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Information and Material Support to Environmental Education in Slovakia in the Times of Crisis

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Abstract:

Introduction: The undergoing globalization brings epidemiological, economical, energetical, and environmental security risks. The current task in the field of improving the quality of the environment is educating students in schools for adaptation to the climate change and mitigating its impact on the life and health of living organisms.

Methods: The authors carried out a research study on the sample of teachers in 57 schools in the Slovak Republic focusing on particular themes of environmental security, teachers' knowledge in the field and the availability of material didactic means.

Results: Particular themes of environmental security were identified and teachers' knowledge in the field was examined. Special attention was paid to the availability of material didactic means to be used for the purposes of environmental education. Statistically significant differences were found between their availability in towns and villages.

Discussion: Human activities have significantly changed the quality of the environment and now, the necessary to start applying a more environmentally responsible approach is clear. In the Slovak school system, the cross-cutting theme environmental education provides space for it.

Limitations: Limitations are given by the size and the composition of the sample, which do not allow to generalize the obtained findings to the entire population.

Conclusions: In education, it is important to introduce measures and to prepare graduates for the future as a reaction to the climate emergency situation and the planetary crisis. So, teachers should have expertise, possess objective information, as well as appropriate didactic means for educating students.

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Key words: environmental education, environmental security, environmental sustainability, cross-cutting theme, didactic means.

Introduction

The undergoing globalization of the world, as well as the scientific and technical progress are associated with new opportunities for using human and material resources, overcoming cultural differences, geographical distance, or speeding information access, but on the other hand, it represents a serious threat for the sustainability of the environment. Human activities have significantly changed the quality of the biosphere, hydrosphere, atmosphere, and pedosphere. The climate change has increased the average yearly temperature in the atmosphere and melting glaciers leading to rising ocean levels can be observed. Polluted rivers, seas full of waste, decreasing acreage of quality agricultural land, microplastics found in remote mountains, as well as in the deepest place on our planet both freely in the environment and in animals' bodies are a proof of not the best condition of the environment. Decreased biodiversity of organisms, instability of burdened ecosystems, expansion of monocultures, extensive forest fires in diverse parts of the world on one hand, and large flash floods in other parts of the world on the other hand can be observed. Many of the above phenomena are the consequences of human activities and have a significant impact on the quality of the environment and also on human health and life.

It is important to realize that the undergoing processes in the nature are not isolated phenomena, but - as stated by Liba (2016) - they create a continuous chain of mutual causal, spontaneously applying relationships and each negative change in the nature - environment - has a negative impact on the quality of human life. Váňa (2013) divided individual interactions between material objects according to the duration of their impact, the environment, in which they are present, and their effects (Figure 1).

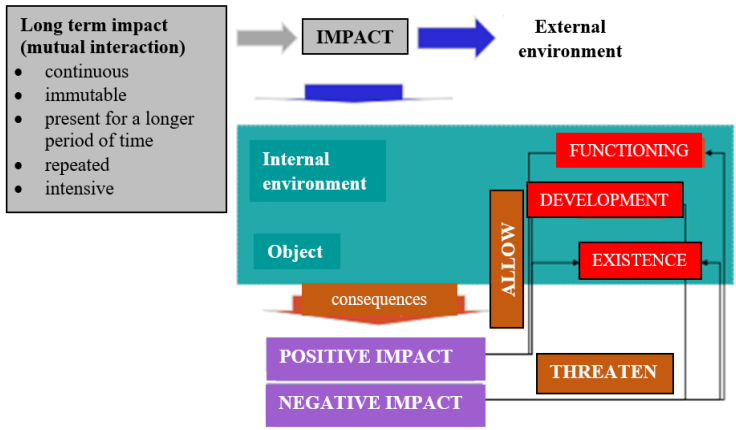


Figure 1. Mutual impact of objects in the geographical space of the Earth (Váňa, 2013).

Krajhanzl (2010) confirms that individuals are in a permanent interaction with their environments, therefore, almost all human behaviour can be considered environmental behaviour. In the times characterized by changes in the environment, ecosystems, biosphere, and climate that are caused by human activities, experts' attention is focused mainly on such environmental behaviour, which is connected with resource and energy consumption, producing waste, and polluting.

There are many examples from the past when inappropriate human activities disturbed and polluted the environment and endangered the health and lives of living organisms. They resulted in environmental burden, territories contaminated by transport, industrial, agricultural, mining, and military activities, but also by inappropriate waste management, representing a serious risk for human health or rock environment, underground water, and soil. In Slovakia, they are registered in the Information System of Environmental Burden (Ministerstvo životného prostredia, 2022), which is a part of the information system of public administration.

Mitigating the negative impact and its prevention require creative solutions and involvement of the general public, which depends on the societies' environmental awareness. Široký et al. (2020) claim that Slovak citizens' environmental awareness is insufficient and therefore, it cannot lead to a change in behaviour, nor to setting values for sustainable development.

Krajhanzl (2015) accentuates that individuals with a higher level of environmental awareness are internally motivated to protect the environment. They are aware of environmental issues and they perceive pollution, extinction of species, and threatening the natural cycles on the planet as serious threats. They understand the environmental context of life and try to find more nature-friendly behaviour patterns, develop a whole range of pro-environmental habits, support environmentally sustainable policies, and are engaged in activities focused on nature and environment protection. They also realize that environmental awareness can only be increased by quality environmental education and edication, and by education for sustainable development. These also promote an active approach to the environment by means of developing skills necessary for sustainable development, such as systemic thinking, foresight, strategic thinking, critical thinking, normative competence, or an integrated approach to problem solving (Široký et al., 2020).

Information about the environment form an important part of environmental education and edication, but Krajhanzl (2015) points out that they alone only rarely lead to a change in environmental behaviour. He also adds that environmental awareness cannot be increased by means of threatening as it can result in creating a block against open reasoning about environmental issues in a person.

1 Environmental education and edication

The fact that schools, as well as all other segments, must adopt their own measures as a reaction to the climate emergency situation and the planetary crisis, and to prepare school graduates for future, is emphasized in the Council Recommendation on Learning for Environmental Sustainability (European Commission, 2022) as well and so, taking effective measures in the field is a necessity.

There is research evidence that environmental education and increasing ecological literacy in the population have an impact on individuals' behaviour, which means that targeted education and edication can contribute to improving the quality of the environment. Activities in this field can encourage people to adopt "greener" attitudes and motivate them to recycle, reduce litter, conserve energy, and improve water sanitation (Wals & Benavot, 2017). Education for sustainable development is defined by Anderson (2012) as an approach to teaching and learning influenced by the ideals and principles promoting sustainability, which can be considered a priority in the modern society. As Mogren, Gericke, and Sherp (2019) claim, in the framework of environmental education, specific issues, such as climate, poverty, and biodiversity, are addressed and space for the application of appropriate methods, approaches, as well as developing skills, abilities, visions, and practices is provided.

Undoubtedly, implementing environmental education in school curricula promotes school quality development and its advantage is that education for sustainable development can be applied regardless the type, level, or settings of education. Furthermore, properly selected activities of environmental education encourage active citizenship, especially pro-environmental political behaviour, e.g. involvement in environmental activism, supporting environment-friendly policies, voting for "green" parties, etc. (Meyer, 2015; Coan & Holman, 2008).

2 Environmental education in the Slovak school system

There are several advantages of implementing environmental education in schools and increasing students' environmental awareness. As available research findings indicate, if sufficient attention is paid to environmental education, it frequently comes to an improvement in students' academic performance, development of their critical thinking processes and soft skills, and also personal growth can be observed (Natural England, 2012). In the Slovak Republic, as stated in the national curricula for different types and levels of schools, there are four ways of the realization of environmental education: 1. as a cross-cutting theme; 2. as a school subject; 3. as a theme included in the educational content of any school subject; or 4. in the form of a course or a project. As experience shows, schools most frequently opt for implementing the content of environmental education in teaching school subjects included in the school curriculum and, alongside with that, participate in a range of environmental projects on school, regional, national, or international levels. One of the problems that schools have to face is that currently, there are only educational standards for individual school subjects, but not for cross-cutting themes, such as environmental education.

For teaching about environmental sustainability, teachers in schools need appropriate and targeted education and training, sufficient amount of information, and didactic means. Unfortunately, in Slovakia, similarly to other countries, the currently offered teacher training programmes do not sufficiently prepare pre-service teachers for teaching about and for the green and digital transformation. As findings by Seikkula-Leino et al. (2021) show, even in Nordic countries, where the situation in the field of environmental sustainability is much better and the citizens' environmental awareness is a lot higher than in Slovakia, the formulated goals and the specified contents in curricula related to the climate change and sustainable development are limited, which means that there is a need to promote environmental/sustainable education more explicitly.

3 Teachers' preparedness for environmental education

In the context of practicing teachers' expertise for preparing their students for the twin transition green and digital, the results of a survey focused on education about climate change available on the European online platform School Education Gateway (2020) are interesting. 1,101 respondents participated in the survey, from among which 89% were formed by teachers or school directors from 36 countries, but mainly from Spain, Turkey, and Romania. Almost all respondents agreed that education in the field of climate change is each school's responsibility. From among the reasons for not including education in the field of climate change in the school or national curriculum, teachers most frequently indicated a lack of professional knowledge/training (66.3%) and a lack of teaching resources (50.5%). This indicates, that in-service teachers need learning opportunities in the field of environmental education, which can result in developing their competencies. These competencies can be also well-developed within undergraduate teacher training programmes, especially when considering that for all stakeholders, it is a time and cost saving solution as universities can prepare all future teachers for environmental education regardless their specialization.

As mentioned above, in Slovakia, various issues of environmental education are most frequently implemented in a variety of school subjects. It can be explained by the fact that in Slovakia, the content of undergraduate teacher training programmes does not allow to introduce the subject environmental education in schools. What is alarming, teachers do not feel prepared for teaching environmental topics or introducing environmental activities in the classroom within their subjects - as a cross-cutting theme - either. Therefore, there is an urgent need to develop an "environmental minimum" to be included in undergraduate teacher training programmes. It should contain indispensable thematic content, and should be targeted on developing necessary skills and habits in teachers with the aim to gain competencies for developing students' environmental literacy and increasing their environmental awareness. Moreover, examples of good practice, recommended activities, and verified teaching methods should be focused on (Bilčík, Bilčíková, & Geršicová, 2021).

In the above-mentioned context, the present study introduces the results of an investigation aimed at revealing whether teachers in Slovak schools possess sufficient information and material didactic means for teaching environmental themes.

4 Methodology

In Slovakia, on the level of the school system, in the national curricula, environmental themes are included in the cross-cutting theme 'Environmental Education', which can be realized in the form of an independent school subject, courses, or – as it is in the case of most schools - it can be implemented in the educational content of individual school subjects. In the presented survey, we examined whether Technics teachers in lower secondary schools implement environmental themes in their teaching process and whether they have sufficient information and appropriate didactic means at their disposal (Bilčíková, 2022). Alongside with that, the differences in the availability of didactic means for teaching environmental themes by teachers in towns and cities on one hand, and in villages on the other hand were investigated into. These categories were created based on the list of schools available at the Slovak Centre of Scientific and Technical Information website.

The examined environmental themes were specified based on the educational standards for the subject 'Technics', the cross-cutting theme 'Environmental Education' in the innovated national curricula, recommendations by the Ministry of Education, Science, Research and Sports of the Slovak Republic in the Guide for the School Year, relevant legislation in force, and the Strategy of the Environmental Policy of the Slovak Republic until 2030. The following environmental themes were identified:

- environmental pollution and protection;
- sustainable development;
- climate change;
- alternative sources of energy;
- drinking water, water conservation;
- sustainable construction, green houses;
- waste, separation, recycling;
- landfills, dangerous waste;
- means for household maintenance and cleaning and their impact on the environment;
- environment-friendly products;
- product life cycle;
- circular economy;
- sustainable agriculture.

In the survey (Bilčíková, 2022) carried out in 57 Slovak schools providing lower secondary education - considering the restrictive measures in the context of the COVID-19 pandemic - the combination of semi-structured interviews in schools and a questionnaire administered online using Google Forms, which was distributed via social networks, was used.

5 Results

The participating Technics teachers' responses are displayed in percentages in Figures 2-5, where the responses by teachers working in schools in towns and cities and schools in villages are compared.

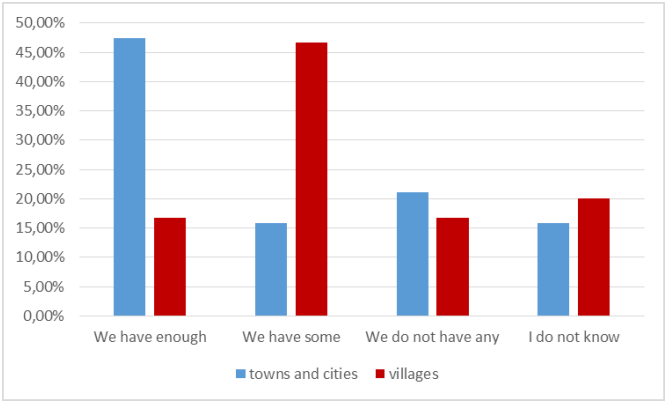


Figure 2. Waste, separation, recycling.

As displayed in Figure 2, the most material didactic means are at teachers' disposal for teaching the theme waste, separation, and recycling. As many as 47.4% of Technics teachers working in schools in towns and cities and 16.7% of teachers working in schools in villages indicated that they have sufficient material didactic means for the theme.

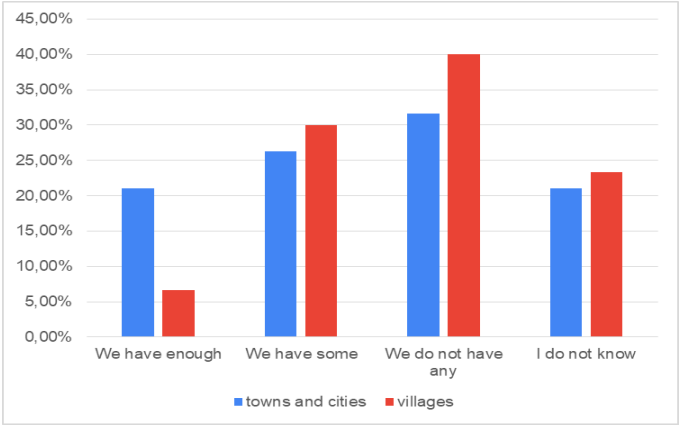


Figure 3. The theme of environment pollution and protection.

On the other hand, in the context of the theme environment pollution and protection, 31.6% of teachers in towns and cities and 40% of teachers in villages responded that they did not have any material didactic means at all. With other environmental themes, teachers reported an even higher lack of material didactic means.

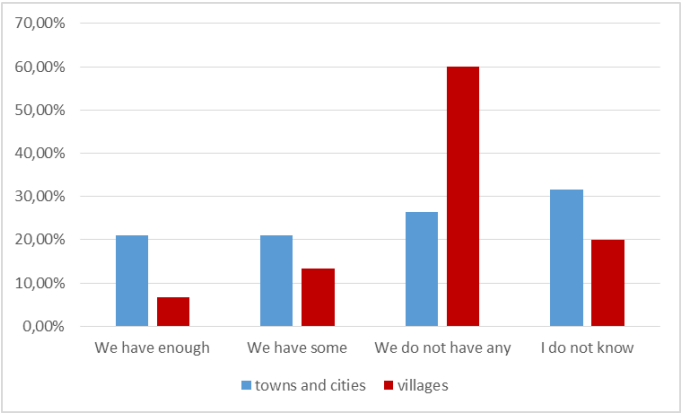


Figure 4. The theme of sustainable development.

In the context of the theme of sustainability, 26.3% Technics teachers working in towns and 60% of their colleagues working in villages reported a lack of material

didactic means. Similarly, 36.8% of teachers in towns and cities and 60% of teachers in villages reported that they did not have any material didactic means for teaching about climate change.

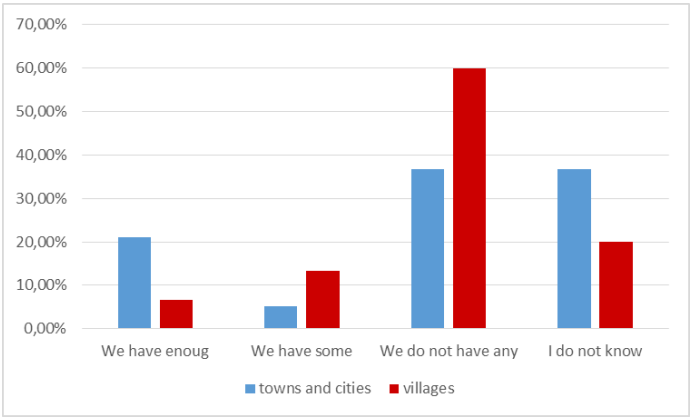


Figure 5. The theme of climate change.

From among all participating lower secondary school Technics teachers working in towns and cities, 21.05% responded that they possessed sufficient information and material didactic means for teaching environmental themes, but only 5.90% of teachers working in schools located in villages reported satisfaction with the availability of material didactic means for this theme. It represents 11.77% of the responses by all participating teachers. More details are displayed in Table 1.

Table 1

Teachers' responses for the question whether they have sufficient material didactic means for teaching environmental themes

		Material didactic means		
Teachers working in:		*yes*	*Other responses*	*Total*
Towns and cities	Number of responses	52	195	247
	%	21.05%	78.95%	100%
Villages	Number of responses	23	367	390
	%	5.90%	94.10%	100%
Total		75	562	637
Total %		11.77%	88.23%	100%

The statistical significance of the found differences was tested by chi-square analysis - p-value = 7.36*10-9. It was confirmed that more material didactic means for teaching environmental themes are available to Technics teachers working in towns and cities than to those working in schools in villages.
During the personal interviews with one part of the participating teachers, they were asked about their sources of information about environmental themes. Their responses varied, but most frequently, they reported using Google. None of the respondents browsed the Central Educational Platform Viki, which was set up by the Ministry of Education, Science, Research and Sport of the Slovak Republic during the pandemic crisis, nor the Ewobox portal operated by the Slovak Environment Agency.

Conclusion

Undoubtedly, education is one of the key determinants on the pathway to sustainable development and environmentally responsible behaviour. The twin transition green and digital has a significant impact on our everyday lives, work, and communication. Promoting circular, digitalized, and climate neutral economy brings new jobs, leads to an effective use of artificial intelligence and robotics. Naturally, schools as institutions preparing students for their future lives must be prepared for changes of such an extent and react to them flexibly. Not only lifelong learning opportunities, but also teachers' characteristics including openness to innovations and using new methods of teaching in the classroom, their willingness to collaborate with their colleagues and share experiences may lead to more environmentally responsible actions in their students in a global context, to developing independent and critical thinking, students' creativity, an ability to find innovative solutions, and using new environment-friendly technologies in order to create a healthier and safer environment.
Also material didactic means and appropriate teaching aids can be considered important tools for creating conditions for developing students' key competencies necessary for living in the 21st century. The twelve 'green' competencies - as defined by the European Commission (Bianchi, Pisiotis, & Giraldez, 2022) - can be divided into four fields:

- Embodying sustainability values;
- Embracing complexity in sustainability;
- Envisioning sustainable futures;
- Acting for sustainability.

In the context of environmental education in Slovakia, the gathered answers indicate that teachers in towns have more material didactic means at their disposal than their colleagues in villages. Teachers in towns and cities have didactic means mainly for teaching the themes waste, separation, recycling,

means for household maintenance and cleaning and their impact on the environment, but they lack resources for the themes landfills, dangerous waste, environment-friendly products, product life cycle, circular economy, and sustainable agriculture. These themes - but the same applies to the issues of sustainable development - are not covered in lower secondary schools in villages.

In the obtained answers (School Educational Gateway, 2022; Bilčíková, 2022), teachers reported a lack of information despite their interest in lifelong learning activities in the field of environmental education. The authors of the paper consider creating favourable conditions for practical activities by all stakeholders of education - not only from schools' internal, but also their external environments - and allowing students' involvement in protecting and creating the environment, in which they live for the benefits of their community important. Only then we can believe that thanks to a holistic approach and understanding the context current students will be able to make environmentally responsible decisions on a daily basis in the future during their productive lives.

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