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TEACHERS' ATTITUDES TOWARDS THE APPLICATION OF THE EXPERIMENTAL METHOD IN TEACHING NATURE AND SOCIETY

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teachers' attitudes.

Abstract. Teaching nature and society should encompass a combination of different methods that encourage students to engage in independent research, critical thinking, and logical reasoning. The experimental method contributes to the development of students' learning in an effective way by providing opportunities for them to express their opinions, make assumptions, conduct experiments, actively observe phenomena and processes, record their observations, think critically, and draw conclusions independently. The aim of this paper was to examine and determine teachers' attitudes and opinions regarding the use and significance of the experimental method within the subjects Nature and Society and The World Around Us. The research was conducted in the Republic of Serbia in 2025 and included 103 teachers. The results showed that teachers recognize the importance and benefits of applying the experimental method for the development of students' personality, and that there is no statistically significant difference in their attitudes regarding years of work experience or the type of settlement in which the school is located. The conclusions of the paper indicate that teachers are willing to apply this method in their teaching practice but face obstacles in its implementation, particularly due to the lack of equipment in schools. Adequate support provided to teachers may contribute to improving the application of the experimental method in practice.

Introduction

Modern education in schools is faced with the fact that, due to technological advancements and the progress of globalization, the educational process is increasingly confronted with the need for change, particularly regarding the methods and techniques used to transfer knowledge to students. Teachers in modern schools have ample opportunities to organize a creative teaching process, which can be particularly effectively implemented within nature and society classes. The subjects Nature and Society and The World Around Us, taught in the lower grades of elementary school, offer numerous opportunities for gaining knowledge and learning. By applying different methods for exploring the world around them, students can acquire knowledge about natural and social phenomena, their cause-and-effect relationships, natural laws, and similar concepts in an easier and more meaningful way. For this purpose, the experimental method in teaching nature and society represents a creative and innovative approach to students' acquisition of knowledge, enabling the development of their abilities, ways of thinking, and skills, which differs from the traditional approach to knowledge acquisition based on memorization and reproduction of teaching content. This approach allows for adequate and comprehensive understanding of the material, with a focus on the interests, abilities, and personality of the student.

Theoretical Framework of the Research

Modern schools aim to provide students with high-quality knowledge, meaningful understanding of teaching content, and the ability to apply acquired knowledge in everyday life, which necessitates the use of contemporary teaching methods and approaches. Accordingly, the school environment and the overall teaching process should be aligned with social changes and global educational trends. Contemporary society requires a school context in which teaching is student-oriented, emphasizing the active role of students in the learning process (Скоморац-Пезер & Рустемпашић, 2020). This orientation implies the

application of methods that foster research behavior, creativity, innovation, and critical thinking, enabling schools to respond to societal demands and support students' comprehensive development and practical application of knowledge (Suzić, 2014). Modern teaching of the subject nature and society is based on the need to prepare students in the lower grades of primary school for active participation in a knowledge-based society. This teaching approach is grounded in the concept of active learning, which differs from traditional instructional models by placing emphasis on students' engagement in the learning process (Veselinovska & Kirova, 2011). Within this framework, the teacher assumes the role of a guide who supports and directs students, creating conditions for individualized learning and encouraging the development of creativity and innovation (De Zan, 2005; Скоморац-Пезер & Рустемпашић, 2020).

Contemporary teaching strategies are based on the construction of knowledge through active participation, where teachers and students jointly contribute to the learning process. Students acquire knowledge through independent and collaborative exploration, experimentation, and discovery, integrating newly acquired information into a coherent understanding. Such an approach enables students to develop the ability to evaluate information and use it for deeper analysis, thereby enhancing their thinking processes and building upon prior knowledge. In this context, the student is regarded as an active participant in teaching. These principles correspond to the concept of developmental teaching, which emphasizes active engagement and the use of students' individual potential in the learning process (Вилотијевић & Мандић, 2016).

The contemporary educational approach further emphasizes students' activities in exploring natural and social phenomena. The quality of learning largely depends on students' understanding of teaching content, as comprehension influences both the durability of knowledge and its applicability in everyday life (Влаховић, 2020). Teaching the subjects Nature and Society and The World Around Us should therefore foster a culture of learning in which students are motivated for independent inquiry, creative work, and the application of knowledge in real-life contexts. The essence of teaching lies in the methods applied by teachers, whose professional competencies are developed through the implementation of innovative teaching models. Consequently, the methodological transformation of the content of Nature and Society and The World Around Us should be based on contemporary and innovative learning models (Veselinovska & Kirova, 2011). For example, in elementary science education, experiential activities such as water-based investigations have been shown to significantly enhance students' conceptual understanding of processes like the water cycle and properties of matter, demonstrating how hands-on experimentation supports deeper learning (Levy & Moore Mensah, 2021). This integration makes the content more understandable and teaching more engaging.

Integrating nature and society content with other school subjects and scientific disciplines also enables students to be active participants in the classroom

process. Moreover, this approach contributes to the development of collaborative learning, interactive behavior, critical thinking, creativity, and innovation, and stimulates students' creativity in processing new content (Ценић & Видосављевић, 2022). The nature and society curriculum emphasizes the application of innovative teaching models, while the teacher's professional practice, personality, and competencies play an important role in achieving learning outcomes, including cross-curricular themes such as education for sustainable development. Increasing attention is being given to the implementation of teaching content in natural and social environments, avoiding student passivity. Research findings indicate that the effects of learning are significantly stronger in integrated learning environments (Миленовић & Ботић, 2023). Moreover, the literature highlights the crucial role of the teacher in shaping students' attitudes toward nature and society teaching (Ристић & Мандић, 2018). At the level of initial education, learning is most effective when it takes place in real-life contexts and through concrete examples, guiding students toward inquiry and knowledge transformation rather than reproduction. Knowledge acquired through students' direct engagement is more durable and applicable, while concepts formed in this way support students' understanding of the surrounding world and serve as a foundation for further learning. Through empirical knowledge and active thinking, students solve various tasks that arise in the teaching process, directing education toward skill development and active learning. In this instructional approach, the student is the subject of learning, with emphasis placed on developing analytical, synthetic, and abstract thinking, as well as the ability to formulate and solve problems (Шикл-Ерски, 2023).

Experiment as a Contemporary Method in Teaching Nature and Society

Within the teaching of nature and society, the experimental method represents an important way of acquiring knowledge. Through this method, a certain phenomenon or process is induced under strictly controlled conditions, allowing results to be measured precisely and processes and phenomena to be observed under varying conditions. In some cases, the experimental method must be repeated several times in order to obtain reliable qualitative and quantitative results that can be further analyzed (Potkonjak & Šimleša, 1989). Acquiring knowledge in the field of nature and society through this method is valuable because students actively observe the processes and phenomena to which the method is applied, explore the relationships between them, identify underlying principles, and build a knowledge base that enables them to draw conclusions (Grubić, 1963). The experimental method enables the induction of a phenomenon or process under strictly controlled conditions, so that the expected results can be measured, and the experimental process can be monitored and, if necessary, repeated several times.

In addition, this method allows for both qualitative and quantitative analysis of the obtained results (Potkonjak & Šimleša, 1989).

Skomorac-Pezer and Rustempašić (Скоморац-Пезер & Рустемпашић, 2020) emphasize that this method of learning is particularly important in teaching early elementary school students, because through collaborative learning and conducting experiments, students jointly construct their knowledge, and the focus is placed on the way students learn rather than on the teaching method applied by the teacher. Thus, learning here represents the result of students' joint activity, where the role of the teacher is to encourage, motivate, and guide students to collaboratively participate in the construction of knowledge within an interactive environment.

The experimental method is highly applicable in teaching nature and society as it requires students to actively conduct experiments, thereby enabling direct exploration of phenomena and processes, identification of cause-and-effect relationships, recognition of governing principles, and independent formulation of conclusions (Grubić, 1963). Since the teaching of the subjects Nature and Society and The World Around Us is oriented toward exploring the surrounding world, observing changes, processes, and phenomena in nature, as well as understanding relationships formed within society, it is clear that teaching content should be focused on independent and collaborative student work (Kostović-Vranješ, 2015), through the application of the experimental method (De Zan, 2005). The application of experiments in teaching nature and society enables students to examine and discover, in different ways, the characteristics of the environment in which they live. The environment in which students conduct experiments should be sufficiently stimulating to encourage curiosity, the desire to find solutions to problems, the posing of questions related to their surroundings, as well as the deepening of interpersonal relationships. The space where the method is applied refers both to external and internal features of the environment (Hočevar et al., 2010).

Teaching in the early grades of elementary school has a significant influence on the further development of students' overall personality. Therefore, it is important that teachers, through the teaching of nature and society and the application of modern methods such as experimentation, contribute to the development of students' moral and ethical values, environmental awareness, and responsibility toward environmental protection, foster a caring attitude toward plant and animal life, and encourage the development of empathy, solidarity, and tolerance (Lipovac et al., 2017). Research shows that students' understanding of content largely depends on how they learn and how knowledge is transferred, and that most students learn best through engagement, teamwork, and collaborative work. In this way, in addition to gaining knowledge on a particular topic through experience, students also learn from each other, engage in discussions on specific topics (Golubović-Ilić & Cekić-Jovanović, 2013), express their observations and opinions, think critically, and draw logical conclusions, which

ultimately contributes to better comprehension of the material. The experimental method allows students to be highly engaged, which increases their interest in a given topic. Through teamwork and collaboration among groups of students and between students and the teacher, with the teacher acting as a facilitator guiding students toward appropriate solutions and students taking an active role in conducting the lesson through experimentation, students are enabled to express their creativity, innovativeness, and talent, become aware of the results of their work, critically discuss them, and ultimately evaluate them (Скоморац-Пезер & Рустемпашић, 2020).

Research Method

The main goal of the research is to determine and examine teachers' attitudes toward the application of the experimental method in teaching nature and society, that is, the importance of applying this method in the process of transferring knowledge in the subjects Nature and Society and The World Around Us.

General Hypothesis

H0: Teachers' attitudes show that they are familiar with the importance of applying the experimental method in nature and society classes and that they use it in the realization of the teaching process in the subjects Nature and Society and The World Around Us, as applicable.

Specific Hypotheses

H1a: There is no statistically significant difference in teachers' attitudes regarding the application and possibilities of applying the experimental method in nature and society teaching with respect to years of service.
H1b: There is no statistically significant difference in teachers' attitudes regarding the application and possibilities of applying the experimental method in teaching nature and society with respect to the type of settlement in which the school is located.
H2a: There is no statistically significant difference in teachers' attitudes regarding the benefits of applying the experimental method in teaching nature and society with respect to years of service.
H2b: There is no statistically significant difference in teachers' attitudes regarding the benefits of applying the experimental method in teaching nature and society with respect to the type of settlement in which the school is located.
H3a: There is no statistically significant difference in teachers' attitudes regarding the reasons for not applying the experimental method in teaching nature and society with respect to years of service.

H3b: There is no statistically significant difference in teachers' attitudes regarding the reasons for not applying the experimental method in teaching nature and society with respect to the type of settlement in which the school is located.

The instrument constructed for the purposes of the research is a questionnaire. The questionnaire consists of 16 questions examining teachers' attitudes toward the importance of applying the experimental method in teaching nature and society. It was designed to provide answers to the given research problem, including teachers' understanding of the importance of the experimental method, access to resources, as well as personal attitudes and experiences. It also includes questions in which respondents evaluate their attitudes and agreement with certain statements on a scale from 1 (strongly agree) to 5 (strongly disagree). The sample included 103 respondents working as teachers in the lower grades of elementary school (grades 1–4). The research was conducted online in the Republic of Serbia in 2025. The questionnaire was created in Google Forms and contained an explanation of how to fill it out, as well as a description of the purposes of the research. The criterion for participation in the study was that respondents were employed as elementary school teachers. The data obtained were processed using the statistical package SPSS 25.0 (Statistical Package for Social Sciences). Descriptive and inferential statistical methods were applied, specifically Fisher's test. The standard level of significance $p < 0.05$ was used for all statistical tests.

Research Results

This research aimed to determine teachers' attitudes toward the application of the experimental method in teaching the lower grades of elementary school and to indicate whether there are significant statistical differences in teachers' attitudes with respect to work experience and the type of settlement in which the school is located. For the purpose of determining the factors of the Teachers' Attitudes Questionnaire, Fisher's significance test was used. Table 1 presents the independent variables, which include the respondents' gender, age, years of teaching experience, and the type of settlement in which the school where the teacher works is located.

Table 1. Independent variables

Gender	N (%)
Male	10 (9.7%)
Female	93 (90.3%)
Total	103 (100%)
Age	N (%)
25–34	72 (69.9%)
35–44	13 (12.6%)

45–54	15 (14.6%)
55 or more	3 (2.9%)
Total	103 (100%)
How many years of teaching experience do you have?	N (%)
0–10 years	78 (75.7%)
11–20 years	8 (7.8%)
21–30 years	14 (13.6%)
31–40 years	3 (2.9%)
Total	103 (100%)
What type of settlement is the school where you work located in?	N (%)
Urban school	62 (60.2%)
Rural school	41 (39.8%)
Total	103 (100%)

The type of settlement in which a school offering Nature and Society and/or The World Around Us classes is located can influence teachers' attitudes toward the application of teaching methods in practice. Schools situated in urban areas are generally better equipped for implementing various teaching methods, which further increases the possibilities and ease of applying these methods in practice. This can contribute to the formation of diverse teacher attitudes regarding the importance, necessity, and possibilities of using the experimental method in teaching. In this study, 60.2% of teachers conducted classes in schools located in urban areas, while 39.8% worked in schools situated in rural areas. Given the small proportion of male teachers participating in the survey, respondents' gender as an independent variable will not be further considered, as it cannot adequately indicate statistical significance. Additionally, the high concentration of respondents in the youngest age group would not produce relevant data during statistical analysis, so respondents' age was also excluded from further analysis. The focus was on analyzing the independent variables of years of teaching experience and the type of settlement in which the school is located, as these are significant for examining and verifying the accuracy of the proposed hypotheses. Table 2 presents the distribution of respondents' answers in relation to years of teaching experience, concerning the practice and possibilities of applying the experimental method in teaching nature and society.

Table 2. Distribution of respondents' answers according to years of teaching experience related to the practice and possibilities of applying the experimental method in teaching nature and society

How many years of teaching experience do you have?							
		0–10 years	11–20 years	21–30 years	31–40 years	Total	Statistical significance
I use experimental methods in teaching nature and society.	Always	23 (22.3%)	2 (1.9%)	2 (1.9%)	0 (0.0%)	27 (26.2%)	Fisher = 7.585, p = 0.825
	Often	20 (19.4%)	3 (2.9%)	7 (6.8%)	1 (1.0%)	31 (30.1%)	
	Sometimes	19 (18.4%)	1 (1.0%)	3 (2.9%)	1 (1.0%)	24 (23.3%)	
	Rarely	8 (7.8%)	1 (1.0%)	1 (1.0%)	1 (1.0%)	11 (10.7%)	
	Never	8 (7.8%)	1 (1.0%)	1 (1.0%)	0 (0.0%)	10 (9.7%)	
The equipment in my school is sufficient for conducting experimental methods in teaching.	Strongly agree	13 (12.6%)	2 (1.9%)	3 (2.9%)	1 (1.0%)	19 (18.4%)	Fisher = 8.424, p = 0.752
	Partially agree	17 (16.5%)	2 (1.9%)	2 (1.9%)	0 (0.0%)	21 (20.4%)	
	Neutral / Undecided	20 (19.4%)	1 (1.0%)	5 (4.9%)	0 (0.0%)	26 (25.2%)	
	Partially disagree	12 (11.7%)	2 (1.9%)	1 (1.0%)	2 (1.9%)	17 (16.5%)	
	Strongly disagree	16 (15.5%)	1 (1.0%)	3 (2.9%)	0 (0.0%)	20 (19.4%)	
In my school, I have access to equipment for conducting experiments.	Always	13 (12.6%)	0 (0.0%)	4 (3.9%)	0 (0.0%)	17 (16.5%)	Fisher = 8.748, p = 0.710
	Often	12 (11.7%)	1 (1.0%)	3 (2.9%)	1 (1.0%)	17 (16.5%)	
	Sometimes	23 (22.3%)	5 (4.9%)	3 (2.9%)	0 (0.0%)	31 (30.1%)	
	Rarely	15 (14.6%)	1 (1.0%)	2 (1.9%)	1 (1.0%)	19 (18.4%)	
	Never	15 (14.6%)	1 (1.0%)	2 (1.9%)	1 (1.0%)	19 (18.4%)	
Experimental methods are used more frequently in rural schools than in urban ones.	Strongly agree	15 (14.6%)	3 (2.9%)	2 (1.9%)	0 (0.0%)	20 (19.4%)	Fisher = 7.658, p = 0.840
	Partially agree	12 (11.7%)	2 (1.9%)	2 (1.9%)	0 (0.0%)	16 (15.5%)	
	Neutral / Undecided	17 (16.5%)	1 (1.0%)	3 (2.9%)	0 (0.0%)	21 (20.4%)	
	Partially disagree	16 (15.5%)	1 (1.0%)	5 (4.9%)	1 (1.0%)	23 (22.3%)	
	Strongly disagree	18 (17.5%)	1 (1.0%)	2 (1.9%)	2 (1.9%)	23 (22.3%)	

According to the data presented in Table 2, it can be concluded that there is no statistically significant difference in the distribution of respondents' answers regarding the practice and possibilities of applying the experimental method in the schools where they teach relative to their years of teaching experience. The distribution of responses does not indicate that teachers, depending on their years of experience, apply the experimental method to different extents in delivering the curriculum ($p = 0.825$), nor do the years of service affect whether the use of experimental methods in teaching is more frequent in urban schools compared to rural schools ($p = 0.840$). Regarding the possibilities for applying the experimental method in practice, the distribution of respondents' answers also shows no statistical significance in relation to years of teaching experience concerning the equipment available in schools ($p = 0.710$) and the potential to conduct quality experimental lessons with its help ($p = 0.752$). Table 3 presents the distribution of respondents' answers related to teachers' views on the impact of applying the experimental method in teaching on students and their achievements according to years of teaching experience.

Table 3. Distribution of respondents' answers regarding teachers' views on the impact of applying the experimental method in teaching on students and their achievements according to years of teaching experience

How many years of teaching experience do you have?							
		0–10 years	11–20 years	21–30 years	31–40 years	Total	Statistical significance
The use of experimental methods improves students' analytical skills.	Strongly agree	39 (37.9%)	6 (5.8%)	6 (5.8%)	2 (1.9%)	53 (51.5%)	Fisher = 4.365, p = 0.997
	Partially agree	14 (13.6%)	1 (1.0%)	3 (2.9%)	0 (0.0%)	18 (17.5%)	
	Neutral / Undecided	15 (14.6%)	1 (1.0%)	3 (2.9%)	1 (1.0%)	20 (19.4%)	
	Partially disagree	6 (5.8%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	7 (6.8%)	
	Strongly disagree	4 (3.9%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	5 (4.9%)	
Conducting experiments has a positive effect on students' motivation.	Strongly agree	48 (46.6%)	7 (6.8%)	6 (5.8%)	1 (1.0%)	62 (60.2%)	Fisher = 16.757, p = 0.057
	Partially agree	5 (4.9%)	0 (0.0%)	3 (2.9%)	1 (1.0%)	9 (8.7%)	
	Neutral / Undecided	8 (7.8%)	0 (0.0%)	1 (1.0%)	1 (1.0%)	10 (9.7%)	
	Partially disagree	3 (2.9%)	1 (1.0%)	3 (2.9%)	0 (0.0%)	7 (6.8%)	
	Strongly disagree	14 (13.6%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	15 (14.6%)	

Experimental methods encourage students to think critically and to ask questions.	Strongly agree	47 (45.6%)	8 (7.8%)	8 (7.8%)	2 (1.9%)	65 (63.1%)	Fisher = 5.942, p = 0.927
	Partially agree	12 (11.7%)	0 (0.0%)	2 (1.9%)	1 (1.0%)	15 (14.6%)	
	Undecided	6 (5.8%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	7 (6.8%)	
	Partially disagree	7 (6.8%)	0 (0.0%)	2 (1.9%)	0 (0.0%)	9 (8.7%)	
	Strongly disagree	6 (5.8%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	7 (6.8%)	
Experimental methods improve students' understanding of natural phenomena.	Strongly agree	46 (44.7%)	5 (4.9%)	6 (5.8%)	2 (1.9%)	59 (57.3%)	Fisher = 11.243, p = 0.361
	Partially agree	7 (6.8%)	3 (2.9%)	3 (2.9%)	0 (0.0%)	13 (12.6%)	
	Undecided	10 (9.7%)	0 (0.0%)	2 (1.9%)	0 (0.0%)	12 (11.7%)	
	Partially disagree	4 (3.9%)	0 (0.0%)	1 (1.0%)	1 (1.0%)	6 (5.8%)	
	Strongly disagree	11 (10.7%)	0 (0.0%)	2 (1.9%)	0 (0.0%)	13 (12.6%)	
I often observe improvements in students' logical thinking after using experimental methods.	Always	44 (42.7%)	6 (5.8%)	8 (7.8%)	2 (1.9%)	60 (58.3%)	Fisher = 5.532, p = 0.956
	Often	13 (12.6%)	1 (1.0%)	2 (1.9%)	0 (0.0%)	16 (15.5%)	
	Sometimes	9 (8.7%)	0 (0.0%)	2 (1.9%)	0 (0.0%)	11 (10.7%)	
	Rarely	5 (4.9%)	0 (0.0%)	1 (1.0%)	1 (1.0%)	7 (6.8%)	
	Never	7 (6.8%)	1 (1.0%)	1 (1.0%)	0 (0.0%)	9 (8.7%)	
Conducting experiments increases students' ability to draw conclusions and make generalizations.	Strongly agree	45 (43.7%)	6 (5.8%)	8 (7.8%)	3 (2.9%)	62 (60.2%)	Fisher = 6.134, p = 0.917
	Partially agree	13 (12.6%)	1 (1.0%)	1 (1.0%)	0 (0.0%)	15 (14.6%)	
	Undecided	8 (7.8%)	0 (0.0%)	2 (1.9%)	0 (0.0%)	10 (9.7%)	
	Partially disagree	4 (3.9%)	1 (1.0%)	2 (1.9%)	0 (0.0%)	7 (6.8%)	
	Strongly disagree	8 (7.8%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	9 (8.7%)	
Experimental methods greatly contribute to the development of students' problem-solving skills.	To a great extent	43 (41.7%)	7 (6.8%)	8 (7.8%)	1 (1.0%)	59 (57.3%)	Fisher = 6.592, p = 0.887
	Sufficiently	15 (14.6%)	1 (1.0%)	2 (1.9%)	1 (1.0%)	19 (18.4%)	
	Moderately	8 (7.8%)	0 (0.0%)	2 (1.9%)	0 (0.0%)	10 (9.7%)	
	Little	5 (4.9%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	6 (5.8%)	
	Not at all	7 (6.8%)	0 (0.0%)	1 (1.0%)	1 (1.0%)	9 (8.7%)	

The distribution of responses in relation to teaching experience regarding the practice and possibilities of applying the experimental method in teaching nature and society does not show statistical significance. Regarding the opinion that conducting experiments positively affects students' motivation, the statistical significance was on the borderline (p = 0.057), indicating that the distribution of responses is not evenly spread across the groups of respondents according to years of teaching experience. Table 4 presents the distribution of respondents' answers according to years of teaching experience regarding teachers' opinions on the reasons why they do not apply the experimental method in the teaching of nature and society.

Table 4. Distribution of respondents' answers according to years of teaching experience regarding teachers' opinions on the reasons for not applying the experimental method in the teaching of nature and society

How many years of teaching experience do you have?						
		0–10 years	11–20 years	21–30 years	31–40 years	Statistical significance
What are the main reasons why you do not use experimental methods?	Lack of equipment	37 (35.9%)	5 (4.9%)	4 (3.9%)	2 (1.9%)	Fisher = 38.873, p = 0.193
		6 (5.8%)	1 (1.0%)	1 (1.0%)	1 (1.0%)	
	Lack of competencies	11 (10.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
		3 (2.9%)	0 (0.0%)	2 (1.9%)	0 (0.0%)	
	Lack of equipment, lack of time	5 (4.9%)	0 (0.0%)	4 (3.9%)	0 (0.0%)	
		7 (6.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
	Lack of equipment, lack of time, large classes	1 (1.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
		2 (1.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
	Lack of time	3 (2.9%)	1 (1.0%)	1 (1.0%)	0 (0.0%)	
		1 (1.0%)	1 (1.0%)	0 (0.0%)	0 (0.0%)	
	Large classes	2 (1.9%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	
		0 (0.0%)	0 (0.0%)	1 (1.0%)	0 (0.0%)	

The statistical significance test did not show a statistically significant difference in the group of responses regarding teachers' attitudes toward the reasons for not applying the experimental method in teaching nature and society in relation to years of teaching experience. Table 5 presents the distribution of respondents' answers according to the type of settlement in which the school they teach is located, with respect to the practice and possibilities of applying the experimental method in teaching nature and society.

Table 5. Distribution of respondents' answers according to the type of settlement in which the school is located, in relation to the practice and possibilities of applying the experimental method in teaching nature and society

Type of settlement in which the school is located					
		Urban school	Rural school	Total	Statistical significance
I use experimental methods in teaching nature and society.	Always	17 (16.5%)	10 (9.7%)	27 (26.2%)	Fisher = 2.409, p = 0.681
	Often	19 (18.4%)	12 (11.7%)	31 (30.1%)	
	Sometimes	16 (15.5%)	8 (7.8%)	24 (23.3%)	
	Rarely	6 (5.8%)	5 (4.9%)	11 (10.7%)	
	Never	4 (3.9%)	6 (5.8%)	10 (9.7%)	
The equipment in my school is sufficient for conducting experimental methods in teaching.	Strongly agree	11 (10.7%)	8 (7.8%)	19 (18.4%)	Fisher = 7.644, p = 0.105
	Partially agree	12 (11.7%)	9 (8.7%)	21 (20.4%)	
	Undecided	20 (19.4%)	6 (5.8%)	26 (25.2%)	
	Partially disagree	6 (5.8%)	11 (10.7%)	17 (16.5%)	
	Strongly disagree	13 (12.6%)	7 (6.8%)	20 (19.4%)	
In my school, I have access to equipment that allows the conducting of experiments.	Always	12 (11.7%)	5 (4.9%)	17 (16.5%)	Fisher = 5.886, p = 0.212
	Often	12 (11.7%)	5 (4.9%)	17 (16.5%)	
	Sometimes	20 (19.4%)	11 (10.7%)	31 (30.1%)	
	Rarely	7 (6.8%)	12 (11.7%)	19 (18.4%)	
	Never	11 (10.7%)	8 (7.8%)	19 (18.4%)	
Experimental methods are used more frequently in rural schools than in urban ones.	Strongly agree	8 (7.8%)	12 (11.7%)	20 (19.4%)	Fisher = 7.469, p = 0.111
	Partially agree	10 (9.7%)	6 (5.8%)	16 (15.5%)	
	Undecided	14 (13.6%)	7 (6.8%)	21 (20.4%)	
	Partially disagree	18 (17.5%)	5 (4.9%)	23 (22.3%)	
	Strongly disagree	12 (11.7%)	11 (10.7%)	23 (22.3%)	

According to the data presented in Table 5, it can be concluded that there is no statistical significance in the statements within the group of questions related to the practice and possibilities of applying the experimental method in teaching natural and social sciences in relation to the distribution of responses of teachers from rural and urban school environments. Specifically, the distribution of responses showed that teachers from urban and rural areas hold similar views regarding the application and possibilities for using the experimental method in teaching practice. It was expected that respondents' answers would indicate greater possibilities for applying the experimental method in schools located in urban areas, given the fact that these schools are equipped with more modern technical and information-communication equipment. Table 6 presents the distribution of respondents' answers regarding teachers' views on the impact that the application of the experimental method in teaching has on students and their achievements in relation to the type of settlement in which the school is located.

Table 6. Distribution of respondents' answers related to teachers' views on the impact of applying the experimental method on students and their achievements according to the type of settlement where the school is located

What type of settlement is the school where you work located in?					
		Urban school	Rural school	Total	Statistical significance
The use of experimental methods improves students' analytical skills.	Strongly agree	28 (27.2%)	25 (24.3%)	53 (51.5%)	Fisher = 6.102, p = 0.186
	Partially agree	14 (13.6%)	4 (3.9%)	18 (17.5%)	
	Undecided	12 (11.7%)	8 (7.8%)	20 (19.4%)	
	Partially disagree	6 (5.8%)	1 (1.0%)	7 (6.8%)	
	Strongly disagree	2 (1.9%)	3 (2.9%)	5 (4.9%)	
Experimental methods improve students' understanding of natural phenomena.	Strongly agree	35 (34.0%)	24 (23.3%)	59 (57.3%)	Fisher = 0.310, p = 1.000
	Partially agree	8 (7.8%)	5 (4.9%)	13 (12.6%)	
	Undecided	7 (6.8%)	5 (4.9%)	12 (11.7%)	
	Partially disagree	4 (3.9%)	2 (1.9%)	6 (5.8%)	
	Strongly disagree	8 (7.8%)	5 (4.9%)	13 (12.6%)	
Experimental methods encourage students to think critically and ask questions.	Strongly agree	37 (35.9%)	28 (27.2%)	65 (63.1%)	Fisher = 1.807, p = 0.803
	Partially agree	10 (9.7%)	5 (4.9%)	15 (14.6%)	
	Undecided	4 (3.9%)	3 (2.9%)	7 (6.8%)	
	Partially disagree	7 (6.8%)	2 (1.9%)	9 (8.7%)	
	Strongly disagree	4 (3.9%)	3 (2.9%)	7 (6.8%)	
Conducting experiments positively influences students' motivation.	Strongly agree	36 (35.0%)	26 (25.2%)	62 (60.2%)	Fisher = 1.002, p = 0.946
	Partially agree	5 (4.9%)	4 (3.9%)	9 (8.7%)	
	Undecided	7 (6.8%)	3 (2.9%)	10 (9.7%)	
	Partially disagree	4 (3.9%)	3 (2.9%)	7 (6.8%)	
	Strongly disagree	10 (9.7%)	5 (4.9%)	15 (14.6%)	
I often notice improvements in students' logical thinking after applying experimental methods.	Always	34 (33.0%)	26 (25.2%)	60 (58.3%)	Fisher = 3.736, p = 0.451
	Often	13 (12.6%)	3 (2.9%)	16 (15.5%)	
	Sometimes	6 (5.8%)	5 (4.9%)	11 (10.7%)	
	Rarely	4 (3.9%)	3 (2.9%)	7 (6.8%)	
	Never	5 (4.9%)	4 (3.9%)	9 (8.7%)	
Conducting experiments increases students' ability to draw conclusions and make generalizations.	Strongly agree	35 (34.0%)	27 (26.2%)	62 (60.2%)	Fisher = 1.696, p = 0.829
	Partially agree	11 (10.7%)	4 (3.9%)	15 (14.6%)	
	Undecided	6 (5.8%)	4 (3.9%)	10 (9.7%)	
	Partially disagree	4 (3.9%)	3 (2.9%)	7 (6.8%)	
	Strongly disagree	6 (5.8%)	3 (2.9%)	9 (8.7%)	
Experimental methods greatly contribute to the development of students' problem-solving skills.	To a great extent	33 (32.0%)	26 (25.2%)	59 (57.3%)	Fisher = 3.429, p = 0.504
	Sufficiently	13 (12.6%)	6 (5.8%)	19 (18.4%)	
	Moderately	7 (6.8%)	3 (2.9%)	10 (9.7%)	
	Little	5 (4.9%)	1 (1.0%)	6 (5.8%)	
	Not at all	4 (3.9%)	5 (4.9%)	9 (8.7%)	

In the group of statements concerning teachers' views on the impact of applying the experimental method in teaching on students and their achievements, the

distribution of teachers' responses in relation to rural and urban environments did not show statistical significance for any of the statements. Therefore, the attitudes of teachers from both urban and rural areas are similar regarding the influence of the experimental method on students' motivation and achievements. Table 7 presents the distribution of respondents' answers regarding the reasons why they do not apply the experimental method in teaching nature and society according to the type of settlement in which the school where they teach is located.

Table 7. Distribution of respondents' answers regarding teachers' opinions on the reasons why they do not apply the experimental method in teaching nature and society according to the type of environment in which the school where they teach is located

What type of settlement is the school where you work located in?				
		Urban school	Rural school	Statistical significance
What are the main reasons why you do not use experimental methods?	Lack of equipment	28 (27.2%)	20 (19.4%)	Fisher = 7.534, p = 0.828
	Lack of competencies	5 (4.9%)	4 (3.9%)	
	Lack of equipment, lack of time	5 (4.9%)	6 (5.8%)	
	Lack of equipment, lack of time, large classes	4 (3.9%)	1 (1.0%)	
	Lack of time	7 (6.8%)	2 (1.9%)	
	Large classes	4 (3.9%)	3 (2.9%)	
	Lack of time, lack of competencies	0 (0.0%)	1 (1.0%)	
	Lack of equipment, lack of competencies	1 (1.0%)	1 (1.0%)	
	Lack of equipment, large classes	3 (2.9%)	2 (1.9%)	
	Lack of equipment, lack of time, lack of competencies	1 (1.0%)	1 (1.0%)	
	Lack of time, large classes	3 (2.9%)	0 (0.0%)	
	Lack of equipment,lack of time, lack of competencies, and large classes	1 (1.0%)	0 (0.0%)	

No statistical significance was found (p = 0.828) in the analysis of the distribution of responses regarding teachers' attitudes about the reasons they do not use the experimental method in teaching nature and society in relation to the type of settlement in which the school is located.

Discussion

The subjects Nature and Society and The World Around Us require teachers to present the surrounding reality to younger students in an age-appropriate, clear, and meaningful way, preparing them to understand natural and social phenomena

encountered in everyday life. At early stages of development, children display a strong natural curiosity and a tendency toward exploration, which can be effectively stimulated through teaching methods based on active participation and experiential learning. In this context, the experimental method represents one of the most effective approaches for acquiring knowledge, developing scientific thinking, and strengthening practical and cognitive skills. In all of this, the teacher's role is to direct students' attention to observing specific facts, which are then explained. This approach is consistent with contemporary constructivist theories of learning, which emphasize knowledge construction through direct experience and student engagement.

According to De Zan (2005), teaching nature and society provides numerous opportunities for experience-based learning, making it a particularly suitable context for the application of the experimental method. The results of this study indicate that more than half of the surveyed teachers apply the experimental method in teaching nature and society, which confirms its recognized value in educational practice. These findings are consistent with previous research showing positive teacher attitudes toward experimental and inquiry-based approaches (Nikolić, 2024; Скоморац-Пезер & Рустемпашић, 2020).

Conversely, Letina (2019) found that teachers, despite the benefits of applying the experimental method, rarely use it. This percentage should be increased by improving resources and technical requirements, and by providing support for the use of this method. The availability of equipment in schools is one limiting factor for the application of the experimental method, and teachers show divided opinions regarding the adequacy of equipment. Around 38.8% of teachers confirmed that the school has sufficient equipment for conducting experimental methods, while 35.9% disagreed. A significant percentage of undecided responses regarding equipment availability may indicate either disinterest or a lack of initiative to independently secure conditions for applying experiments in teaching. These findings confirm the results of Skomorac-Pezer and Rustempašić (Скоморац-Пезер & Рустемпашић, 2020), who indicated that school equipment is only partially available for implementing the experimental method. Contrary to our results, their study also notes that teachers often provide necessary resources themselves.

It is important to emphasize that there were no significant differences in the use of experimental methods between rural and urban schools, confirming the first hypothesis of this study. The results show that teachers have a positive attitude toward the benefits of the experimental method in transferring knowledge of nature and society to students. Most teachers reported that the experimental method improves students' analytical skills, positively affects motivation, encourages critical thinking and questioning, enhances understanding of natural phenomena, improves logical thinking, increases the ability to draw conclusions and generalizations, and contributes to the development of problem-solving skills. These findings align with multiple other studies examining the benefits of applying

the experimental method in nature and society (Bintoro et al., 2022; Križanac & Lacić, 2011; Nurhidayat et al., 2018; Perković Krijan, 2016; Бошњак, 2015; Ристановић, 2015; Скоморац-Пезер & Рустемпашић, 2020; Шефер, 2008).

Since no statistical significance was found regarding teachers' attitudes about the benefits of the experimental method, either in general or in relation to any analyzed independent variable, the second hypothesis of the study is also confirmed. The final research hypothesis examined obstacles to implementing the experimental method in teaching practice. The results indicate that there is no statistical significance in teachers' responses relative to years of teaching experience or the type of settlement in which the school is located. Regarding the reasons teachers report for not using experimental methods, the lack of equipment stands out. These results align with Skomorac-Pezer and Rustempašić (Скоморац-Пезер & Рустемпашић, 2020), who identified the lack of material resources and working conditions as the primary obstacle to implementing the experimental method. In contrast, some studies point to lack of time and energy as the main barrier (Costenson & Lawson, 1986; Letina, 2013; Ристановић, 2015). Additionally, some studies indicate that the duration of experimental activities does not fit within the allocated teaching schedule (Marshall et al., 2010; Marx et al., 1997; Ристановић, 2015). According to the statistical test results, the last subsidiary hypothesis in this study is also confirmed. In conclusion, the results suggest that the importance of applying the experimental method in teaching nature and society is sufficiently recognized by the surveyed teachers, and there are no significant differences in attitudes regarding years of experience or school location. Teachers demonstrated good knowledge of the benefits and impact of the experimental method on motivation, critical thinking, functional and analytical skills, and other positive effects on younger students. Furthermore, while teachers identify lack of equipment as the most relevant limiting factor, a high percentage still apply the method in accordance with the opportunities available, confirming the main hypothesis of the study.

Conclusion

The results of this study make a meaningful contribution to both theoretical and practical understandings of the application of the experimental method in teaching nature and society. From a theoretical perspectivé, the findings further support constructivist learning theories, which emphasize knowledge construction through active student participation, direct experience, and inquiry-based activities. In this sense, the experimental method emerges as a powerful didactic approach that connects theoretical content with real-life situations, moving beyond traditional, reproductive models of learning.

From a practical standpoint, the findings highlight the need to systematically strengthen the conditions for implementing the experimental method in primary

education. Although teachers recognize its value and apply it whenever possible, the lack of material and technical resources remains a major limiting factor. These results point to the importance of continuous investment in school equipment and infrastructure, as well as ongoing professional development programs focused on the practical use of experimental and inquiry-based teaching methods.

The study also has important implications for future research. Further studies could explore not only the frequency but also the quality and effectiveness of experimental method implementation, as well as its impact on specific learning outcomes and student achievement. Expanding the research sample and incorporating students' perspectives would provide a more comprehensive understanding of how experimental teaching influences the learning process and educational outcomes.

Within a broader educational and social context, the findings emphasize the necessity of aligning teaching practices with contemporary educational goals that prioritize the development of functional knowledge, critical thinking, creativity, and problem-solving skills. In this regard, the experimental method plays a crucial role in preparing students for active participation in a knowledge-based society. By fostering supportive school environments and ensuring adequate institutional support for teachers, education systems can contribute to higher-quality learning experiences and the development of competencies essential for lifelong learning.

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Ставови учитеља о примени експерименталне методе у настави природе и друштва

Резиме

Настава природе и друштва треба да обухвати комбинацију различитих метода рада које подстичу ученике на самостално истраживање, критичко размишљање и логичко закључивање. Експериментална метода доприноси развоју искустава ученика на адекватан и квалитативан начин, пружајући им могућност да изражавају своја мишљења, постављају претпоставке, изводе експерименте, активно посматрају појаве и процесе, бележе своја запажања, критички размишљају и доносе личне закључке. Циљ овог рада био је да се испитају и утврде ставови и мишљења учитеља у вези са применом и значајем експерименталне методе у оквиру наставних предмета Природа и друштво и Свет око нас. Истраживање је спроведено 2025. године на територији Републике Србије и обухватило је 103 наставника разредне наставе / учитеља и учитељица. Резултати су показали да учитељи препознају

значај и корист примене експерименталне методе за развој личности ученика, као и да не постоји статистички значајна разлика у ставовима учитеља у односу на године радног искуства и тип насеља у коме се школа налази. Закључци рада указују да су учитељи спремни да овај метод примењују у својој наставној пракси, али се сусрећу са препрекама у његовој реализацији, пре свега због недовољне опремљености школа. Пружање адекватне подршке учитељима може допринети унапређењу примене експерименталне метода у пракси.

Кључне речи: експериментална метода; савремена настава; настава природе и друштва; ставови учитеља.