



INTEGRATED TEACHING FOR SUSTAINABLE DEVELOPMENT: BEHAVIORAL CHANGES IN STUDENTS

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Abstract

Achieving behavioral changes and acquiring new skills necessitates a multilevel approach, beginning at the individual level and extending to local and global contexts. Teachers hold a pivotal role in fostering a sustainability-oriented society by preparing students to become active citizens equipped with knowledge, competencies, and skills, while demonstrating entrepreneurial and proactive behavior. This study aims to examine the behavioral changes observed in students following the implementation of a project that integrated media-based educational content and didactically structured materials on sustainable development. The project was conducted between November 2021 and June 2022, involving 41 schools across Croatia. A total of 69 teachers and 1,037 first- and second-grade primary school students participated in the project activities. Data collection tools included an activity log, an activity recording table, a Facebook support group for teachers, and a final evaluation in the form of an online questionnaire featuring reflections from both teachers and students. This paper presents the findings of the final evaluation focused on students, analysed through descriptive statistical methods and qualitative approaches. Teachers observed diverse changes in student behavior, including increased care for plants and animals, maintaining cleanliness in their surroundings, valuing a healthy diet, respecting cultural and natural heritage, and heightened motivation for independent exploration. Additional improvements included enhanced empathy,

collaboration, peaceful conflict resolution, polite behavior, inclusivity, self-confidence, freedom of expression, and active participation in discussions.

Keywords: *sustainable development, primary education, pilot project, behavioral changes, media-based educational content.*

Introduction

Sustainable development entails improving the quality of life for individuals and communities in a manner that does not compromise environmental integrity or societal identity. This concept is examined through both local and global lenses, aiming to harmonize natural resource preservation with quality of life, as well as social and economic factors. It is a critical topic in contemporary society, closely tied to political decision-making and economic objectives. In 2015, the United Nations adopted the 2030 Agenda for Sustainable Development, which includes 17 Sustainable Development Goals (SDGs). These goals serve as a framework for civic actions at the local level, contributing to a global sustainability movement. Countries that have endorsed the Agenda are committed to tracking and reporting progress toward these goals from 2015 to 2030 (Garašić et al., 2023).

Education plays a central role in promoting sustainable development, beginning with family education and extending into the formal education system. Uzelac et al. (2015) emphasize that the foundations for education on sustainable development are established in early childhood. Through the learning process, students acquire the knowledge, skills, values, and attitudes required for responsible and sustainable action. Such education prepares students to think and act in ways that prioritize environmental preservation and resource conservation, ensuring quality of life for current and future generations. Barrable (2019) and Chawla (2020) assert that teaching sustainable development and fostering connections with nature from the onset of formal education yield positive outcomes for children's well-being, mental and physical health, psychological functioning, and socio-emotional development.

In Croatia, since the 2019/2020 academic year, a cross-curricular curriculum on sustainable development has been implemented in primary and secondary schools. This curriculum is integrated into mandatory and elective subjects, interdisciplinary teaching, project-based learning, outdoor education, fieldwork, and extracurricular activities, and aligns with other cross-curricular themes and curriculum areas (Narodne novine, 7/2019).

The curriculum addresses the interconnectedness of the three pillars of sustainability—environmental, social, and economic. It equips students for active societal participation aimed

at achieving personal and collective well-being. Furthermore, it provides insights into global and local sustainability challenges, emphasizing the necessity for sustainable management of natural resources, human potential, and the responsibilities and rights associated with these aspects (Ministarstvo znanosti, obrazovanja i sporta, 2019).

The curriculum suggests problem-based teaching, inquiry-based learning, project-based activities, simulations, workshops, and interdisciplinary approaches. Recommended methods include debates, interactive games, dramatic and artistic representations, collaborative learning, hands-on activities (e.g., experiments, model construction, and creating informational materials), and the use of natural or recycled materials (Ministarstvo znanosti, obrazovanja i sporta, 2019). It also highlights the importance of connecting sustainability topics to practical examples from family life, schools, and local communities. Schools are encouraged to collaborate with local stakeholders through visits to businesses, institutions, museums, nature parks, and other educational sites (Ministarstvo znanosti, obrazovanja i sporta, 2019).

Modern curricula emphasize networking principles, values, and goals, correlating cross-curricular and subject-specific learning outcomes (Anđić, 2022). Teachers are granted autonomy in selecting teaching topics and determining the extent of integration into their teaching practices. Summers & Kruger (2003) argue that the effectiveness of sustainability education depends not only on teacher competencies but also on their awareness. Škugor et al. (2024b) emphasize the importance of teacher motivation, initiative, and proactivity. Anđić & Mažar (2023) suggest that initial teacher education and professional development programs on sustainability should incorporate factors such as emotions, personality traits, and values. Vukelić et al. (2018) found that pre-service teachers who perceive their knowledge of sustainability as more comprehensive demonstrate higher levels of teaching self-efficacy and feel more confident in implementing sustainability education in their future practices.

Given the interdisciplinary nature of sustainable development, its content should be taught using an integrated approach (Vásquez, García-Alonso et al., 2021; Škugor et al., 2024a). Walsh (2003) highlights that integrated teaching requires clearly defined goals and content that is engaging and relevant to students, thereby ensuring their active involvement. This approach connects various educational domains, providing students with a holistic understanding of sustainability issues. By encouraging creativity, innovation, discipline, and collaboration, integrated teaching fosters opportunities for students to devise solutions to real-world problems (Lilić & Ivančok Varga, 2022).

Beyond formal education, practices outside the prescribed curriculum—such as those involving family and community participation—are essential. The activities of civil society organizations in education offer valuable alternatives to traditional formal education frameworks (Meyer, 2001). Educational Programs and Projects by Civil Society Organizations as Drivers of Social Democratization

Educational programs and initiatives led by civil society organizations contribute significantly to the democratization of society by understanding the local context—what parents aspire to for their children, the barriers to ensuring quality education, and strategies to strengthen institutions (Sutton & Arnove, 2004). Intrinsically motivated teachers eagerly participate in diverse non-formal education activities, including training sessions, workshops, roundtable discussions, festivals, and conferences organized by civil society organizations. Such participation is often driven by a desire for personal or professional growth or the ambition to enrich the teaching process in collaboration with students to achieve desired learning outcomes. According to Rieckman (2018), the role of teachers extends to fostering change within schools and local communities through the lens of sustainable development. Similarly, Chawla (2020) emphasizes that adopting an integrated approach to the concept and practice of sustainable development enhances the well-being and experiences of children, youth, and adults within a community. This perspective positions schools as pivotal centers for their local communities, highlighting their humanistic and societal roles beyond fundamental educational functions.

This study describes the collaboration between a civil society organization, teachers, and university professors, demonstrating the integration of formal and non-formal education. The *Children's Creative Center DOKKICA*, as a civil society organization, developed the *Nature Heroes* project within the school curriculum framework and with approval from the Croatian Ministry of Science and Education. The project provided teachers with support through an educational-entertainment media series of 14 episodes and didactic materials incorporating drama exercises and techniques.

The *Nature Heroes* YouTube series engaged children in a relatable and entertaining manner, capturing their attention and sparking interest in their environment and human activities linked to sustainable development. Themes and scenarios addressed subtopics of sustainable development and core values such as health, nature, cultural heritage, kindness, cooperation, adaptability, creativity, and problem-solving. These elements were aligned with learning outcomes in multiple subjects (Croatian language, Science and Society, Visual Arts, Music,

and Class Community Sessions) and cross-curricular themes (sustainable development, personal and social development, civic education, learning to learn, and ICT).

According to Kolucki and Lemish (2013), the appeal and popularity of entertainment can be harnessed to drive societal change and promote individual and community well-being. The term *edutainment*, a blend of "education" and "entertainment," captures this fusion. Fisch (2004) argues that high-quality media products aimed at school-aged children foster independence, self-reliance, and curiosity about the world. Applying diverse forms of media education within the sustainable development context extends the traditional educational functions of schools to encompass informational, ethical, motivational, and preventive roles (Chaikovska et al., 2021).

Methodology

The *Nature Heroes* educational project by the *Children's Creative Center DOKKICA* was approved through competitive grants from the Croatian Ministry of Science and Education (projects in extracurricular education), the Ministry of Culture and Media (audience development in culture), and the City of Osijek. The project aimed to assist teachers in implementing the cross-curricular theme of Sustainable Development innovatively, combining educational value with entertainment. It involved collaboration between the *DOKKICA* center, teachers, and university professors, achieving integration between formal and non-formal education. The project was conducted between November 2021 and June 2022 in partnership with 41 schools across Croatia, involving 69 teachers and 1,037 first- and second-grade students.

This research sought to evaluate changes in students' behavior based on teachers' assessments following project implementation.

Research Questions:

1. To what extent were students satisfied with participating in the *Nature Heroes* project?
2. To what degree did students, according to teachers, acquire new knowledge and skills related to sustainable development?
3. What behavioral changes were observed among students after the project?

Data Collection Tools:

1. Activity logs,
2. Tables documenting implemented activities,
3. A Facebook support group for teachers (*Nature Heroes – Teacher Community*),

4. Evaluations of each of the 14 educational-entertainment episodes, and
5. Final evaluation using an online questionnaire with reflections from teachers and students.

This study presents results from the final evaluation completed by teachers via an online questionnaire. The questionnaire comprised two sections, with this paper focusing on the second part, where teachers assessed behavioral changes in students related to sustainable development content. The second section included five questions: two Likert-scale items (1 = "dissatisfied" or "insufficient"; 5 = "extremely satisfied" or "excellent") and three open-ended questions where teachers reflected on observed behavioral changes. The data were analyzed using descriptive statistics and qualitative methods.

Results

Analysis of the data addressing the first research question revealed that 68.9% of students were extremely satisfied, and 22.2% were satisfied with their participation in the *Nature Heroes* project (Figure 1). The average satisfaction score was 4.57. Students eagerly anticipated each new episode of the series, identified with the characters, engaged in dialogue with them, and provided feedback on their actions.

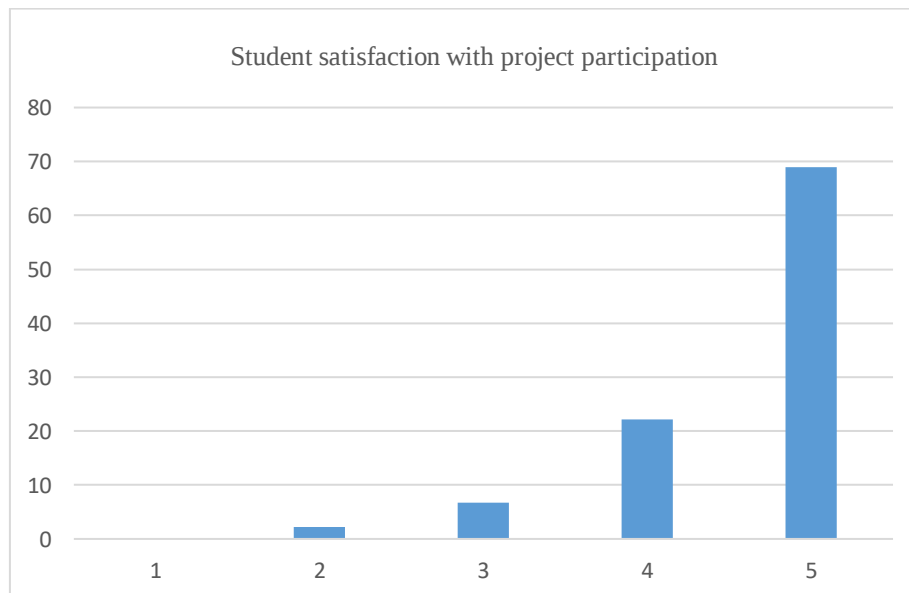


Figure 1. Student satisfaction with project participation

Teachers reported that 84.5% of students demonstrated excellent acquisition of new knowledge and skills related to healthy lifestyles, environmental protection, and sustainable development, while 15.5% achieved good or satisfactory levels (Figure 2). The average score for knowledge and skill acquisition was 4.46, indicating high motivation and active engagement during the project.

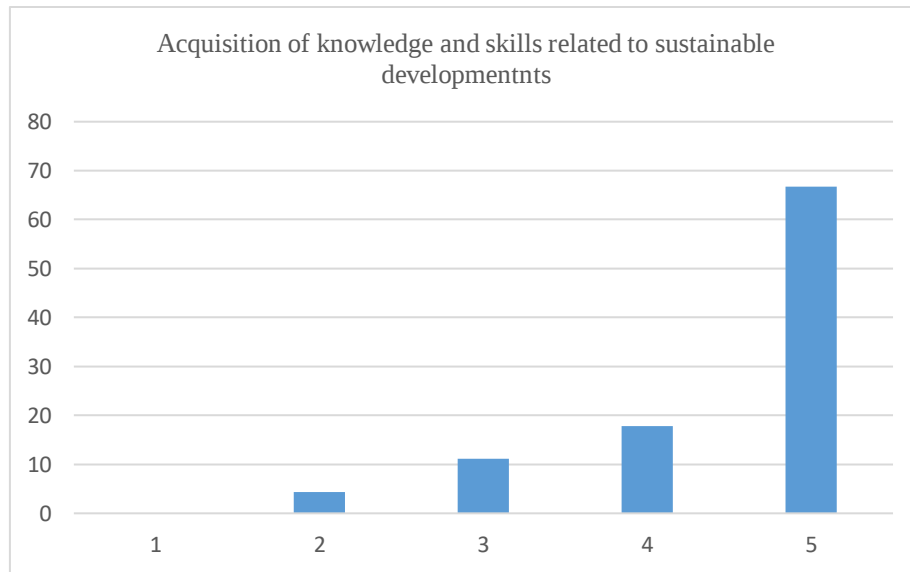


Figure 2. Acquisition of knowledge and skills related to sustainable development

To address the third research question, responses to three specific items were analyzed. Teachers reported that the project significantly or exceptionally stimulated creativity in 88.9% of students, while 2.2% did not exhibit noticeable improvements. The mean score (M) on the creativity scale was a high 4.48. Similarly, teachers observed that the project fostered entrepreneurship and activity in 83.2% of students, with 2.2% showing no significant change (Figure 4). The mean score (M) on the entrepreneurship and activity scale was 4.37.

The teachers themselves demonstrated considerable creativity, innovation, and entrepreneurial spirit during the project (Škugor et al., 2024b), which had a positive influence on the students. Teachers estimated that behavioral changes occurred in 64.4% of students. The most commonly reported changes included improved collaboration, empathy, peaceful conflict resolution, tolerance, openness, increased self-confidence, and greater attention to their surroundings, such as caring for plants and animals, maintaining cleanliness, understanding the importance of a healthy diet, and respecting cultural and natural heritage. Teachers also noted heightened motivation for exploring topics beyond the standard curriculum.

Students became more entrepreneurial and innovative, eager to participate in various activities and contribute to their communities, which brought them personal satisfaction. Additional observed outcomes included thoughtful engagement with the actions of project characters, improved language and dramatic expression skills, relaxation, and better concentration—particularly noteworthy given the younger school age of the students involved. Chaikovska et al. (2021) demonstrated that integrating media content into educational processes aligns students' values and behaviors with activities and motivations, effectively linking sustainable development content with daily life. This aligns with the findings of this study.

Teachers expressed a need for additional media resources covering topics such as personal and social development, mental health, and financial literacy.

Conclusion

Sustainable development in education is imperative for contemporary society, as it equips students with knowledge, attitudes, values, and skills necessary to address environmental, social, and economic challenges. The integration of sustainable development content into educational processes fosters critical thinking, responsible behavior, active citizenship, and the development of practical, entrepreneurial, and collaborative skills.

The *Nature Heroes* educational project emerged as a collaborative initiative between the civil society organization DOKKICA and teachers and university professors, focusing on implementing sustainable development as an interdisciplinary theme. The project combined educational media content and drama-based activities, demonstrating an effective methodological approach.

Based on teacher evaluations, the project resulted in noticeable behavioral changes among first- and second-grade students. Teachers reported that the project had an excellent impact on creativity for 62.2% of students and fostered significant entrepreneurial and active engagement in 57.8%, both in classroom settings and within their local communities.

Teachers observed diverse changes in student behavior, including increased care for plants and animals, maintaining cleanliness in their surroundings, valuing a healthy diet, respecting cultural and natural heritage, and heightened motivation for independent exploration. Additional improvements included enhanced empathy, collaboration, peaceful conflict resolution, polite behavior, inclusivity, self-confidence, freedom of expression, and active participation in discussions.

Further research is needed to explore the potential of such methodological approaches in developing students' key competencies. Given the positive reception and engagement among younger students, this approach holds promise for wider application in early education.

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