

## FUTURE TEACHERS' KNOWLEDGE, ATTITUDES AND PRACTICE REGARDING SUSTAINABLE DEVELOPMENT GOALS

Alena Letina<sup>1</sup>, & Marina Diković<sup>2</sup>

<sup>1</sup>Faculty of Teacher Education, University of Zagreb/PhD, Associate Professor (Croatia)

<sup>2</sup>Faculty of Educational Sciences, Juraj Dobrila University of Pula/PhD, Associate Professor (Croatia)

### Abstract

Through their activities, future teachers demonstrate the values that children and young people should adopt to become active citizens who influence the ecological, economic, and social dimensions of sustainable development. Therefore, future teachers should exhibit pro-environmental behaviors and attitudes to effectively integrate education for sustainable development into their teaching. They should also have a high level of knowledge about the sustainable development goals to ensure the effective realization of learning outcomes in this field. Sustainable development was defined by the World Commission on Environment and Development in 1987 as development that "enables us to meet the needs of the present without compromising the ability of future generations to meet their needs as well". This idea is directly related to the *Sustainable Development Goals* (2016–2030). In accordance with these principles sustainable development competencies are based on knowledge, positive attitudes, and practical action toward sustainable development goals. The aim of this study is to investigate prospective teachers' knowledge, attitudes, and practices related to the sustainable development goals. The research was conducted on a sample of 275 students, future preschool and primary school teachers, from teacher education programs at universities in Rijeka, Pula and Zagreb. Data processing employed descriptive and inferential statistics (t-test and correlation analysis). A knowledge, attitudes, and practice questionnaire using a 5-point Likert scale was adapted from Afroz and Ilham (2020). The main research variables included future teachers' knowledge, attitudes, and practices related to the sustainable development goals. The results were compared in the context of study location, year of study, and study program (early and preschool education and teacher study). The results indicate that the respondents have a moderate level of knowledge and positive attitudes towards the sustainable development goals, but they showed a slightly lower performance in the practical application of these goals. Spearman's rho coefficient correlation revealed a positive correlation between students' knowledge and practices, and between their attitudes and practices related to the sustainable development goals. In terms of study location, study years, and study program, there were no statistically significant differences in the students' knowledge, attitudes and practices. Based on the obtained results, recommendations were provided for enhancing the initial education of future teachers in the field of sustainable development, as well as suggestions for improving professional training in this area.

**Keywords:** *Environmental sustainability, future teachers' knowledge, attitudes and practices, initial teacher education, sustainable behavior, sustainable development goals.*

---

### 1. Introduction

In 1987 the *World Commission on Environment and Development* defined sustainable development as something that "enables us to meet the needs of the present without compromising the ability of future generations to meet their needs as well" (WCED, 1987). The definition presented several years later described sustainable development as progress which includes forms of economic and social development which protect and enhance the natural environment and social equity (Jeronen, 2020). Principles of inclusiveness in sustainable development are based on an "inherent ambiguity that seeks to finesse the real conflicts between economy and environment and between the present and the future" (Parris & Kates, 2003, 560) and there is a growing acknowledgement that there is a variety of purposes in characterizing and measuring sustainable development: from decision making and management to participation and research (Sachs, 2012; Afroz & Ilham, 2020; Funa, Gabay, Ibardaloza, & Limjap, 2022). The *Sustainable Development Goals* (2016–2030) include 17 goals, 169 marks and 303 indicators (UN, 2014). Parris and Kates (2003, 582) emphasized that each individual, as well as children and young

people “must both improve the integration of sustainable development theory with the practice of characterization and measurement and recognize that the process is as important as product”. We are invited to act simultaneously on the international, national and local levels (Carley & Christie, 2017). Though sustainability is the core value of university strategies in Zagreb<sup>1</sup>, Pula<sup>2</sup> and Rijeka<sup>3</sup>, the purpose of this research is connected to the *Sustainable Development Goals* (2016–2030), like numerous authors in their recent research investigated pro-environmental behaviors and attitudes to effectively integrate education for sustainable development into their university education (Al-Naqbi & Alshannag, 2018; Afroz & Ilham, 2020; Braßler & Sprenger, 2021). It is very important to conduct research in this field on students – prospective preschool and primary school teachers (for example Borges, 2019; Nousheen, Zai, Waseem, & Khan, 2020; Sakin, 2020; Miralles-Cardona, Chiner, & Cardona-Moltó, 2022). They are role models for children and could help them to develop a high level of attitudes and practices about sustainable development goals to ensure the effective realization of learning outcomes in this field.

## 2. Method

### 2.1. Research aim and research questions

The aim of this study is to investigate prospective preschool and primary school teachers' knowledge, attitudes, and practices related to the sustainable development goals. The research questions were formulated based on the research aim as follows: (RQ1) What is the extent of students' knowledge regarding sustainable development? (RQ2) How do students articulate their attitudes towards sustainable development? (RQ3) To what degree do students' practical engagements align with the objectives of sustainable development? (RQ4) Is there a correlation between the knowledge, attitudes, and practical involvements of students within the realm of sustainable development? (RQ5) Is there a statistically significant difference in the knowledge, attitudes, and practical actions of students related to sustainable development regarding: a) study location; b) year of study; c) study program.

### 2.2. Research sample

The study involved a sample of 275 students enrolled in teacher education programs at universities in Zagreb, Pula and Rijeka in the Republic of Croatia. In the participant sample, female respondents were predominantly represented (98.5 %). The sample distribution included 52.7 % of participants from the Faculty of Teacher Education of the University of Zagreb, 35.6 % from the Faculty of Educational Sciences of the Juraj Dobrila University of Pula, and 11.6 % from the Faculty of Teacher Education of the University of Rijeka. Among the participants, 52.4 % were students of the teacher study, and 47.6 % were students of the early and preschool education, with 43.3% of first-year, 16% of second-year, 15.3% of third-year, 17.5% of fourth-year, and 8% of fifth-year students.

### 2.3. Research procedure and instruments

The survey was conducted electronically using the Google Forms platform. Participation in the research was approved by the Research Ethics Committee of the Juraj Dobrila University of Pula, it was voluntary and anonymous. A knowledge, attitudes and practice questionnaire, adapted from Afroz and Ilham (2020), comprised four sections. The first section collected demographic data about the participants (gender, study location, study program, and academic year). The second section of the questionnaire consisted of a list of 10 concepts related to goals of sustainable development, and students assessed their familiarity with these concepts. The third section of the questionnaire included 14 statements examining students' opinions on sustainable development. Students expressed their agreement with the statements on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). In the fourth section of the questionnaire, students evaluated the alignment of their practical actions with the goals of sustainable development across 14 statements using a 5-point scale from 1 (never) to 5 (always).

### 2.4. Research methods

Statistical analysis of the data was conducted using the SPSS software. Descriptive parameters, such as M and SD, were employed to establish descriptive indicators for individual items and scales. Spearman's correlation coefficient was calculated to determine the intercorrelation of different variables, while one-way analysis of variance (ANOVA) was applied to ascertain the statistical significance of differences in knowledge, opinions, and practical actions of students in alignment with sustainable

---

<sup>1</sup>[https://www.unizg.hr/fileadmin/rektorat/O\\_Sveucilistu/Dokumenti\\_javnost/Dokumenti/Strateski\\_dokumenti/Izvjesca/Istrazivacka\\_strategija\\_verzija.pdf](https://www.unizg.hr/fileadmin/rektorat/O_Sveucilistu/Dokumenti_javnost/Dokumenti/Strateski_dokumenti/Izvjesca/Istrazivacka_strategija_verzija.pdf) (23.12.2023)

<sup>2</sup>[https://www.unipu.hr/download/repository/Ad\\_4\\_Strategija\\_razvoja\\_Sveucilista\\_2021-2026.pdf](https://www.unipu.hr/download/repository/Ad_4_Strategija_razvoja_Sveucilista_2021-2026.pdf) (23.12.2023)

<sup>3</sup>[https://uniri.hr/wp-content/uploads/2022/10/2020\\_Strategija\\_Sveucilista\\_u\\_Rijeci\\_2021.-2025.pdf](https://uniri.hr/wp-content/uploads/2022/10/2020_Strategija_Sveucilista_u_Rijeci_2021.-2025.pdf) (23.12.2023)

development goals, considering the year of study and study location. The statistical significance of differences in respondents' answers, based on the study program in which they were enrolled, was evaluated using the t-test. The reliability of the utilized scales of internal consistency type reached satisfactory or high levels for all scales (Cronbach's  $\alpha = 0.71 - 0.86$ ).

## 2.5. Results

One of the research questions (RQ1) was to assess students' knowledge of sustainable development. Thus, the study analyzed students' self-assessment of their familiarity with specific concepts related to the goals of sustainable development, presented through 10 statements. The results indicate a moderate level of knowledge among students regarding sustainable development. While students positively assessed their familiarity with most of the statements related to sustainable development, the determined percentages are not satisfactory. A significant portion of students acknowledged to have heard about the *goals of sustainable development* (83.6 %), but only a smaller number (18.5 %) were aware that these goals are to be achieved by 2030. Only 50.9 % of students believed that the *excessive use of natural resources affects the well-being of future generations*, which is a fundamental aspect of sustainable development goals. Students also demonstrated a moderate level of knowledge about the concept of sustainability, with only 41.1 % recognizing its definition. The majority of students (73.5 %) agreed with the statements that *maintaining good relations with different countries is crucial for world peace*, that *healthy oceans and seas are crucial for our existence* (72.4 %), and that *environmental protection, economic growth, and social justice are fundamental elements of a nation* (66.2 %). Although most students affirmatively assessed the statement that *achieving sustainable development requires all people worldwide to have access to quality education* (56.4 %), it is concerning that as many as 43.6 % of students in teacher study negatively evaluated their familiarity with this statement, considering that respondents in this study are future contributors to education for sustainable development. Additionally, 45.1 % of students negatively assessed the statement that *income inequality is a global problem requiring global solutions*, and only 53.8 % of students positively evaluated the idea that *increased use of renewable resources can reduce greenhouse gas emissions*. The second part of the questionnaire explored students' attitudes towards sustainable development (RQ2). The values of the overall M and SD of respondents' answers on the provided scale indicate a positive perception of sustainable development among students ( $M_{\text{total}} = 4.20$ ;  $SD_{\text{total}} = 0.50$ ). The mean values of respondents' answers fall within a high range (from  $M = 3.76$  to  $M = 4.79$ ). Participants fully agreed with statements expressing the *need to provide society with the best and free basic health services* ( $M = 4.79$ ;  $SD = 0.51$ ) and that *individuals from different cultures must be treated with equal respect* ( $M = 4.79$ ;  $SD = 0.52$ ). They generally agreed with all other statements (from  $M = 4.39$  to  $M = 3.76$ ). The least agreement is observed for statements expressing that *courses on the environment and sustainable development should be part of our university curriculum* ( $M = 3.76$ ;  $SD = 0.96$ ) and the statement aimed at determining their *interest in issues related to environmental protection and conservation* ( $M = 3.83$ ;  $SD = 0.96$ ). Although these statements fall within the range of positive attitudes, it is concerning that respondents, who will be educating future generations about sustainable development within the education system, have shown less interest in topics related to environmental conservation and the implementation of courses addressing these issues in university curricula. Descriptive indicators of respondents' self-assessment regarding the frequency of practical actions in line with sustainable development goals show that students only occasionally engage in activities aligned with these goals ( $M_{\text{total}} = 3.41$ ;  $SD_{\text{total}} = 0.55$ ). The mean values of respondents' answers span a wide range (from  $M = 1.46$  to  $4.81$ ), and a noticeable range of standard deviation in respondents' answers is also observed. Participants assessed that they always *treat people of all different religions equally* ( $M = 4.81$ ;  $SD = 0.51$ ), and this is the only statement evaluated by respondents with such a high value. Furthermore, respondents assessed that they *often separate recyclable waste in their homes* ( $M = 4.24$ ;  $SD = 0.99$ ) and are *willing to use renewable energy* ( $M = 4.24$ ;  $SD = 0.86$ ). They also frequently *turn off unused electrical appliances in their homes* ( $M = 3.97$ ;  $SD = 1.19$ ), *avoid using products made of animal leather* ( $M = 3.92$ ;  $SD = 1.25$ ), *conserve water usage in their homes* ( $M = 3.88$ ;  $SD = 0.98$ ), and *use reusable shopping bags for groceries* ( $M = 3.82$ ;  $SD = 1.12$ ). However, respondents assessed that they rarely *attend courses related to sustainable development* ( $M = 1.46$ ;  $SD = 0.94$ ) or *participate in events related to sustainable development* ( $M = 1.85$ ;  $SD = 1.14$ ), and infrequently *discuss sustainable development with their friends and family* ( $M = 2.45$ ;  $SD = 1.19$ ). This indicates an insufficient development of the proactive role of future preschool and primary school teachers in this field. Furthermore, it was found that respondents assessed that they only occasionally *prioritize public transportation over personal* ( $M = 3.04$ ;  $SD = 1.33$ ), are occasionally *willing to pay more for environmentally friendly products* ( $M = 3.19$ ;  $SD = 1.13$ ), and only occasionally *avoid using plastic straws in restaurants and cafes* ( $M = 3.34$ ;  $SD = 1.29$ ) (RQ3). Furthermore, there is a statistically significant correlation between knowledge and attitudes ( $r = .332$ ) and practice ( $r = .217$ ) as well as

between attitudes and practice ( $r = .479$ ). Correlations among the specified variables are statistically significant at the level of  $p < 0.01$ . The highest correlation is between attitudes and practical actions, but correlations have been identified among other variables as well. So, students with a higher level of knowledge simultaneously hold more positive attitudes towards sustainable development and engage more frequently in practical actions aligned with sustainable development goals. Additionally, students who exhibited more positive attitudes in the context of sustainable development estimated that they also behave more frequently in line with sustainable development goals (RQ4). Concerning the academic institution or study location, a univariate analysis of variance (ANOVA) disclosed a statistically significant distinction in students' knowledge of sustainable development ( $F=4.07$ ,  $df=274$ ,  $p=0.02$ ). Subsequent Tukey post hoc examinations revealed that students from Rijeka exhibited a significantly higher average knowledge of the specified objectives compared to students of the other two universities. It is presumed that the increased prevalence is attributed to a higher abundance of courses within the domain of sustainable development available at that academic institution. However, there were no notable differences in other variables among students from diverse universities (attitudes  $F=0.06$ ,  $df=274$ ,  $p=0.95$ ; practice  $F=2.35$ ,  $df=274$ ,  $p=0.09$ ). Moreover, a univariate analysis of variance (ANOVA) elucidated a statistically significant difference in both knowledge and practical actions across distinct years of study among the student sample. Specifically, marked divergences in sustainable development knowledge materialized exclusively between fourth and fifth-year students ( $F=2.71$ ,  $df=274$ ,  $p=0.03$ ), with those entrenched in more advanced academic years exhibiting a superior grasp of the subject matter. Regarding practical actions in the context of sustainable development, second-year students evaluated their practical actions with the lowest values ( $M = 3.13$ ;  $SD = 0.46$ ), followed by fourth-year students ( $M = 3.35$ ;  $SD = 0.48$ ) and first-year students ( $M = 3.44$ ;  $SD = 0.55$ ). Third-year students ( $M = 3.50$ ;  $SD = 0.59$ ) and fifth-year students ( $M = 3.70$ ;  $SD = 0.56$ ) assessed their engagement with the highest values. One-way ANOVA detected significant difference in evaluating the frequency of practical actions among first and second-year, second and third-year, and second and fifth-year students ( $F=5.35$ ,  $df=274$ ,  $p=0.00$ ). First-, third- and fifth-year students expressed a higher level of assessment in engagement compared to second-year students. No differences were discerned in attitudes across different study years ( $F=1.69$ ,  $df=274$ ,  $p=0.15$ ). Further analysis using the t-test revealed no statistically significant differences in knowledge ( $t = -0.70$ ;  $df=273$ ;  $p=0.27$ ), attitudes ( $t = -0.36$ ;  $df=273$ ;  $p=0.52$ ), and practical actions ( $t = -0.33$ ;  $df=273$ ;  $p=0.82$ ) among students based on their study program given that students from both study programs need to be equally equipped for the implementation of education for sustainable development (RQ5).

## 2.6. Discussion

Proficiency in knowledge, attitudes, and practical involvement within the realm of sustainable development is imperative for the maturation of prospective teachers in their capacity within the framework of education for sustainable development (similar to Borges, 2019; Nousheen et al., 2020; Sakin, 2020; Miralles-Cardona et al., 2022). The outcomes derived from this study underscore a deficiency in the development of sustainable development knowledge among students enrolled in teacher education programs, accentuating the exigency for concerted efforts to fortify this facet of their competencies. Specifically, as concluded by Nousheen et al. (2020), the confluence of elevated knowledge levels concerning sustainable development, conjoined with adept generic and specific pedagogical and methodical competencies facilitating the transmutation of knowledge into efficacious learning experiences for students, is deemed indispensable for the efficacious orchestration of pedagogical endeavours oriented toward sustainable development. As such, a recommendation is proffered advocating for the incorporation of courses addressing sustainable development, emphasizing the attainment of an advanced level of student knowledge in this domain within the formal education curricula for future teachers (Barth, Godemann, Rieckmann, & Stoltenberg, 2007). Despite students' positive expressions of attitudes toward sustainable development, the ascertained level of practical engagement within the ambit of sustainable goals is deemed suboptimal, similar to results of Borges (2019), Nousheen et al. (2020), and Sakin (2020). Of particular concern is the observation that students exhibit passivity in their involvement in workshops and events germane to sustainable development, signifying a lack of active advocacy for this field. Instead, their participatory actions predominantly encompass sporadic adherence to sustainable development goals within their domestic spheres (Borg, Winberg, & Vinterek, 2017; Bautista, Moreno-Núñez, Ng, & Bull, 2018). Hence, it is suggested that courses focusing on sustainable development, embedded in the curricula for future teachers, not only disseminate theoretical knowledge, but also integrate learning outcomes necessitating active involvement in contemporaneous events and the promotion of sustainable development. This pedagogical approach aspires to nurture proactive agents and proponents of the inherent values of sustainable development. In contrast to the findings of Afroz and Ilham (2020), whose research indicated a negative correlation

between students' knowledge levels and their practical engagements, the present study identifies a positive correlation between these variables. This observation supports the proposition that education and knowledge levels may exhibit a substantive nexus with individual practical endeavours. Consistent with Afroz and Ilham (2020), a discernible disjunction between students' professed attitudes towards sustainable development and their enacted practices within that milieu is apparent in this investigation.

### 3. Conclusions

Based on this research we can conclude that the study programs conducted at all three universities could be compared and the extent to which they contain learning outcomes in the context of achieving practical skills in the field of sustainable development could be checked. The results obtained in this research promote the necessity of education, especially practice and behaviour, for sustainable development in academic programs of the prospective preschool and primary school teachers to enhance students' proactive approach towards sustainable development. Thus, knowledge would be raised and practice developed to act in this field.

### References

- Afroz, N., & Ilham, Z. (2020). Assessment of knowledge, attitude and practice of University Students towards Sustainable Development Goals (SDGs). *The Journal of Indonesia Sustainable Development Planning*, 1(1), 31-44.
- Al-Naqbi, A. K., & Alshannag, Q. (2018). The status of education for sustainable development and sustainability knowledge, attitudes, and behaviors of UAE University students. *International Journal of Sustainability in Higher Education*, 19(3), 566-588.
- Barth, M., Godemann, J., Rieckmann, M., & Stoltenberg, U. (2007). Developing key competencies for sustainable development in higher education. *International Journal of sustainability in higher education*, 8(4), 416-430.
- Bautista, A., Moreno-Núñez, A., Ng, S. C., & Bull, R. (2018). Preschool educators' interactions with children about sustainable development: Planned and incidental conversations. *International Journal of Early Childhood*, 50(1), 15-32.
- Borg, F., Winberg, M., & Vinterek, M. (2017). Children's learning for a sustainable society: Influences from home and preschool. *Education Inquiry*, 8(2), 151-172.
- Borges, F. (2019). Knowledge, Attitudes and Behaviours Concerning Sustainable Development: A Study among Prospective Elementary Teachers. *Higher Education Studies*, 9(2), 22-32.
- Braßler, M., & Sprenger, S. (2021). Fostering sustainability knowledge, attitudes, and behaviours through a tutor-supported interdisciplinary course in education for sustainable development. *Sustainability*, 13(6), 3494.
- Carley, M., & Christie, I. (2017). *Managing sustainable development*. London: Routledge.
- Funa, A. A., Gabay, R. A. E., Ibardaloza, R. T., & Limjap, A. A. (2022). Knowledge, attitudes, and behaviors of students and teachers towards education for sustainable development. *Cakrawala Pendidikan: Jurnal Ilmiah Pendidikan*, 41(3), 567-580.
- Jeronen, E. (2020). Sustainable development. In *Encyclopedia of Sustainable Management* (pp. 1-7). Cham: Springer International Publishing.
- Miralles-Cardona, C., Chiner, E., & Cardona-Moltó, M. C. (2022). Educating prospective teachers for a sustainable gender equality practice: survey design and validation of a self-efficacy scale. *International Journal of Sustainability in Higher Education*, 23(2), 379-403.
- Nousheen, A., Zai, S. A. Y., Waseem, M., & Khan, S. A. (2020). Education for sustainable development (ESD): Effects of sustainability education on pre-service teachers' attitude towards sustainable development (SD). *Journal of Cleaner Production*, 250, 119537.
- Parris, T. M., & Kates, R. W. (2003). Characterizing and measuring sustainable development. *Annual Review of environment and resources*, 28(1), 559-586.
- Sachs, J. D. (2012). From millennium development goals to sustainable development goals. *The lancet*, 379(9832), 2206-2211.
- Sakin, A. (2020). Preschool Pre-Service Teachers' Scientific Attitudes for Sustainable Professional Development. *International Journal of Curriculum and Instruction*, 12, 16-33.
- UN (2014). *Millennium Development Goals Report 2014*. New York: United Nations.
- WCED, S. W. S. (1987). *Our common future* (17 – 149). Berlin: World Commission on Environment and Development.