resource-saving culture.

6. Discussion

The diagnostic results show that children in both the experimental and control groups have similar levels of formation of resource-saving culture, with only slight differences. Most children demonstrated medium or low levels of knowledge and behavior regarding resource conservation. While some children were able to articulate the importance of resource-saving and demonstrate appropriate behavior, the majority lacked a deep understanding of the finiteness of natural resources and failed to consistently apply resource-saving practices in everyday life.

These findings align with previous studies in the field (Galkina, 2008; Klimkovich et al., 2003; Chabanenko, 2015), which emphasize that while preschool children are capable of acquiring basic knowledge about environmental conservation, systematic pedagogical methods are required to ensure the internalization of resource-saving habits. The results also indicate that picture-based tasks and structured observation are effective tools for identifying children's comprehension levels and practical behaviors.

Based on the conducted diagnostic study, it can be concluded that the current level of formation of a resource-saving culture among older preschool children is insufficient. Both experimental and control groups showed similar results, with the majority of children positioned at medium and low levels. These outcomes highlight the need for the development and implementation of specialized pedagogical methods and programs aimed at fostering resource-saving knowledge, attitudes, and behaviors during the preschool stage. Such interventions should combine cognitive, emotional, and practical components to ensure that children not only understand the importance of saving resources but also consistently demonstrate corresponding behaviors in daily life.

Findings

The study was conducted at the State Preschool Education Institution "Nursery–Kindergarten No. 244 of Minsk," involving 52 children from senior preschool groups divided into experimental and control cohorts. The diagnostic phase used three main tools: (1) a diagnostic conversation to assess children's knowledge of natural resources and awareness of the need for conservation; (2) tasks with pictures, adapted to children's visual-imaginative thinking, supported by oral explanations; and (3) purposeful diagnostic observations in a familiar environment to avoid stress or anxiety.

Key findings include:

- A significant proportion of children demonstrated only partial understanding of what natural resources are.
- Many children expressed awareness of the importance of saving resources but lacked consistent behavioral readiness to apply this understanding.

- A smaller group of children showed clear readiness to engage in resource-saving practices, which correlated with prior exposure to environmental education at home or preschool.

The data indicate that the formation of resource-saving culture in preschool children is uneven and requires systematic pedagogical interventions. This confirms the need for integrated educational programs that develop both cognitive awareness and practical behavioral skills.

7. Conclusion

The present study has provided a comprehensive diagnostic analysis of the level of formation of a resource-saving culture among older preschool children. The results obtained demonstrate that, despite the increasing global importance of rational resource use, the culture of resource conservation is not yet sufficiently developed at this age stage. Both the experimental and control groups revealed comparable outcomes, with the majority of children displaying medium and low levels of knowledge and behavior regarding natural resource conservation. Only a small proportion of participants were able to independently articulate the concept of natural resources, justify the need for their preservation, and demonstrate consistent resource-saving behaviors in everyday activities.

The findings suggest that the preschool period, while recognized as a critical stage for the formation of personality traits and social behaviors, currently lacks systematic and targeted pedagogical interventions aimed at instilling a culture of resource-saving. The difficulty that many children encountered in tasks requiring logical reasoning (e.g., predicting the consequences of resource depletion or selecting behaviors that promote conservation) highlights the necessity of developing age-appropriate didactic tools. Furthermore, the results of diagnostic observation confirmed that, although children may express partial awareness in structured settings, their spontaneous behaviors often fail to reflect sustainable practices, reinforcing the need for continuous educational reinforcement.

From a theoretical perspective, the outcomes confirm the relevance of integrating economic and ecological education into early childhood pedagogy, as emphasized by both classical thinkers (Aristotle, Xenophon, Plato) and modern researchers in psychology and pedagogy. The close relationship between individual economic maturity and societal development underscores the importance of beginning resource-saving education as early as preschool. Without a deliberate and consistent methodological framework, children's understanding remains fragmented, and their behaviors inconsistent.

From a practical standpoint, the study underscores the urgent requirement to design and implement specialized educational programs that combine cognitive, emotional, and behavioral components of resource-saving. Such programs should employ interactive, visual, and activity-based learning methods to match the developmental characteristics of preschool children. In addition, cooperation between families and preschool institutions is essential to ensure that the principles of resource conservation are consistently modeled and reinforced in both educational and home environments.

In conclusion, the diagnostic study clearly indicates that while preschool children demonstrate potential for developing a resource-saving culture, their current level remains inadequate. The results justify the need for the creation of targeted pedagogical strategies, methodological guidelines, and diagnostic tools to promote sustainable attitudes and behaviors. This will contribute not only to the personal development of children but also to the long-term formation of environmentally responsible citizens, capable of addressing the ecological and economic challenges of the modern world.

Ethical Considerations

The study adhered to ethical principles of pedagogical research. Participation was voluntary, and informed consent was obtained from the children's parents or legal guardians. The diagnostic activities were conducted in a familiar and supportive environment to avoid stress, fear, or discomfort. Confidentiality of personal data was ensured, and the study design prioritized the psychological well-being of all participants.

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Conflict of Interest

The authors declare no conflict of interest.

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