

SUSTAINABLE DEVELOPMENT UNIVERSITIES: KEY INITIATIVES AND IMPACT ON STUDENT AWARENESS AND ENGAGEMENT

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Purpose: This paper aimed to examine what the most important initiatives and sustainable development goals are visible in the activities of sustainable development universities (SDUs), where sustainable development issues are considered a priority in the opinion of students from in total 10 countries around the world, and how this affects the awareness and involvement of students, the main stakeholders of SDUs.

Design/methodology/approach: The study was conducted among students at universities using the CAWI questionnaire in 2022. In the further part of the work, a statistical study was carried out using the non-parametric Pearson's Chi-square test for 2×2 tables and the PQStat 1.8 program from PQStat Software.

Findings: The study showed that students positively perceive initiatives and sustainable development goals at universities and actively participate in them, especially at public universities. Moreover, research has shown that the university's efforts towards sustainable development increase students' awareness and involvement in sustainable development, contributing to creating a more sustainable future and "Society 5.0".

Research limitations/implications: The study focused on the association between university initiatives and students' awareness and involvement, but it cannot establish a causal relationship. There might be other factors influencing students' engagement that were not explored in this research. Furthermore, the study primarily focuses on students, thereby excluding the perspectives and involvement levels of other stakeholders such as faculty, staff, and local communities. Understanding the views of these groups is critical for a more comprehensive assessment of SDUs' impact on sustainable development.

Practical implications: The article can guide universities on what sustainable development activities students need and how universities can achieve sustainable development goals.

Originality/value: The article fills the gap in the analysis of how the activities undertaken by sustainable development universities in the field of sustainable development affect the awareness and involvement of students.

Keywords: managing sustainable development, sustainable development universities, CAWI survey, awareness.

Category of the paper: research paper.

1. Introduction

For over 20 years, academic institutions have consistently been recognized as important partners in developing local sustainable development projects. The discussion of sustainable development is not new, but it is now more important than ever to look for innovative strategies, techniques, and tools to advance the sustainability argument in the context of higher education (Filho, 2011). Due to their experience, specialized knowledge, and contributions to regional development, universities become significant governance players. They have a huge potential to actively assist sustainable development because of their strong ties, especially with civil society players (Sedlacek, 2013). Universities must be ready to actively play this essential role given the opportunities provided by the Sustainable Development Goals to advance sustainable development in higher education as well as the importance of this subject and its global scope. Additionally, the Sustainable Development Goals give universities a special chance to consider how they run their institutions and may motivate them to put forth even more effort to improve their sustainability—not just in terms of operations but also in terms of research and instruction (Leal Filho et al., 2018). It is more important than ever to take into account the viability of creating academic programs that can actually equip graduates with the necessary knowledge and values, the ability to engage in critical thought, and the drive to address the vast array of problems connected to non-sustainable states, according to Sibbel (Sibbel, 2009). The major objective of the manuscript was to investigate which institutions involved in sustainable development execute projects and objectives, and how this influences student engagement and awareness, who are these universities' primary stakeholders what is novelty at work. There are many papers that examine sustainability issues in universities (Al-Naqbi, Alshannag, 2018; Brugmann et al., 2019; Gomes et al., 2022; Holmes et al., 2022), but they are more concerned with assessing students' understanding of the issue and determining what these activities are. Our manuscript fills the gap in the analysis of how the activities undertaken by universities in the field of sustainable development affect the awareness and involvement of students.

2. Literature review

In order to increase awareness of the need for a balance between the environment, the economy, and society, the idea of sustainable development is disseminated through the transmission of information. Universities play a key role in this process by serving as a link between scientific understanding and common sense (Mazon et al., 2020). Increasing students' awareness of sustainability should be a major focus for higher education institutions, according to Michel and Zwickle (Michel, Zwickle, 2021). By taking into account their three fundamental

tasks, which are training, research, and knowledge production and transfer, universities are a critical component to achieving Sustainable Development and Sustainable Development goals (Purcell et al., 2019b; Waas et al., 2010). They also have a moral obligation to future people to create a more sustainable and engaged society. With the pro-sustainable movement gaining strength, achieving sustainability on college campuses has drawn attention from all over the world (Moganadas et al., 2013; Sustainable markets..., 2015). The "University Charter for Sustainable Development" created by COPERNICUS is one of the key documents promoting university-community collaboration. According to the Magna Charta of European Universities and in accordance with the UNCED recommendations for environment and development education, universities have a responsibility to spread environmental literacy and encourage the practice of environmental ethics in society. Universities are urged under the Charter to "... commit themselves to an on-going process of informing, educating, and mobilizing all the relevant parts of society regarding the consequences of ecological degradation..." (The University Charter..., 1993). It is crucial to consider how social, political, and economic factors might be included in efficient planning and management of sustainable development processes (Łukomska-Szarek et al., 2023; Ulewicz, Blaskova, 2018). Although there have been some developments in the Higher Education for Sustainable Development field, there are still numerous challenges that need to be overcome (Leal Filho et al., 2019). To achieve progress in helping societies becoming more sustainability orientated, Universities' leaders, faculty, and students worldwide are challenged to co-work to build upon the foundations already laid to develop sustainable societies (Ramos et al., 2015). It is also necessary to take a learning and process-oriented approach, instead of focusing solely on the output of SD integration activities (Barth, 2013). It is important to motivate faculty, staff, and students to consider sustainability's core values and modify their behavior on a daily basis to support sustainability goals and efforts. Therefore, students can represent the most effective sustainability projects (Helferty, Clarke, 2009; Holmberg et al., 2008; Hopkinson et al., 2008; Leal Filho et al., 2019; Pereira Ribeiro et al., 2021). How can the members of these organizations act as more powerful role models and agents of change in all societies, ask Lozano et al. (Lozano et al., 2013). This is our chance, educators and students alike. In the past two decades, there has been an increase in awareness of the role that universities may play in assisting countries in becoming sustainable societies. The institutionalization of sustainability in higher education stands out among the alternative responses, aiming to make the switch to a design that has been dubbed a sustainable university. According to Velazquez et al. (Velazquez et al., 2006), a sustainable development university (SDU) is a University that places priority on reducing negative effects on the environment, society, economy, and health at the local, national, and international levels. Whether these are produced by the use of its resources when doing its outreach, teaching, or research or by assisting society in the shift to sustainable lifestyles. SDUs are new educational environments that "enable individuals to reflect through multicultural, global, and future-oriented perspectives, on their responsibility for the complex effects of decision-making and behavior",

according to authors Adomßent et al. Currently, capacity building activities are primarily focused on two areas: internally-focused activities aimed at building capacity within a local community to promote sustainable development among a larger group of stakeholders and externally-oriented activities aimed at building capacity within a local community to train students and staff towards a more sustainable university and campus (Shiel et al., 2016). Universities can make a significant contribution to sustainable development by educating and preparing their students to meet the challenges, as well as by increasing the capacity of their own internal structures and systems to operate more sustainably (Rosak-Szyrocka, Zywiolok et al., 2022; Szyrocka et al., 2023). Finally, universities can make a difference externally by helping to increase the capacity of stakeholders throughout their communities through education and research (Rosak-Szyrocka et al., 2024; Rosak-Szyrocka, Apostu et al., 2022; Shiel et al., 2016). By accelerating implementation through research and development, teaching, curriculum development, good governance, networking, reporting, and extension activities, SDU culture offers the best solution for achieving sustainability development goals (Leal Filho, Viera Trevisan et al., 2023; Purcell et al., 2019a). The conversion of universities into SDU gives a setting for conducting experiments to address complex issues and encourage community involvement (Aleixo et al., 2016; Filho et al., 2015; Leal Filho, Simaens et al., 2023). The importance of higher education in fostering sustainable behavior has been the subject of several research in the past (Meyer, 2015). According to Torgler et al. (Torgler, García-Valiñas, 2007), aiming to avert environmental harm depends in part on education. Higher education is a crucial element connected with environmental awareness and sustainable activities (Rampasso et al., 2019; Rosak-Szyrocka, Apostu et al., 2022). On the basis of these research, Meyer (Meyer, 2015) examines the possible causal link between educational attainment and environmentally friendly behavior. The research finds a clear causal relationship between the two factors and comes to the conclusion that rising levels of education are followed by rising levels of pro-environmental behavior. When considered together, these findings imply that higher education may have a significant influence on people's behavior, creating a pool of human resources to help with the transition to greater sustainability. University students can assist, promote, and accomplish progress if they understand the breadth of the sustainability development goals, according to Alomari and Khataybeh (Farouq Alomari, Abdullah Khataybeh, 2021). The knowledge, attitudes, and conduct of tertiary students concerning SD were examined in a number of research. To investigate undergraduate engineering students' comprehension of SD, authors Azapagic et al. (Azapagic et al., 2005) performed a global survey. The research found that even while students had little awareness of SD and had major gaps in their understanding of its economic and social elements, they still anticipated that SD will be increasingly crucial for future generations. A further finding of the research was that students had a fair amount of familiarity with important environmental laws, regulations, and policies.

3. Research Methodology

The aim of the article was to examine what the most important initiatives and sustainable development goals are visible in the activities of sustainable development universities (SDUs), where sustainable development issues are considered a priority in the opinion of students, and how this affects the awareness and involvement of students, the main stakeholders of SDUs.

The research sample in this study refers to a subset of students from universities in 10 countries around the world who identified their universities as Sustainable Development Universities (SDUs). These students were selected to provide data and insight into their perceptions of sustainability initiatives and goals at their SDU. These students are considered the main stakeholders within SDUs as they directly experience and interact with the sustainable development initiatives and goals of their respective institutions. The sample includes both undergraduate and postgraduate students from various academic disciplines. It consists of individuals who hold sustainability issues in high regard, as they have chosen to pursue their education in universities that prioritize sustainable development. Due to the use of the CAWI questionnaire, the research sample represents a technologically literate group, comfortable with online surveys, and potentially more inclined towards sustainability awareness. The research sample is international and diverse, reflecting a broad range of cultural perspectives and sustainable development practices. By including students from both public and private SDUs, the sample aims to capture variations in sustainability initiatives and goals implemented across different types of institutions. The research sample is a dynamic group of students contributing to a more comprehensive understanding of the impact of SDUs on student awareness and engagement in sustainability efforts. In this study, the research population consists of students from SDUs around the world. However, the research sample represents only a fraction of this larger population, and the findings are based on the characteristics and responses of the students who took part in the survey using the CAWI questionnaire.

The method used to select the research sample is Computer-Assisted Web Interviewing (CAWI) questionnaire. This online survey allows researchers to reach a diverse and geographically dispersed group of students efficiently. The CAWI questionnaire was distributed among students at various universities, and those who voluntarily responded constituted the research sample. By using this method, a broader range of students from different countries and universities could participate, providing valuable insights into their perspectives on sustainable development initiatives and goals.

The results presented in this article are part of a broader study (Rosak-Szyrocka, Apostu et al., 2022), which aimed to collect data and information on understanding, assessing and analyzing the impact of universities on sustainability in the context of society 5.0 from the perspective of the university's main stakeholder - students. The title of this study is: "Univeristy 4.0 Sustainable Development in the Way of Society 5.0". The full version of the

questionnaire consisted of 21 closed-ended questions and 8 questions on respondent characteristics. The questionnaire from the main study entitled above was addressed to students studying at private and public universities, at different years and levels of study, in different fields of study, coming from 13 selected countries around the world (9 from Europe and 4 from Asia). The survey was conducted electronically (CAWI questionnaire) from April to December 2022. Responses from 301 respondents were obtained. The responses to one of the questions in the survey were filtered: *Do you consider sustainability issues at the university where you study to be a priority?* 188 respondents answered "YES" to the above question. Universities, where sustainability issues were considered a priority by students, were identified and named "Sustainable Development Universities (SDUs)". Responses from these respondents were the basis for further analysis. Students from 10 of the max. 13 countries surveyed identified their Universities as Sustainable Development Universities (SDUs).

As part of the analysis of the results studied, the percentage characteristics of the metric characteristics of the respondents who indicated their Universities as SDUs were characterized first. On this basis, the profile of a typical student studying at SDUs was indicated. In order to obtain information on the importance of sustainability initiatives that were definitely undertaken by SDUs, a Pareto diagram was developed. Using it, the structure of the "Definitely YES" responses to the question *What sustainability initiatives are undertaken by the university where you study?* was analysed. In order to obtain information on the visibility of the goals of sustainable development in SDUs activities, an analysis of the percentage structure of "Definitely YES" responses to the question *Please assess which, in your opinion, the goals of sustainable development are the most visible in the university's activities* was performed using a Pareto diagram. This made it possible to identify the priority goals of sustainable development at SDUs from the students' perspective.

In order to gather students' opinions on SDUs' sustainability efforts, an analysis of the percentage structure of their responses to a series of questions regarding their interest, pride, active participation, evaluation of the university's activities, and acquired knowledge about sustainability during their studies at SDUs was conducted. The questions are: *Are the actions your university has taken toward sustainability important to you?*, *Are you proud of the initiatives your university is taking toward sustainability?*, *Do you actively participate in such initiatives?*, *Do you think the university could do even more for sustainability?*, *Did you gain additional knowledge about sustainability during your studies?*, *Do you think public awareness will increase due to the university's sustainability initiatives?*. Analysing the structure of the percentage of "Yes" answers to these questions will provide an understanding of the level of involvement and perception of the university's sustainability-related activities by students.

To obtain information on the effectiveness of SDUs in building students' awareness of sustainable development, the following questions were asked: *Do you think universities are effective in building students' awareness of sustainable development?*, *Do you think that universities are taking action for sustainable development because society expects them to do*

so? and the percentage structure of "Yes" answers to these questions was analyzed. A hypothesis was also formulated that students studying at public SDUs participate more actively in sustainability initiatives undertaken by these universities than students at private SDUs, which was verified using the non-parametric Pearson's Chi-square test for 2×2 tables and the PQStat 1.8 program from PQStat Software of Poznań (Poland). The hypothesis was verified at the assumed significance level of $\alpha = 0.05$.

4. Research Results

The results of the analysis of the percentage structure of students studying at SDUs (i.e., where sustainability issues are prioritized in the opinion of students) are shown in Figure 1.

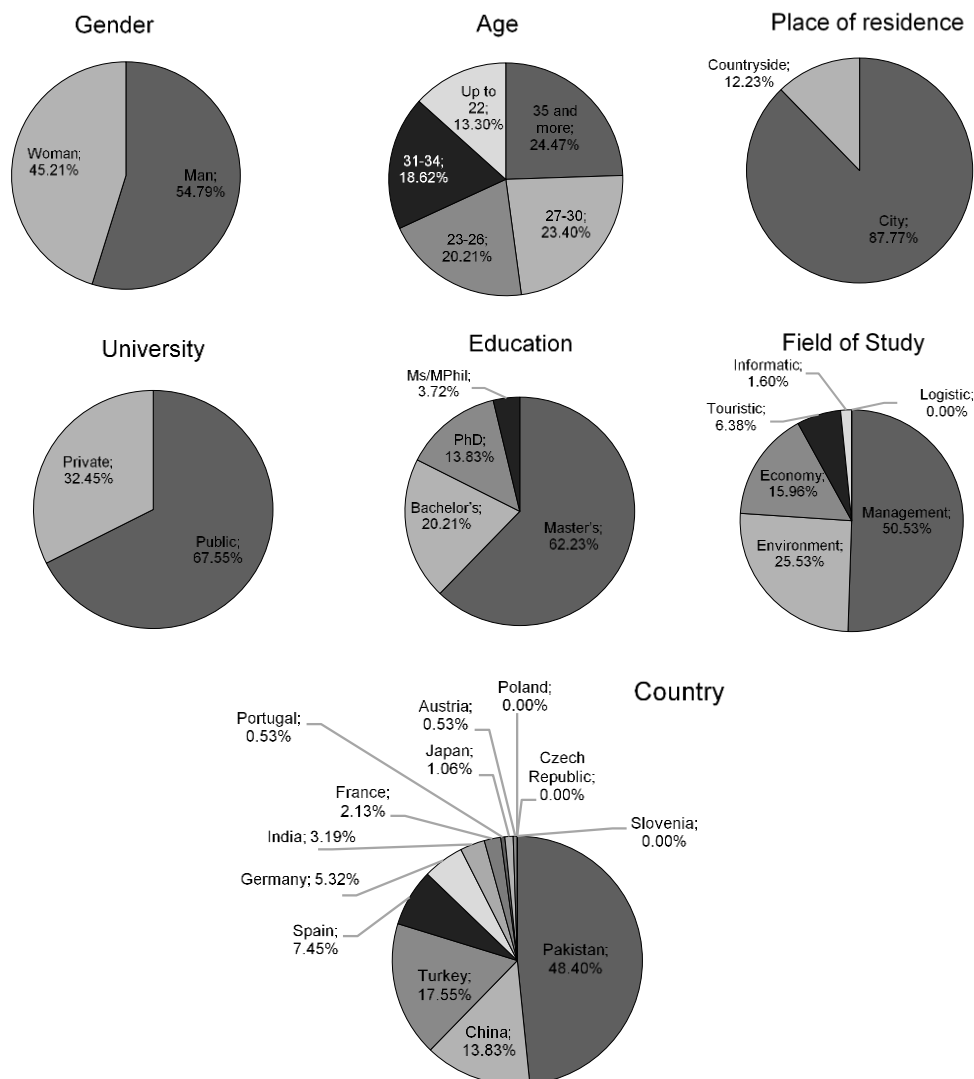


Figure 1. Percentage structure of respondents' characteristics - students studying at SDUs.

Source: own study.

Based on the presented percentage structure of respondents' characteristics, the profile of a typical (most frequent; based on the modal value statistics) student studying at SDUs can be indicated. He is: male, aged 35 or older, residing in a city area, studying at a public university, at the second degree level (Master's degree), majoring in Management, coming from Pakistan.

The following sustainability initiatives were identified, which were definitely undertaken by SDUs according to students studying at SDUs (Figure 2).

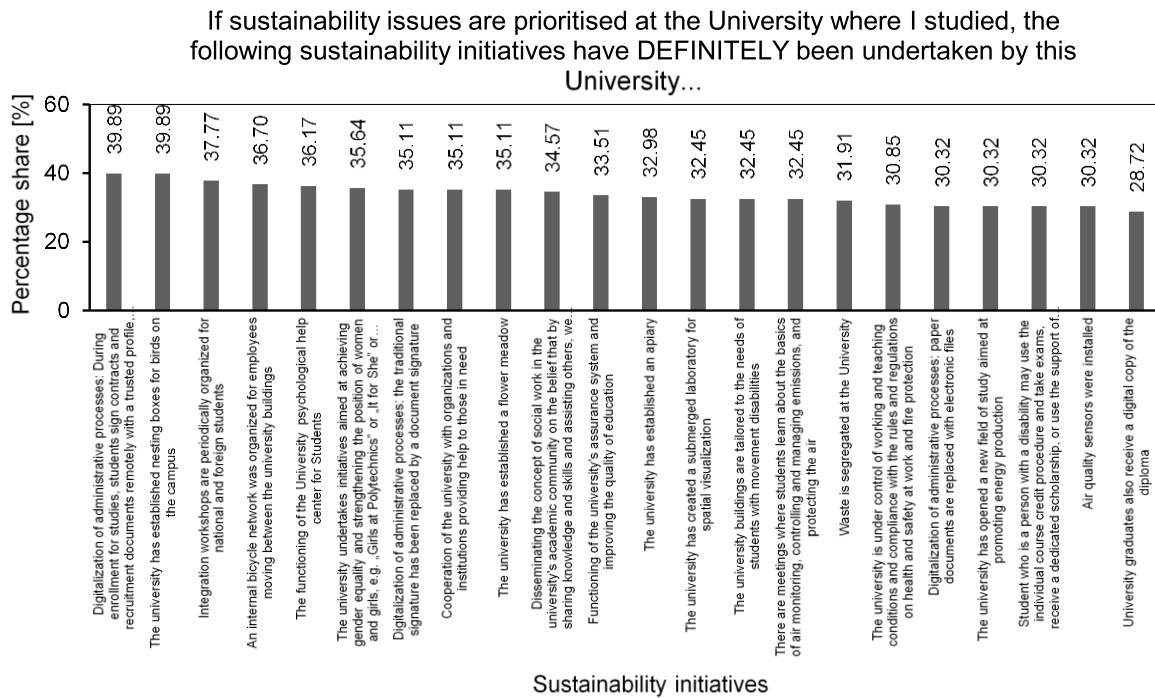


Figure 2. Pareto diagram of sustainability initiatives that were definitely undertaken by SDUs in the opinion of students.

Source: own study.

As can be seen from the Pareto diagram (Figure 2), the TOP 5 sustainability initiatives implemented by SDUs according to students are: 1. Digitalization of administrative processes: during enrolment for studies, students sign contracts and recruitment documents remotely with a trusted profile, qualified signature, or e-ID card (39.89%), 2. The university has established nesting boxes for birds on the campus (39.89%), 3. Integration workshops are periodically organized for national and foreign students (37.77%), 4. An internal bicycle network was organized for employees moving between the university buildings (36.70%), 5. The functioning of the University psychological help center for students (36.17%). According to students, these initiatives are particularly important to SDUs in terms of sustainability. Through digitalization, environmental protection, integration, sustainable transportation and psychological support, the SDUs surveyed are setting ambitious sustainability goals and looking out for the well-being of their students.

The following sustainability goals were identified, which were by far the most prominent in SDUs activities according to students studying at SDUs (Figure 3).

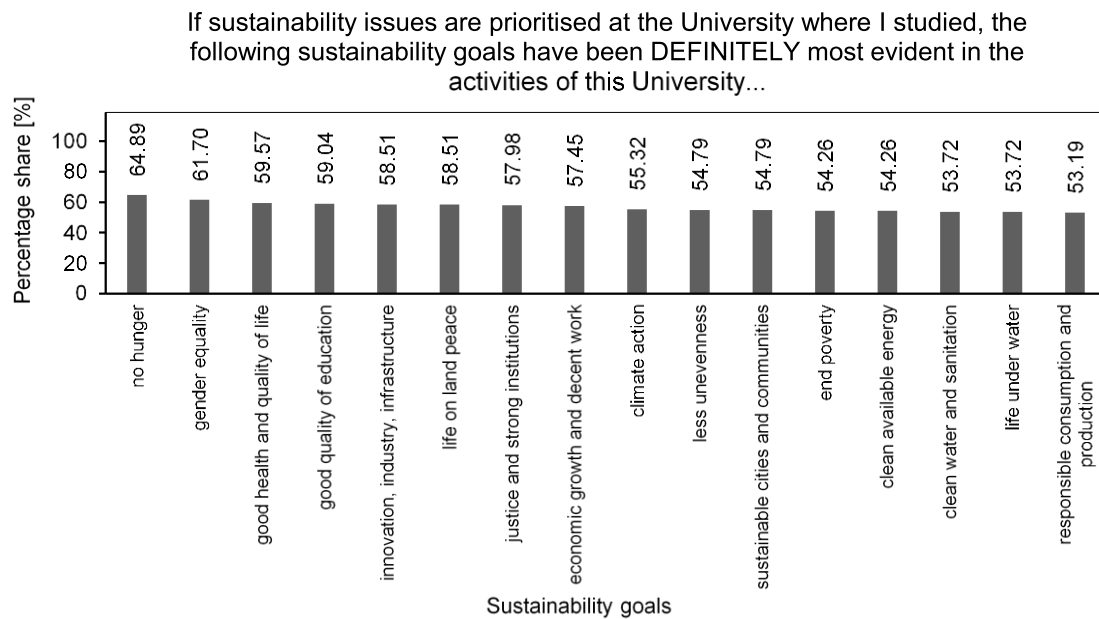


Figure 3. Pareto diagram of the sustainability goals that were by far the most prominent in SDUs activities according to students.

Source: own study.

The TOP 5 sustainability goals that were by far the most prominent in SDUs' activities according to students (Figure 3) were: 1. No hunger (64.89%), 2. Gender equality (61.70%), 3. Good health and quality of life (59.57%), 4. Good quality of education (59.04%), 5. Innovation, industry, infrastructure (58.51%). Analysis of student opinions indicates that the most important sustainability goals for SDUs are the elimination of hunger, gender equality, and good health and quality of life. These results indicate SDUs' social commitment and SDUs' awareness of issues critical to building a sustainable future. In addition, education and innovation are also important areas for SDUs, showing that students understand that through the development of science and infrastructure, SDUs contribute to achieving sustainable development.

The results of the analysis of the percentage structure of responses to the questions on interest, pride, active participation of students, evaluation of SDU activities, and knowledge gained by students on sustainability during their studies at SDUs are shown in Figure 4.

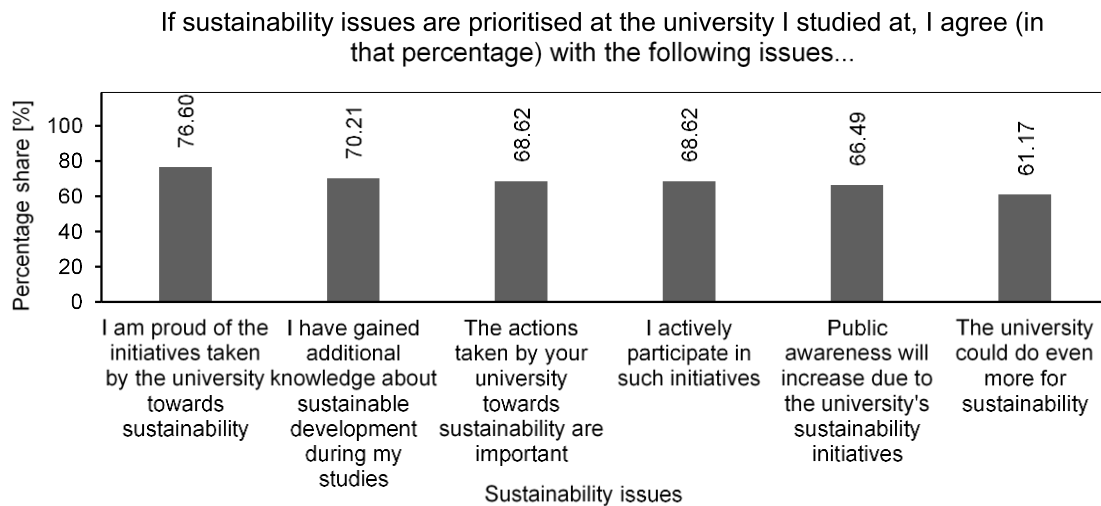


Figure 4. Pareto diagram of sustainability issues with which students studying at SDUs agree. 1st set of opinions.

Source: own study.

As can be seen from Figure 4, students studying at SDUs are most proud of the sustainability initiatives undertaken by SDUs (76%), getting an extra one on sustainability during their studies (70.21%), and the importance of actions taken by SDUs towards sustainability (68.62%). 68.62% of students studying at SDUs confirmed their active participation in sustainability initiatives. Thus, students not only feel pride and gain knowledge, but also actively engage in sustainability activities, which is important for promoting awareness and social change. SDUs play a key role in inspiring and engaging students in sustainability initiatives. These results suggest that SDUs are effective in influencing students' awareness and involvement in this important field, which can contribute to creating a more sustainable future and a "5.0 society."

The results of the percentage structure analysis on the effectiveness of SDUs in building students' awareness of sustainability are shown in Figure 5.

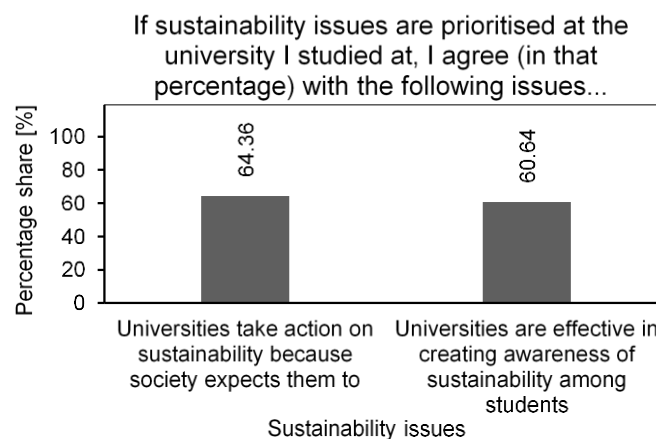


Figure 5. Pareto diagram of sustainability issues with which students studying at SDUs agree. 2nd set of opinions.

Source: own study.

As can be seen from Figure 5, SDUs' activities in the area of sustainability as perceived by students are mainly driven by society's expectations (64.36%). This suggests that SDUs are responsible for responding to society's needs and demands regarding sustainability. SDUs also play an important role in building students' awareness of sustainability according to students (60.64%). This implies that SDUs effectively contribute to educating and informing students about sustainability issues, which also leads to greater awareness and involvement in the subject.

The promotion of student involvement in and active participation of students in sustainability initiatives may depend on the legal status and form of ownership of SDUs (private universities vs. public universities). The following hypotheses (null and alternative) were verified:

H₀: there is no dependence between the legal status and form of ownership of SDUs and the active participation of students in SDUs' sustainability initiatives.

H₁: there is a dependence between the legal status and form of ownership of SDUs and students' active participation in SDUs' sustainability initiatives.

These hypotheses were verified using the non-parametric Pearson's Chi-square test for 2×2 tables. The expected frequency table does not contain any values less than 5. Cochran's condition was therefore met, making this test applicable.

At the accepted level of significance $\alpha = 0.05$, the Pearson's Chi-square for 2×2 tables test performed confirmed the truth of the alternative hypothesis ($p = 0.008687$). There is a relationship between the status and form of ownership of SDUs and active participation in sustainability initiatives undertaken by the university. Thus, it can be concluded that the status and form of ownership of SDUs significantly determine the active participation of students in initiatives undertaken by the university in the field of sustainability. Students studying at public SDUs participate more actively in sustainability initiatives than those studying at private SDUs, as confirmed by the cumulative column chart by row (Figure 6).

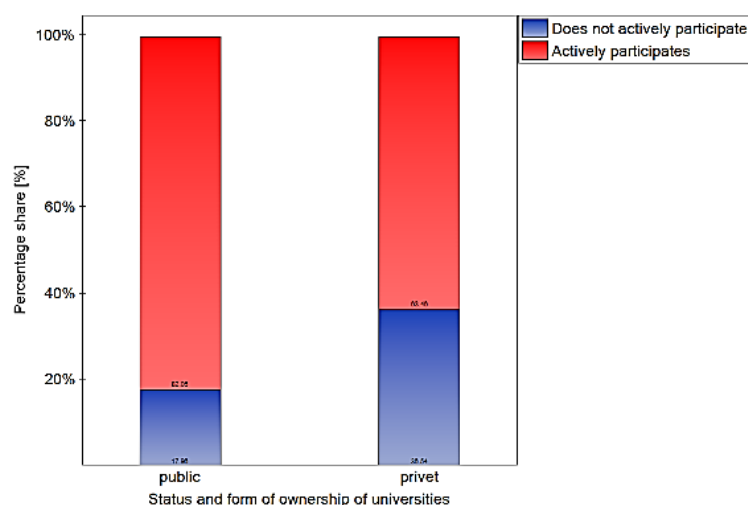


Figure 6. Percentage share of "active participation" responses type to sustainability initiatives by private and public SDUs.

Source: own study.

The proportion of responses of the "active participation" type for public universities (82.05%) is significantly different (higher) than for private universities (62.46%). Public SDUs often have more community involvement and may offer more sustainability-related programs and initiatives, such as courses, research projects, awareness campaigns or volunteer opportunities. The presence of such programs can influence greater student involvement in sustainability initiatives at the university. Public SDUs also often have a greater impact on the local community and can be more socially conscious. This can lead to greater student awareness and involvement in sustainability issues. Public SDUs can promote values of social responsibility, sustainability and community involvement. This culture of the institution can influence students' attitudes and behaviors toward greater involvement in sustainability initiatives.

5. Conclusion

The purpose of the article was to study what sustainable universities are doing to take initiatives and pursue sustainability goals, and how this affects the awareness and involvement of students, the main stakeholders of these universities. In the course of the research and analysis conducted, it was identified that the digitization of administrative processes, bird nests on campus, the organization of inclusive workshops, the establishment of a bicycle network for employees, and the operation of a psychological support center for students are the most visible initiatives undertaken by SDUs for students. In turn, students said that the most visible sustainability goals in SDUs' activities are fighting hunger, gender equality, good health and quality of life, high quality education, innovation, industry and infrastructure. The survey also showed that students studying at SDUs are proud of the university's sustainability initiatives. A large number of students expressed satisfaction with the additional knowledge about sustainability gained during their studies and the importance SDUs place on sustainability activities. In addition, the results showed that SDUs' sustainability activities are mainly driven by society's expectations, indicating that these universities are responding to society's needs and actively taking them into account in their activities. It was also proven that students studying at public SDUs participate more actively in sustainability initiatives than students studying at private SDUs. This suggests that there is a difference between the two types of universities in terms of student involvement in sustainability initiatives. In conclusion, the results of the study show a positive reflection of the implemented initiatives and set goals for sustainability at SDUs on student opinions, which demonstrates the success of these Universities in achieving their sustainability missions. Continuing these efforts can further increase students' awareness and involvement in sustainability topics, contributing to a more sustainable future and a "5.0 society". In the course of further analysis of the survey results obtained, the authors also

intend to verify, among other things, whether there are significant differences in the sustainability goals and initiatives undertaken by private and public SDUs, whether students' active participation in sustainability initiatives is significantly related to a particular field of study or year of study at SDUs.

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