The 28th International Scientific Conference
"Educational Research and School Practice"

THE STATE AND PROBLEMS OF THE NEEDS MODERN EDUCATION COMMUNITY

BOOK OF PROCEEDINGS

Editors
Jelena **STEVANOVIĆ**
Dragana **GUNDOGAN**
Branislav **RANĐELOVIĆ**

ipi Institut za pedagoška istraživanja
Univerzitet u Novom Pazaru
Российский университет дружбы народов
Завод за вредновање квалитета образовања и васпитања

Belgrade, 2022.

Institute for Educational Research, Belgrade, Serbia

28th International Scientific Conference
"Educational Research and School Practice"

The State, Problems, and Needs of the Modern Education Community

December 9th, 2022
Belgrade

BOOK OF PROCEEDINGS

Editors
Jelena STEVANOVIĆ
Dragana GUNDOGAN
Branislav RANĐELOVIĆ

PROGRAM BOARD

Chairwoman of the Program Board

Jelena Stevanović, PhD, Senior Research Associate, Institute for Educational Research, Belgrade, Serbia

Members

- **Mara Cotič**, **PhD**, **Full Professor**, Faculty of Education, University of Primorska, Koper, Slovenia
- **Olga Borisovna Mikhailova**, **PhD**, **Associate Professor**, The Peoples' Friendship University of Russia, RUDN University, Moscow, the Russian Federation
- **Sergey Ivanovič Kudinov**, **PhD**, **Full Professor**, The Peoples' Friendship University of Russia, RUDN University, Moscow, the Russian Federation
- **Branislav Ranđelović**, **PhD**, **Associate Professor**, Institute for Education Quality and Evaluation, Belgrade, Serbia
- **Daniel Churchill**, **PhD**, **Full Professor**, Faculty of Education, The University of Hong Kong, Hong Kong
- **Vilmos Vass**, **PhD**, **Full Professor**, Budapest Metropolitan University, Budapest, Hungary
- **Nataša Vlah**, **PhD**, **Full Professor**, Faculty of Teacher Education, University of Rijeka, Croatia
- **Milan Pol**, **PhD**, **Full Professor**, Faculty of Arts, Masaryk University, Brno, Czech Republic
- **Djuradj Staki*ć***, **PhD**, **Professor Emeritus**, Pennsylvania State University, Pennsylvania, USA
- **Snežana Marinković**, **PhD**, **Full Professor**, Faculty of Education in Užice, University of Kragujevac, Užice, Serbia
- **Ana Pešikan**, **PhD**, **Full Professor**, Faculty of Philosophy, University of Belgrade, Belgrade, Serbia

- **Mile Srbinovski**, **PhD**, **Full Professor**, Institute for Environment and Health, South East European University, Tetovo, Republic of North Macedonia
- **Slobodanka Antić**, **PhD**, **Associate Professor**, Faculty of Special Education and Rehabilitation, University of Belgrade, Belgrade, Serbia
- **Tina Štemberger**, **PhD**, **Associate Professor**, Faculty of Education, University of Primorska, Koper, Slovenia
- **Elizabeta Karalić**, **PhD**, Institute for Education Quality and Evaluation, Belgrade, Serbia
- **Emilija Lazarević**, **PhD**, **Principal Research Fellow**, Institute for Educational Research, Belgrade, Serbia
- **Nikoleta Gutvajn**, **PhD**, **Senior Research Associate**, Institute for Educational Research, Belgrade, Serbia
- **Slavica Ševkušić**, **PhD**, **Senior Research Associate**, Institute for Educational Research, Belgrade, Serbia
- **Milica Marušić Jablanović**, **PhD**, **Senior Research Associate**, Institute for Educational Research, Belgrade, Serbia
- **Dušica Malinić**, **PhD**, **Senior Research Associate**, Institute for Educational Research, Belgrade, Serbia
- **Jelena Stanišić**, **PhD**, **Research Associate**, Institute for Educational Research, Belgrade, Serbia

ORGANIZATIONAL BOARD

- **Dragana Gundogan**, **PhD**, **Research Associate**, Institute for Educational Research, Belgrade, Serbia
- **Marija Ratković**, **MA**, **Research Trainee**, Institute for Educational Research, Belgrade, Serbia
- **Iva Medojević**, **MA**, **PhD student**, Teacher Education Faculty, University of Belgrade, Belgrade, Serbia

ORGANIZERS

The Institute for Educational Research (Belgrade, Serbia) in cooperation with the Faculty of Education, University of Primorska (Koper, Slovenia), the Peoples' Friendship University of Russia, RUDN University (Moscow, the Russian Federation), and the Institute for Education Quality and Evaluation (Belgrade, Serbia).

Note. This book was funded by the Ministry of Education, Science, and Technological Development of the Republic of Serbia (Contract No. 451-03-68/2022-14/200018).

CIP - **Каталогизација у публикацији**
Народна библиотека Србије, **Београд**

37.091::004(082)
37.018.43:004.738.5(082)
371.13(082)
37.091.33(082)

INTERNATIONAL Scientific Conference "Educational Research and School Practice" (28 ; 2022 ; Beograd)
The State, Problems, and Needs of the Modern Education Community : book of proceedings / 28th International Scientific Conference "Educational Research and School Practice", December 9th , 2022 Belgrade ; editors Jelena Stevanović, Dragana Gundogan, Branislav Ranđelović. - Belgrade : Institute for Educational Research, 2022 (Beograd: MC Most). - 255 str. ; 24 cm
Tiraž 50. - Napomene i bibliografske reference uz tekst. - Bibliografija uz svaki rad. - Registar.

ISBN 978-86-7447-161-6

а) **Информациона технологија** -- **Образовање** -- **Зборници**
б) **Школство** -- **Реформа** -- **Зборници**
в) **Наставници**-- **Стручно усавршавање** -- **Зборници**
г) **Настава** -- **Иновације** -- **Зборници**
д) **Образовна технологија** --**Зборници**
ђ) **Учење на даљину** -- **Зборници**

COBISS.SR-ID 84360457

CONTENT

PLENARY

MODERN APPROACHES TO LEARNING AND TEACHING

THE PROFESSIONAL DEVELOPMENT AND COMPETENCIES OF EDUCATIONAL WORKERS

PREDICTORS OF PRO-ENVIRONMENTAL BEHAVIOR – THE RESULTS OF A PILOT STUDY ON ENVIRONMENTAL LITERACY[22]

Milica Marušić Jablanović[23] and **Jelena Stanišić**
Institute for Educational Research, Belgrade, Republic of Serbia

Slađana Savić
Faculty of Chemistry, University of Belgrade, Republic of Serbia

Introduction

The role of contemporary education is to prepare children and youth for life after school by helping them acquire knowledge and develop skills and attitudes, thus endowing them with certain competencies. One of the key characteristics of contemporary competencies is interdisciplinarity, that is, extension beyond the framework of traditional school subjects, whereby children acquire knowledge that allows them to actively fulfill their civic roles. Inter-subject competencies as defined by the Law on Primary Education and Upbringing in Serbia include a responsible attitude towards the environment (Law on Primary Education and Upbringing, 2021). Therefore, responsible environmental behavior is one of the desired outcomes of the process of education. Likewise, it is an indicator of the wider construct referred to in the literature as *environmental literacy.* Thomas Marcinkowski (1991) defines environmental literacy as an awareness and sensitivity towards the environment, an attitude of respect for the natural environment and concern for nature and human impact on it, the

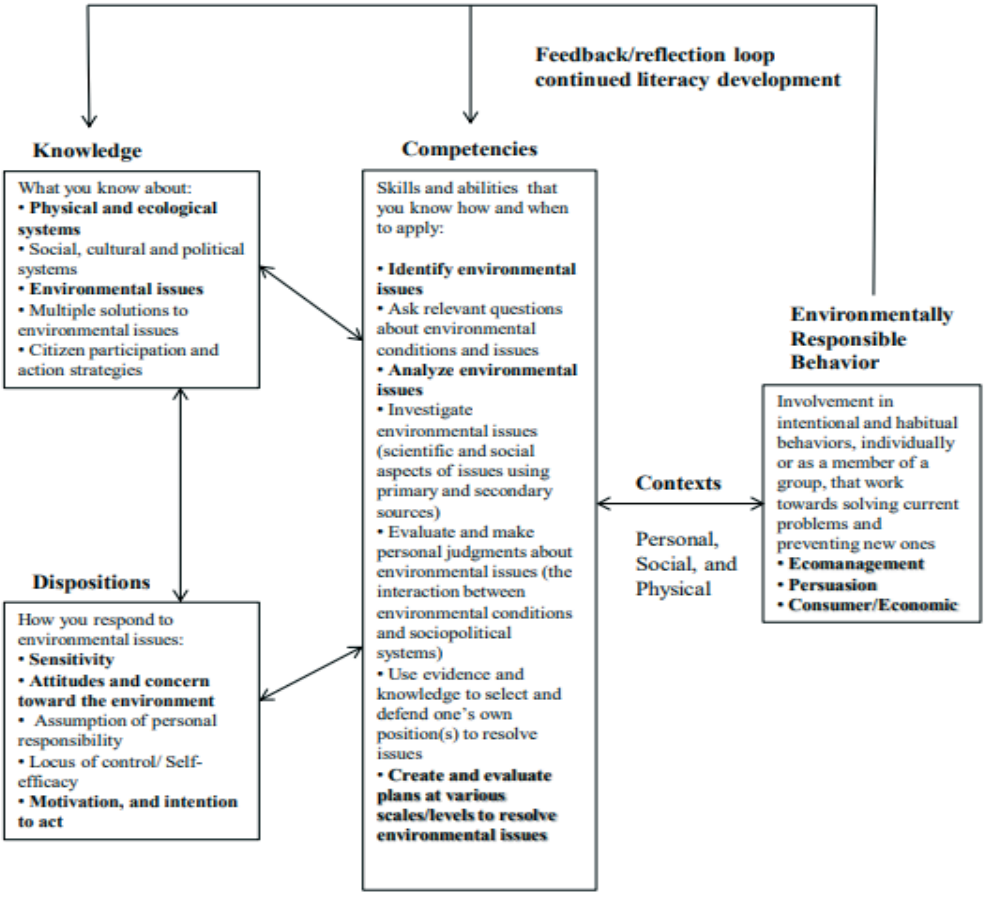
22 *Note.* This research was funded by the Ministry of Education, Science and Technological Development of the Republic of Serbia (Contract No. 451-03-68/2022-14/200018).

23 E-mail: millica13@yahoo.com

knowledge and understanding of the functioning of natural systems and human impact on them, the understanding of environmental issues across multiple scales, from local to global, skills required to analyze, synthesize, and evaluate environmental issues, a sense of personal investment and responsibility as well as motivation to work towards the resolution of environmental issues, the knowledge of the available strategies for solving environmental issues, skills required for the development and implementation of such strategies, and finally, active involvement in the resolution of environmental issues.

Early models, which were quickly rejected, assumed a linear connection between knowledge, attitudes, and behavior, which would imply that individuals with a higher level of knowledge should behave more pro-environmentally (Kollmuss & Agyeman, 2002). Another model was proposed, suggesting that knowledge does not influence behavior directly. Instead, it modifies our attitudes and the way we think about problems, and it is our attitudes and values that directly influence behavior. In addition to attitudes and values, the model recognizes three factors that directly influence behavior – the possibility to act pro-environmentally, which relates to economic and infrastructural conditions, incentives for pro-environmental behavior (mostly internal factors, such as the social desirability of such behavior), and the motivation to sustain this positive behavior (Fietkau & Kessel, 1981, Kollmuss & Agyeman, 2002). Within the theoretical and methodological model upon which we based our study (Hollweg *et al.*, 2011), skills and competencies act as mediators between knowledge and dispositions on the one hand and behavior on the other (Graph 1). The relationship is bidirectional, with behavior influencing the further acquisition of ecological knowledge.

Graph 1. *Components of the Domain of Environmental Literacy (Hollweg et al., 2011)*



Method

In this paper, we present a secondary analysis of the data collected in the aforementioned pilot study, examining if knowledge, affect and cognitive skills can predict pro-environmental behavior.

Sample. The study was conducted on a sample of seventh-grade students (aged 13-14) from three elementary schools in Belgrade. A total of 111 students participated in the study, including 59 boys and 52 girls.

Data Collection and Processing. The study was conducted in April 2022. Participants filled out a questionnaire, which took 60 to 75 minutes. The study was approved by the Ethics Committee and informed consent was obtained from the students, their parents, and school principals. A statistical data analysis was conducted using the SPSS 20 software.

Instrument. To assess participants' environmental literacy, we used the Middle School Students' Environmental Literacy Survey – MSELS[24] (McBeth *et al.*, 2008). The instrument measures environmental literacy through four components, measured in the following manner:

1. *Ecological knowledge* – assessed using a test whose content entirely corresponds to the curriculum for the subject of Biology at the given grade level;
2. *Environmental affect,* with three subcomponents:
   a) verbal commitment – measured based on participants' readiness to engage in behavior directed at environmental protection;
   b) environmental sensitivity – participants' attitudes towards nature, activities in nature, and activities related to nature, and;
   c) environmental feelings – participants' statements on how much they love nature.
3. Actual commitment – measured based on statements about actual pro-environmental behavior;
4. *Cognitive skills*, with three subcomponents:
   a) issue identification – the ability to identify the issue based on a text describing a real-life situation;
   b) issue analysis – the ability to accurately identify the values that actors in the text advocate by offering perspectives on the issue; and
   c) action planning – the ability to recognize the best solutions to the issue described in the text.

The instrument showed satisfactory reliability (α=.87).

24 The application of the MSELS was approved by prof. Marcinkowski, STEM Education Programs, Florida Institute of Technology.

Results

In the first step, we conducted regression analyses, each including one predictor of behavior. Surprisingly, the results showed that knowledge did not significantly predict behavior (std. beta=0.85; Sig=.380), while cognitive skills and affect both constituted significant predictors. The standardized beta for cognitive skills was .353 (Sig=.000). Affect emerged as a stronger predictor, with a standardized beta of .820 (Sig=.000).

However, with all three predictors entered into the regression equation, only environmental affect retained its predictive power. Therefore, cognitive skills lost their predictive power when controlling for the variable of environmental affect (Table 1). The model predicted 65% of the variance in actual commitment (pro-environmental behavior).

Table 1: *Behavior Prediction Based on Knowledge, Affect, and Cognitive Skills*

Coefficients								
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**	**Correlations**		
	B	**Std. Error**	**Beta**			**Zero-order**	**Partial**	**Part**
(Constant)	-16.266	4.826		-3.371	.001			
Ecological Knowledge	-.005	.079	-.004	-.060	.952	.086	-.007	-.004
Environmental Affect	1.255	.104	.803	12.019	.000	.816	.792	.749
Cognitive Skills	.023	.044	.036	.529	.598	.324	.057	.033

Note. Dependent variable: actual commitment

The obtained results could be interpreted as the mediating effect of the variable of environmental affect, having in mind that cognitive strategies significantly predicted participants' affective attitude towards nature and environmental protection (std. beta=.357; Sig=.001). Based on the theoretical model, we can assume that there is a feedback effect of affect on the development of cognitive skills as well as behavior on affect.

While knowledge did not emerge as a significant predictor of behavior, we established that it acted as a moderator, modifying relationships between other predictors and criteria. Namely, in the subsample of participants with scores above the arithmetic mean, the link between cognitive skills and affect was stronger than in the whole sample (std. beta=.369; Sig=003). The same was true for the link between affect and behavior (std. beta=.835, Sig=000). On the other hand, in the subsample of participants whose score on the test was lower than the arithmetic mean, the link between cognitive skills and affect was not statistically significant (std. beta=.294; Sig=136) and affect had a smaller effect on behavior (std. beta=,717; Sig=000).

Discussion

The knowledge test used in our study did not cover the areas assessed by the scales of affect and behavior. Namely, the questions did not refer to reasons for conserving energy and water or reasons for waste sorting. Had we assessed knowledge related to behaviors measured by the test, we might have obtained a stronger link between the two components. Nonetheless, the test corresponded to the curriculum and our results showed that participants' knowledge level failed to explain differences in their behavior.

On the other hand, participants' affective attitude towards nature was significantly predicted by answers to questions that measured their cognitive skills and required them to understand the situation and apply knowledge to specific, real-life situations. We assume that the relationship could be bidirectional, with affect influencing skill-building, having in mind that affect contributes to an individual's motivation for contemplating and dealing with environmental issues. Likewise, students' affective attitude was a strong predictor of behavior. More responsible behavior was observed in students who enjoyed nature more and showed a higher degree of readiness to engage in behavior that helps preserve natural resources.

It is important to note that pro-environmental behavior could not be predicted by ecological knowledge. The absence of a link between knowledge and behavior could simply be explained by the fact that direct experience with ecological issues has far more significant effects on human behavior than indirect experience gained through textbooks and lectures.

Still, general ecological knowledge can help establish consistency between cognitive skills and attitudes and behaviors. Hence, the reasoning, contemplation, decisions, and choices of children who are more familiar with scientific content tend to be more meaningfully linked, consistent, and coherent. In our study, the existing nature-related attitudes of children who possessed lower levels of knowledge could not be linked to the ability to recognize, analyze, and solve ecological issues. This leads us to question whether their attitudes were well-founded and assume that they were formed in a different manner.

Conclusion and Implications

The theoretical model upon which our study was based was not completely confirmed. Namely, affect emerged as the sole predictor of behavior, while cognitive skills were actually linked to affect. We could conclude that ecological knowledge and the ability to analyze and recognize issues cannot influence behavior in children who have not developed an affinity for spending time in nature and fail to show a love of nature and readiness to engage in environmental protection.

Educational institutions focus on knowledge. Knowledge is measured and graded, it determines students' academic success, and it is valued above all else. On the other hand, responsible environmental behavior also constitutes an educational goal, and it can be observed in children who have a positive affective attitude towards nature. While attitudes, habits, affinities, and values are no less important than knowledge itself, the system does not foresee their evaluation and rewarding. All human activity has an impact on the environment and every person has the possibility to make decisions, choose how to behave, and assess the risks associated with the chosen behavior. Therefore, it is necessary to reward children who show initiative and engage in activities such as paper waste collection, recycling, planting, and taking care of plants, making birdhouses, and lobbying for environmental activities. The sole focus on academic achievement is not conducive to the development of future activists willing to do everything in their power to protect the environment. Having in mind that this was a pilot study, future research should validate the findings on a larger sample.

Keywords: environmental literacy, ecological knowledge, affect, cognitive skills, pro-environmental behavior.

References

Fietkau, H. J. & Kessel, H. (1981) *Environmental education. Umweltlernen. Veraenderungsmoeglichkeiten des Umweltbewusstseins*. Germany.

Hollweg, K. S., Taylor, J. R., Bybee, R. W., Marcinkowski, T. J., McBeth, W. C. & Zoido, P. (2011). *Developing a framework for assessing environmental literacy*. Washington, DC: North American Association for Environmental Education, Available at http://www.naaee.net

Kollmuss, A. & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, *8*(3), 239–260.

Marcinkowski, T. (1991). The relationship between environmental literacy and responsible environmental behavior in environmental education. *Methods and Techniques for Evaluating Environmental Education*. Paris: UNESCO.

McBeth, B., Hungerford, H., Marcinkowski, T., Volk, T. & Meyers, R. (2008). *National environmental literacy assessment project: Year 1, National baseline study of middle grades students final research report* (p. 192) [Final]. National Oceanic and Atmospheric Administration. https://www.noaa.gov/sites/default/files/legacy/document/2019/Jun/Final_NELA_minus_MSELS_8-12-08.pdf

Zakon o osnovnom obrazovanju i vaspitanju (2021) *Sl. glasnik RS*, br. 55/2013, 101/2017, 10/2019, 27/2018 - dr. zakon i 129/2021)

REVIEWERS

- **Milica Marušić Jablanović**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- **Emilija Lazarević**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- **Dušica Malinić**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- **Jelena Stanišić**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- **Ivana Đerić**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- Prof. **Emina Kopas-Vukašinović**, Faculty of Education, University of Kragujevac (Jagodina, Serbia)
- **Milja Vujačić**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- **Rajka Đević**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- **Slavica Ševkušić**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- Prof. **Blanka Bogunović**, Faculty of Music, University of Arts in Belgrade (Belgrade, Serbia)
- **Smiljana Jošić,** PhD, The Institute for Educational Research (Belgrade, Serbia)
- **Snežana Mirkov**, PhD, The Institute for Educational Research (Belgrade, Serbia)

- **Nada Ševa**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- **Dragana Gundogan**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- **Mladen Radulović**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- **Vladimir Džinović**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- **Marina Kovačević Lepojević**, PhD, The Institute for Educational Research (Belgrade, Serbia)
- Prof. **Milan Stančić**, Faculty of Philosophy, University of Belgrade, Department of Pedagogy and Andragogy (Belgrade, Serbia)
- Prof. **Mile Srbinovski**, Mother Teresa University, Faculty of Technical Sciences (Skopje, North Macedonia)
- Prof. **Andreas Oikonomou**, School of Pedagogical and Technological Education (Thessaloniki, Greece)
- Prof. **Milan Pol**, aculty of Arts, Masaryk University (Brno, Czech Republic)
- Prof. **Tina Štemberger**, Faculty of Education, University of Primorska (Koper, Slovenia)
- Prof. **Luka Mijatović**, Faculty of Special Education and Rehabilitation, University of Belgrade (Belgrade, Serbia)

BOOK OF PROCEEDINGS

28th International Scientific Conference
"Educational Research and School Practice"

THE STATE, PROBLEMS, AND NEEDS OF THE MODERN EDUCATION COMMUNITY

Publisher
Institute for Educational Research

For the publisher
Nikoleta Gutvajn

Editors
Jelena Stevanović
Dragana Gundogan
Branislav Ranđelović

Proofreader
Aleksandra Ilić

Copy Editor
Ivana Đerić

Print run
50

Cover design
Branko Cvetić

Graphic processing
Branko Cvetić

Printed by
Kuća štampe plus

https://www.ipisr.org.rs/images/naucni-skupovi/book-of-proceedings.pdf

ISBN 978-86-7447-161-6

ISBN 978-86-7447-161-6