

Validation of the Slovenian Version of Questionnaire on Sustainable Behaviour for Higher Education Students

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The study aimed to validate the Slovenian version of the Questionnaire on Sustainable Behaviour, which is based on socio-psychological model of sustainable behaviour as proposed by M. Juares Najera and consists of four scales: (i) Universal values, (ii) Awareness of consequences, (iii) Ascription of responsibility and (iv) Intra- and inter-personal intelligences. The questionnaire was validated using item analysis, principal component analysis and Cronbach α was used to test internal consistency. On a sample of student teachers, results indicate the Slovenian version of the Questionnaire on Sustainable Behaviour to be a valid and a reliable instrument for measuring sustainable behaviour among students.

Keywords: questionnaire, sustainable behaviour, validation, principal component analysis, internal consistency

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Introduction

The concept of sustainability is a complex, multidimensional construct that initially focused on ecological sustainability. Over time, it has transcended ecological boundaries, as other dimensions of sustainability have developed alongside the environmental aspect, particularly the social and economic dimensions of sustainable action (sustainability competencies, social values, care for basic human needs, achieving and maintaining justice, respecting social and cultural diversity, and maintaining environmental integrity (UNESCO, 2017). Therefore, researching this field is not only complex but also undefined, as evidenced by the fact that, despite its emphasized importance, this field is still very sparsely researched (Bianchi, 2020)

The sustainability paradigm is a holistically designed worldview on civilization's progress within the framework of sustainably maintaining conditions for the quality of life of the human species and other species. It encourages a new lifestyle in accordance with ecological principles and rejects excessive, one-sided consumerism that leads to excessive material prosperity and spiri-

tual emptiness. The sustainable path offers: moderate material prosperity for all inhabitants of the world (within environmental limits), social and ecological (also regional) balance, a high quality of spiritual life, and care and respect for all species on earth (Plut, 2005, p. 7). For sustainable development, it is crucial that human needs, environmental limitations, economic-social security, and intergenerational justice (responsibility) are balanced and equivalent. According to Plut (2005), to achieve this, we need a new ethical code of humanity and new value standards. Each of us must become aware of our responsibility for today's and tomorrow's world. We will need to live more reasonably and in greater harmony with nature. The transition to a sustainable, nature-harmonious society is not possible without a thorough change in our entire spirituality, ethics, and value system (Plut, 2005), which includes: responsibility to the environment, intergenerational responsibility, responsibility for the preservation of species, balance of progress goals, and social justice.

The 2030 Agenda for Sustainable Development (United Nations, 2015) emphasizes the importance of education for sustainable development (ESD). In addition, Bürgener and Barth (2018) highlight the need to pay special attention to teacher education. The successful implementation of the goals of sustainable education depends on the competence and dedication of teachers who are ready to take on the role of change agents and who will be trained to promote the development of a system of ESD (Vukelić, 2022). Barth and Timm (2011) state that universities and faculties that educate future teachers play an important role in developing teachers' competences for sustainable development, which should contribute to the conceptualization and development of a sustainable society. In this way, teachers actively contribute to the sustainable transition (Calder & Clugston, 2003) and simultaneously engage with the environment, respond to important social issues, and contribute to the establishment of a more sustainable model of societal development overall.

Education for Sustainable Development

The 2030 Agenda for Sustainable Development (United Nations, 2015) reflects the necessity of integrating the principles of ESD at all levels of education. It is universal and binding for all countries in the world, as its goals must be achieved by 2030. Slovenia has committed to all 17 Sustainable Development Goals and has adopted numerous operational documents to achieve these goals, including the implementation of the 2030 Agenda. By concretizing all 17 Sustainable Development Goals, it confirms that education is a key objec-

tive in contributing to more sustainable, socially just, and equitable societies (Cebrián et al., 2020).

ESD can contribute to realizing this vision by developing and strengthening the capacity of individuals, groups, communities, organizations, and countries to make assessments and decisions in favour of sustainable development. It encourages changes in people's thinking, enabling them to contribute to greater security, health, and well-being in our world, thus improving the quality of life. It can give individuals the ability to think critically, greater awareness, and more empowerment, allowing them to explore visions and concepts and develop new methods and tools (UNECE, 2016). The purpose of this strategy is to encourage UNECE member states to develop ESD and integrate it into their formal education systems as well as into non-formal and informal education. This will provide people with the knowledge and skills necessary for sustainable development, strengthen their competence and confidence, and enhance their opportunities to strive for a healthy and productive life that is in harmony with nature and respects social values, gender equality, and cultural diversity.

In Slovenia, the first guidelines for ESD were adopted in 2007. They outlined the strategy for Slovenia's development based on sustainable development, 'to achieve which Slovenia will ensure the physical, mental, social, cultural, and economic well-being of its citizens with responsibility towards future generations and their natural and social environment' (Ministrstvo za šolstvo in šport Republike Slovenije, 2007). The guidelines stated that ESD includes interconnected environmental, economic, and social issues. The key areas of sustainable development listed were citizenship, peace, ethics, responsibility (in local and international contexts), democracy and governance, justice, security, human rights, poverty reduction, health, gender equality, cultural diversity, rural and urban development, economy, production and consumption patterns, shared responsibility, environmental protection, natural resource management, and biodiversity and landscape diversity.

Thus, ESD is a comprehensive, coherent pedagogical process that includes the relationship between humans and nature and relationships among people, leading to an understanding of the multifaceted connection between natural, economic, social, and political systems and the interdependence of people living in different parts of the world. It aims to actively and constructively address current and future environmental and social issues of humanity (Ministrstvo za šolstvo in šport Republike Slovenije, 2007, p. 2). To achieve all this, changes in behaviour, lifestyle, and thinking at the local and global levels, as well as changes at the individual level, are important.

Given the fact that effective sustainable development or education for sustainability requires particular attention to teachers' sustainability competences (Cebrián & Junyent, 2015; Buzov et al., 2020; UNESCO, 2017; Bürgener & Barth, 2018; Barth & Timm, 2011), this area must also be addressed in the initial teacher education system. An analysis of research in the field of sustainability first reveals the undefined concept of what sustainability actually is (Wiek et al., 2011; Brundiers et al., 2021), so it is not surprising that there is no research that actually examines the development of sustainability competences in teachers and/or future teachers. Rauch and Steiner (2013) highlight the limited scientific output on the competences teachers need to address sustainable development, and Vukelić and Rončević (2021) point to the absolute lack of theoretical models of teachers' competences for sustainable development that meaningfully connect the different elements of these competences. Wals (2010) states that teachers should develop sustainability by encouraging creative thinking, problem-solving, action competence, and collaboration, which are approaches aimed at fostering responsible citizens who will take on the role of change agents. Various existing models (e.g., Bertschy et al., 2013; Rauch & Steiner, 2013) describe how teachers should behave and think and what values and attitudes they should have, but do not specify how these components are interconnected. The fact is that knowledge and an appropriate attitude towards sustainable development alone do not automatically lead to sustainable behavior, so it is rightly concluded that if we want to promote teachers' competences for sustainable development, the individual components must be interconnected. Similarly, Vukelić and Rončević (2021) identifies teachers as key figures in ESD, proposing the so-called action competence of teachers, which consists of three interconnected multidimensional aspects that should significantly contribute to teacher training in ESD: (i) knowledge (ESD - ESD and knowledge of pedagogical content), (ii) motivational beliefs (teachers' self-efficacy for ESD, the value assessment of ESD, and the assumption of personal responsibility), and (iii) readiness to act (the intention to implement ESD). The relationships between the components of competence can significantly influence the planning of educational interventions aimed at training teachers for ESD. Based on the review, we can conclude the absence of an appropriate model for researching sustainability, and consequently, the under-researched competences of teachers and future teachers for sustainable development.

Lindberg (2009) points out that ESD should begin as early as pre-school so that children can become people who show responsibility and care about others. In addition to encouraging environmental awareness, kindergartens

and schools should also consider social development, and hence justice between people, equality between women and men. They should also promote the will and ability to work for the development of a sustainable society. It is necessary to encourage students to become active citizens and participate in and work for social and environmental change. This requires all school stakeholders (teachers, students, principals, parents, local and national government) to participate in activities supporting development of sustainable society. However, teachers have a major role here: they are advisors, who create situations, clarify aims, ask questions, which enable students to prosper in learning process.

Similarly, the significance of teacher's role in ESD is highlighted by Chaleta et al. (2021) – teachers educate future leaders and citizens of the world, thus playing a crucial role in ESD. The authors believe that teacher education at the undergraduate level is among the most effective ways to promote sustainable development. If future teachers and educators embrace a holistic paradigm of understanding lifelong learning and implement environmental education in their curricula using pedagogical strategies associated with the quality of ESD, we can expect future generations to be capable of shaping a world oriented towards sustainability (United Nations, 2015). Chaleta et al. (2021) confirm this and add that universities also face various challenges and emphasize that, in addition to contributing to knowledge and innovative solutions, they play an important role in raising awareness among future generations.

Teachers and other educators are powerful change agents who can deliver the educational response needed to achieve the sustainable development goals. Their knowledge and competences are essential for restructuring educational processes and educational institutions towards sustainability (UNESCO, 2014). Therefore, teacher education (at universities or other teacher training institutions) must meet the challenge by reorienting itself towards ESD, as the support of teachers has been a key condition to the successful adoption and implementation of ESD. Pre-service and in-service trainings must empower teachers also with sustainability competences (UNESCO, 2014, 2017). According to Watkins (2012) and Baráth (2013) the concept of competences encompasses three important areas of capabilities (attitudes, knowledge and skills) and it gives a comprehensive framework to the competence-based approach teacher education. Within such understanding 'certain attitudes and beliefs demands knowledge or level of understanding and then skills in order to implement this knowledge in a practical situation' (Watkins, 2012, p. 11). In addition, it has been determined (Rose & Meyer,

2002) that successful implementation any concept mainly depends on teachers' positive attitudes towards it, and this is why it is important to know what the teachers' attitudes towards ESD are.

At the same time, the problem of measuring attitude towards ESD arises. Some researchers in universities, environmental organizations and other have offered proposals for measuring sustainable development (Waltner et al., 2019), however, we decided to first use The Questionnaire on Sustainable Behaviour (Juárez Nájera, 2010) in our study. Considering the fact that any research requires psychometrically sound instrument, we decided to first validate the existing questionnaire for the Slovenian population.

The Purpose of the Study

The purpose of the study was to validate the Slovenian version of the Questionnaire on the Sustainable Behaviour.

Methodology of Research

Sample

The research *sample* consisted of 235 students from two Slovenian faculties of education. The majority (42.6%) of the participants were students of preschool education, 37.4% were students of primary school teaching and 20% were students of educational studies. They were all the first cycle students. The majority (35.7%) were second year students, followed by first year students (26.4%). Third- and fourth-year students were represented to a smaller extent.

Questionnaire on Sustainable Behaviour

The *Questionnaire on Sustainable Behaviour* (Juárez Nájera, 2010) consists of 58 items which are divided in four scales. The first scale *Universal values* encompass 21 items which are derived from Schwartz's (1994 as cited in Juárez Nájera, 2010) 10 value categories. Respondents rate items on a 5-point Likert scale, with answers ranging from *I strongly agree* (5) to *I strongly disagree* (1). The second scale named *Awareness of consequences* consists of 8 questions and the participants are asked to assess the degree of the proposed problem (1 – a very serious problem, 2 – somewhat serious problem, 3 – no serious problem at all). The third scale *Ascription of responsibility* is comprised of 9 items for which participants are asked to react on a 5-point Likert scale (*I strongly agree* – 5 to *I strongly disagree* – 1). The last scale *Intra- personal and inter-personal intelligences for sustainability* includes 20 items for which

respondents are asked to assess the frequency on a 5-point scale (1 – never, 2 – rarely, 3 – sometimes, 4 – often, 5 – always).

Data analysis

For the initial 58 items, we first checked descriptive statistics and correlation of each item with the total sum and the inter-correlation between items. The analysis showed that 3 items were poorly linked with the total sum and were thus excluded from the further analysis. As a result, the final version of Slovenian version of the Questionnaire on Sustainable Behaviour consists of 55 items. In order to check validity of the questionnaire principal component analysis (by prior check of KMO and Bartlett's Test of Sphericity) was performed and Cronbach's alfa was employed to check the internal consistency.

Results

Validity

The construct validity (Creswell, 2014, p. 160) of the Slovenian version of Questionnaire on Sustainable Behaviour was examined thorough factor analysis. Prior to factor analysis the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was checked, and the Bartlett's Test of Sphericity were analysed (Table 1). The calculated KMOs were all above the recommended value of 0.6 (Field, 2005), which indicates that factor analysis is appropriate for data set. The results of Bartlett's Test of Sphericity suggest the factor ability of the correlation matrix (Field, 2005). To determine the number of factors for each of the scales, Principal Component with Promax rotation was performed. Items were retained when they exceeded 0.40.

For the *Universal values scale* 5 factors were extracted (Table 2), which together explain 54,53% of variance. The first factor accounted for 24,705% of variance, which is above the 20,0% and it indicates the appropriate construct validity of the scale (Field, 2005).

- *Factor 1* consisted of 4 items with factor loadings from 0.783 to 0.419

Table 1 Results of Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's Test of Sphericity

Item	KMO	χ^2	df	P
Universal values	0.791	849.181	153	0.000
Awareness of consequences	0.806	707.806	28	0.000
Ascription of responsibility	0.876	874.938	36	0.000
Intra- and inter-personal intelligences	0.751	905.066	190	0.000

Table 2 Factor Loading

Item	1	2	3	4	5
I am responsible	0.783				
I am self-discip., self-restrained and resistant to temptation	0.754				
I respect myself, others and nature	0.557				
I am broadminded	0.419				
I am ambitious, wealthy, have material possessions and money		0.687			
I am influential and I have impact on people and events		0.595			
I enjoy my life		0.553			
I lead varied life, filled with challenge, novelty and change		0.553			
I except my portion of life			0.730		
I am moderate			0.610		
I believe in equality, in equal opportunities for all			0.591		
I choose my own goals			0.533		
I follow the activities for prevent. and protect. the environ. and conserving nature				0.740	
I have the feeling for social justice, correcting injustice and care for the weak				0.647	
I advocate for the social order				0.585	
I am creative				0.451	
I believe in prosperity of all beings					0.795
I believe in unity with nature					0.686

and accounted for most of the total variance of 24,705%. The item analysis suggested that the factor measures the level of one's responsibility, self-discipline, respect and broadmindedness, so we named it *Personal characteristics*.

- *Factor 2* also consisted of 4 items, and it accounted for the 8,470% of variance. The factor loadings varied from 0.687 to 0.553. The factor included items were mostly connected to ambition, influence, challenge, change, so by items which are related to high the possibility of having an impact on others and we decided to call this factor *Influence*.
- *Factor 3* also consisted of 4 items and it accounted for the 7,816% of variance. The range of factor loadings was from 0.730 to 0.533. The items refer to excepting life as it is, and at the same time believing in equal opportunities and choosing one's own goals and we named factor *Personal values*.
- *Factor 4* also encompassed 4 items with loadings from 0.740 to 0.451 and it accounted for the 7,141% variance. Factor 4 is loaded with items which assume activities for preventing nature, having the feeling for social justice and social order and creativity, we named it *Social values*.

Table 3 Factor Loading *Awareness of Consequences Scale*

Item	1	2	3
The loss of tropical forests will be a problem for plants and animals	0.793		
The loss of tropical forests will be a world problem	0.792		
Climate change will be a problem for plants and animals	0.568		
Climate changes will affect me and my family		0.858	
Climate change will be a problem for the whole country		0.795	
The pollution of air, water and soil will be a world problem			0.790
The pollution of air, water and soil will be a problem for me and my family			0.753
The pollution of air, water and soil will be a problem for plants and animals			0.701

- Finally, *factor 5* is composed of 2 items with loadings of 0.795 and 0.686, indicating someone personal beliefs in human and in nature and thus we called it *Personal attitude*.

In the case of *Awareness of Consequences Scale*, 3 factors were extracted (Table 3) and they explained which together explain 74,238% of variance. The result of first factor accounting for 48,698% of variance indicates the appropriate construct validity of the scale.

- *Factor 1* consisted of 3 items which explained 48,698% of variance. The range of factor loadings was from 0.793 to 0.568. Since two out of three items refer to problems caused by the loss of tropical forests, we named the factor *Attitude towards tropical forests*.
- *Factor 2* included two items with loadings of 0.858 and 0.795 which together explain 13,033% of variance. Both items refer to the problems caused by climate change, so we named the factor *Attitude towards climate change*.
- *Factor 3* accounted for 12,506% of variance with its item's loadings ranging from 0.790 to 0.701. All three items bring us the problem of air, water and soil pollution and the factor was named *Attitude towards air, water and soil pollution*.

The *Ascription of Responsibility* scale consists of two factors (Table 4) which explain 63,804% of variance. Since the first factor accounted for 51,564% of variance, we can conclude this scale to have high construct validity.

- *Factor 1* is comprised of 6 items with the load range from 0.856 to 0.610 and explaining 51,564% of total variance. Items suggest government,

Table 4 Factor Loading *Ascription of Responsibility Scale*

Item	1	2
The Government should take strong action to reduce emissions and prevent global climate change	0.856	
The Government should exert pressure internationally to preserve the tropical forests	0.824	
Business and industry should reduce their emissions to prevent climate change	0.780	
The government should take stronger action to clean up toxic substances in the environment	0.725	
The chemical industry should clean up the toxic waste products it has emitted into the environment	0.685	
Companies that import products from the tropics have a responsibility to prevent destruction of the forests in those countries	0.610	
I feel a personal obligation to do whatever I can to prevent climate change		0.862
I feel a sense of personal obligation to take action to stop the disposal of toxic substances in the air, water, and soil		0.814
People like me should do whatever we can to prevent the loss of tropical forests		0.652

various industries and companies are responsible for taking action for preventing destruction of environment and so the factor was named *External responsibility*.

- *Factor 2* encompassed 3 items with loadings varying from 0.862 to 0.652 and explaining 12,240% of variance. Items indicate personal responsibility for action in preventing climate change, stopping disposal of toxic substances and preventing loss of tropical forest. The factor was named *Personal responsibility*.

For the last scale, the *Inter- and Intra-Personal Intelligences* scale, 6 factors (Table 5) were extracted. They together explain 57,663% of variance. The first factor accounted for 22,378% of variance, which is also above the 20, 0% and it indicates the appropriate construct validity of the scale.

- *Factor 1* consisted of 4 items with factor loadings ranging from 0.766 to 0.669 and accounted for most of the total variance of (22,378). The item analysis suggested that the factor *Optimism*.
- *Factor 2* also consisted of 5 items and it accounted for the 11,740% of variance. The factor loadings varied from 0.766 to –0.575. The factor included items connected negative expectations regarding abilities and opportunities, so we named it *Pessimism*.
- *Factor 3* also included 4 items and it accounted for the 7.501% of vari-

Table 5 Factor Loading *Inter- and Intra-Personal Intelligences Scale*

Item	1	2	3	4	5	6
I adapt ideas based on new information	0.766					
I anticipate obstacles to a goal	0.710					
I solicit others' input	0.691					
I take calculated risks to reach a goal	0.669					
I get impatient or shows frustration		0.766				
I doubt own ability		0.730				
I hesitate to act on opportunities		0.619				
I stay composed and positive, even in stressful situations		-0.575				
I establish and maintain close relationships at work			0.769			
I can see things from someone else's perspective			0.674			
I change overall strategy, goals, or projects to fit the situation			0.613			
I believe myself to be capable for the job			0.560			
I acknowledge mistakes				0.833		
I keep my promises				0.813		
I personally initiate change initiatives					0.796	
I can be considered as model in leading others					0.671	
I advocate change despite opposition					0.533	
I cross the line or break the rules when necessary						0.661
I articulate a compelling vision						0.541
I relate well to people of diverse backgrounds						0.530

ance. The range of factor loadings was from 0.769 to 0.560. The items of the factor refer to *Emotional stability*.

- *Factor 4* encompassed 2 items with loadings of 0.833 and 0.816 which accounted for the 5,685% variance. The two items indicate *Self-criticism*.
- *Factor 5* consisted of 3 items explaining 5,233% of variance and with loadings from 0.796 to 0.533. Since items refer to one's beliefs about his/her possible role of a model and courage to initiate changes, even when they are not well accepted, we named this factor *Ambition*.
- *Factor 6* brings together 3 items which accounted for 5,127% of variance and with loading varying from 0.661 to 530. Items refer to *Flexibility*.

Reliability

Cronbach's alpha (Table 6) for the 55 item Questionnaire of Sustainable Behaviour ($\alpha = 0.892$) demonstrates high internal consistency. Analysing the internal consistency of the 4 scales composing the Questionnaire we found three of them very highly reliable, i.e.: *Universal values scale* ($\alpha = 0.804$),

Table 6 Cronbach's Alpha for the Scales of Questionnaire on Sustainable Behaviour

Scale	N	α
Universal values	18	0.804
Awareness of consequences	8	0.839
Ascription of responsibility	9	0.875
Intra- and inter-personal intelligences	20	0.736
Questionnaire of Sustainable Behaviour	55	0.892

Awareness of consequences scale ($\alpha = 0.839$), and *Ascription of responsibility scale* ($\alpha = 0.875$). The *Intra- and inter-Personal Intelligences scale* ($\alpha = 0.736$), demonstrated moderate internal consistency.

Conclusion

The aim of the study was to validate the Slovenian version of the Questionnaire of Sustainable Behaviour. The final version of the questionnaire consisted of 55 items, which were based on the original version of the questionnaire (Juárez Nájera, 2010) grouped in four scales: Universal values scale, Awareness of consequences scale, and Ascription of responsibility scale, Intra- and inter- personal Intelligences Scale. Based on results of factor analysis we proved all four scales to be valid measures. Also, the internal consistency analysis showed that all four scales are reliable. The results indicate the Slovenian version of the Questionnaire of Sustainable Behaviour could be useful as a reference tool for further research of sustainable behaviour of various range of students. However, the study has certain limitation as the participants of the study were students of the specific faculties. The study should therefore be upgraded by providing more heterogeneous sample. However, the limitations do not impede the scale usefulness as a tool for personal evaluation and targeted development of sustainable behaviour in tertiary education settings.

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Validacija slovenske različice Vprašalnika o trajnostnem ravnanju študentov

Namen raziskave je bil validirati slovensko verzijo Vprašalnika o trajnostnem ravnanju, ki temelji na socialno-psihološkem modelu trajnostnega ravnanja (Juares Najera). Vprašalnik sestavljajo štiri lestvice: (i) univerzalne vrednote, (ii) zavedanje posledic, (iii) pripisovanje odgovornosti, (iv) inter- in intrapersonalne inteligentnosti. Za validacijo vprašalnika sta bili uporabljeni analiza posameznih trditev in metoda glavnih komponent, za preverjanje notranje konsistentnosti pa Cronbachov α -koeficient. Na vzorcu študentov, prihodnjih uči-

teljev, je bilo ugotovljeno, da je slovenska različica Vprašalnika o trajnostnem ravnanju veljaven in zanesljiv instrument za ugotavljanje trajnostnega ravnanja med študenti.

Ključne besede: vprašalnik, trajnostno ravnanje, validacija, metoda glavnih component, notranja konsistentnost