

INTEGRATING SUSTAINABILITY INTO PEDAGOGICAL PRACTICES IN HIGHER EDUCATION

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This paper explores how student participation in virtual exchange (VE) projects focused on sustainable development can contribute to integrating sustainability into pedagogical practices in higher education. The research involved 105 students from Ukrainian, Polish, and American universities, representing various academic specializations. Emphasis is placed on examining key concepts related to sustainable development and the UN Sustainable Development Goals (SDGs). The study is grounded in observational data and interviews conducted during English for Specific Purposes (ESP) courses where VE projects were implemented. The findings reveal that VE collaboration fosters student awareness of sustainability and promotes interdisciplinary dialogue across cultural and academic contexts. Through group activities, students not only developed communication skills but also deepened their understanding of the global and local dimensions of sustainability. Most participants reported a positive experience, noting that VE projects made complex sustainability concepts more accessible and relevant to their future professional paths. However, the effectiveness of these initiatives was found to be closely linked to students' motivation, willingness to engage in intercultural teamwork, and prior awareness of socio-environmental challenges. The study concludes that VE projects can be a valuable tool in integrating sustainability into higher education, provided that supportive conditions for engagement are ensured.

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Introduction

Recent global events – including the COVID-19 pandemic, economic crises, military conflicts, and full-scale war in Ukraine – have significantly impacted the implementation of the Sustainable Development Goals (SDGs) in higher education. Since the 1980s, universities worldwide have actively aligned their missions with the SDGs as formulated by international organizations, accumulating valuable local experience along the way. By 2025, Ukrainian universities have markedly increased their visibility in global university rankings, such as the Times Higher Education Impact Rankings, particularly within the framework of the seventeen SDGs. These include goals such as “Quality Education,” “Decent Work and Economic Growth,” “Industry, Innovation and Infrastructure,” “Peace, Justice, and Strong Institutions,” “Zero Hunger,” “Climate Action,” “Good Health and Well-being”, and others (United Nations, 2015).

The sustainable development agenda cannot and should not be put on hold, even under crisis conditions. Its implementation is vital for ensuring a balanced coexistence of diverse societal groups

and a harmonious relationship between society and nature at national, regional, and global levels. As one of the central concepts of contemporary global society, sustainability promotes an equilibrium across economic, environmental, and social dimensions. This concept emerged in the latter half of the 20th century in response to growing concerns over resource depletion, environmental degradation, and rising inequality – consequences of unchecked economic models of consumption and production.

On a global scale, sustainable development has been adopted as a strategic foundation for humanity's future. Ukraine is an active participant in various UN-led agreements and initiatives under the “2030 Agenda” (Verkhovna Rada Ukrainy, 2019), which not only supports the country’s global integration but also enhances its long-term competitiveness. Accordingly, the sustainable development of Ukraine is understood as a process of balanced socio-economic and environmental advancement designed to meet the needs of the present generation without compromising the ability of future generations to meet theirs.

Over the past decade, the UNESCO Report on the Decade of Education for Sustainable Development identified the Global University Partnership on Environment and Sustainability (GUPES) – which includes 370 universities worldwide – as a major achievement in the field of higher education. This partnership resulted in a shared commitment to embedding environmental topics across university curricula. In Latin America and the Caribbean, 228 universities formed the ARIUSA network (Alianza de Redes Iberoamericanas de Universidadespor la Sustentabilidad y elAmbiente), promoting Education for Sustainable Development (ESD) through institutional policies in 15 countries. Similarly, a consortium of 30 universities in the Asia-Pacific region agreed to collaborate on postgraduate training in sustainability-related fields.

The role of Ukrainian universities in advancing sustainable development has become an important topic of international scholarly interest (Borozinets, 2021; Vnukova & Pyvovarov, 2023). Numerous academic publications (Tunytsia et al. 2019; Žalėnienė & Pereira, 2021; Chankseliani & McCowan, 2021) analyze both achievements and persistent challenges, examining how programmatic goals are translated into action at the regional and institutional levels. University reports highlight higher education’s essential role in promoting sustainable development.

In times of geopolitical instability, higher education institutions have a unique opportunity – and responsibility – to engage students in discussions about strategic approaches and viable solutions for business, governance, and civil society in pursuit of the SDGs, adopted by all UN member states in 2015 (United Nations, 2015). In our study, we identify students’ human capital as the most critical asset in sustainable development. This perspective underscores the vital role of higher education in equipping students to address complex environmental, economic, and social challenges.

The core idea of this paper is that integrating sustainability into pedagogical practices in higher education can be most effectively achieved through virtual exchange (VE) projects. These projects are particularly well-suited to English for Specific Purposes (ESP) and General English courses and function within an interdisciplinary framework. In such initiatives, Ukrainian students collaborate with their peers from the United States and Europe, enabling educators to create meaningful connections between education and sustainable development. These experiences demonstrate the potential of higher education institutions as central platforms for advancing the SDG agenda.

Furthermore, these efforts contribute to the broader goals of “greening” education and fostering its futurization – reorienting education toward long-term global challenges and solutions. The aim of this study, therefore, is to expand existing knowledge of sustainability in higher education,

analyze the experiences of Ukrainian institutions implementing VE projects, and evaluate the integration of sustainability concepts into ESP courses through interdisciplinary collaboration.

Materials and Methods

Design of the research

To achieve the goals of this study, a comprehensive set of interrelated research methods – both theoretical and empirical – was employed. The research design focuses on analyzing the integration of sustainability into pedagogical practices within higher education, particularly through virtual exchange (VE) projects in English for Specific Purposes (ESP) and General English courses.

The theoretical methods used include comparative analysis to examine the specificities of how sustainability is incorporated into pedagogical practices in Ukrainian, American, and European universities. Terminological analysis was applied to define key concepts such as sustainability and interdisciplinary approach. In addition, chronological and causal analysis facilitated an understanding of the development and implementation of sustainability goals and helped identify outcomes achieved by students participating in VE projects.

The empirical methods consisted of observing the educational process within VE projects that embed sustainability goals into ESP instruction. Furthermore, both quantitative and qualitative analyses of experimental data were conducted to assess the effectiveness, benefits, and limitations of using VE for integrating sustainability into pedagogical frameworks in higher education.

The research was implemented through virtual exchange campaigns designed as collaborative projects between students from the University of Rzeszów (Poland), the University of North Carolina Wilmington (USA), and Igor Sikorsky Kyiv Polytechnic Institute (Ukraine) from 2022 to 2024. Students were grouped into teams of 4–5 and tasked with researching one of the 17 Sustainable Development Goals and creating a 20–25-minute awareness campaign on how this goal is being implemented in Ukraine, Poland, and the USA.

The projects followed a structured timeline and included the following stages:

Research and Planning

During the first stage (dates 1-7 October 2022, 2023, and 2024) students participated in an introductory Zoom meeting and uploaded short self-introduction videos to the VE platform (Padlet). Working groups were formed, and each group developed its internal rules and procedures.

Content Development through Comparative Research

During the second stage (dates 8-31 October 2022, 2023, and 2024), students collaboratively designed a survey related to their chosen SDGs. The survey targeted youths in their respective cities or universities. Following data collection, students compared results in Zoom meetings and presented their findings during local classroom sessions.

Campaign Creation

During the third stage (dates 1-30 November 2022, 2023, and 2024), each group created an awareness campaign using formats such as posters, social media content, infographics, or short videos. Students collaboratively selected a unifying theme for their campaign and planned its structure using tools like Google Docs for scripting, planning interviews, and developing multimedia content.

Presentation and Evaluation

During the last stage (dates 1-15 December 2022, 2023, and 2024), each group presented its campaign. Students in all institutions voted for the most impactful project. The winning campaigns were published on the institutions' websites and social media platforms and showcased at an international student conference.

This research design supports the study's aim to evaluate virtual exchange as a pedagogical tool for advancing sustainability education, strengthening student collaboration across borders, and embedding the SDGs into the fabric of higher education through interdisciplinary, practice-oriented projects.

Participants

To illustrate the applicability of virtual exchange projects as a pedagogical tool for advancing sustainability education, future specialists majoring in Public Administration, Business Studies, Tourism, Organic Chemistry, and Mechanical Engineering were chosen as far as they support the interdisciplinary concept. The general topic of the virtual exchange program was determined by the teachers, the topic "Sustainable development" was chosen, and then the groups were asked to choose a specific aspect (i.e. sub-topic) that they would like to explore, for example, one of the Sustainable Development Goals the study was carried out among 105 students in the third and fourth year of studying at the Igor Sikorsky Kyiv Polytechnic Institute (Ukraine), University of Rzeszow (Poland), and University of North Carolina Wilmington (USA). The sample was divided into 21 teams were created, each with 5 participants. It takes 3 years period, from October 2022 to December 2024.

Instruments and Procedures

To evaluate the effectiveness of integrating sustainability into pedagogical practices in higher education – particularly through the implementation of virtual exchange (VE) projects during English for Specific Purposes (ESP) classes – this study employed several empirical methods. These included systematic observation of the educational process during the application of the VE methodology, as well as quantitative and qualitative analysis of experimental data. These approaches were used to assess the extent to which VE projects influence the understanding and internalization of sustainability goals among students.

As was mentioned the empirical part of the study was conducted among 105 students from Igor Sikorsky Kyiv Polytechnic Institute (Ukraine), the University of Rzeszow (Poland), and the University of North Carolina Wilmington (USA). Participants were third- and fourth-year students representing various academic programs, including Public Administration, Business Studies, Tourism, Organic Chemistry, and Mechanical Engineering. These students were actively involved in VE projects as part of their English for Specific Purposes (ESP) and General English courses.

To gauge the perceived impact of the VE experience, the students were asked to respond to a brief survey consisting of four key questions:

1. Does the use of VE projects during English classes enhance your understanding of sustainability?
2. Do VE projects simplify the process of engaging with the 17 Sustainable Development Goals?
3. Do VE projects during English classes contribute to your future professional development?
4. Do VE projects support your integration into the global professional community?

Participants rated each statement on a four-point Likert scale: Strongly Agree, Agree, Disagree, or Not Sure.

This data collection is aimed to provide insights into the educational value of VE projects in promoting sustainability literacy and preparing students for future interdisciplinary and international professional contexts.

Results and Discussion

This finding includes both quantitative and qualitative data gathered during the experimental phase of the study, indicating that the group of students engaged in virtual exchange projects as part of their English classes demonstrated improved and more effortless social integration. Referring to the data illustrated in Figure 1, it is evident that the vast majority of students responded positively to all the survey questions. Notably, approximately 90 students strongly agreed that the VE projects significantly simplified their understanding and acquisition of sustainability concepts. Only around 5.4% of students expressed uncertainty about this claim.

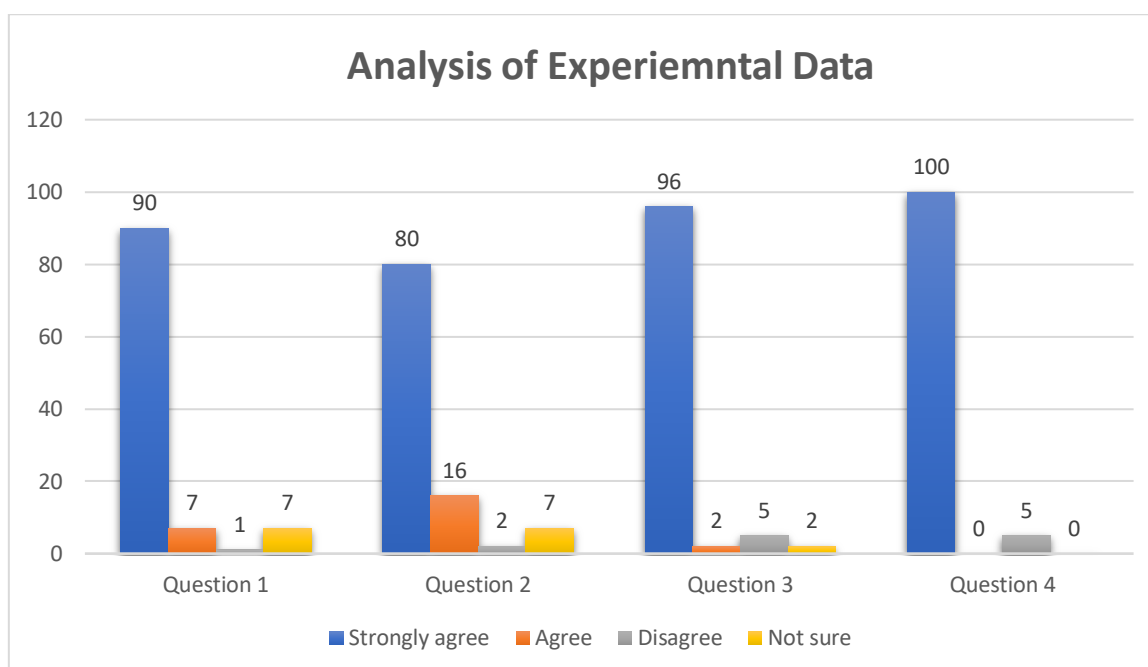


Figure 1. The analysis of experimental data focused impact of the VE projects on Integrating Sustainability into Pedagogical Practices

Nonetheless, one student disagreed, citing personal challenges:

"I have no experience in international collaboration, and due to the time difference, I find that participation in VE projects during the English course complicates rather than simplifies my studies."

A key component of VE projects is international team collaboration, which exposes students to diverse communication practices, behavioral norms, and languages. During group work, students become aware that project participants may differ in their expectations, especially in areas such as politeness and time management. Despite the predominantly positive responses, three students disagreed and seven were unsure about whether VE projects facilitated their integration into the

global professional community. However, approximately 92% strongly agreed that the VE experience was beneficial. One of the students shared:

"I am glad that my classmates and I participated in VE projects dedicated to sustainable development. It provided me with a deeper understanding of sustainability topics and insights into how sustainability goals are implemented in other countries."

At the same time, 100 students strongly agree that participating in VE projects dedicated to sustainable development during English for Specific Purposes (ESP) and General English courses can help them integrate into the global professional community in comparison to 5 students who disagree.

Overall, 100 students strongly agreed that participation in sustainability-focused VE projects during their English for Specific Purposes (ESP) and General English courses contributed to their integration into the global professional community, while only five students disagreed. Although many students across various disciplines such as Public Administration, Business Studies, Tourism, Organic Chemistry, and Mechanical Engineering gained valuable insights and opportunities through VE projects, a few reported difficulties due to a lack of prior experience or skills. These findings align with existing research (O'Dowd, 2018; Helm & Guth, 2018) suggesting that the success of VE projects largely depends on students' motivation, openness to learning, and awareness of socio-environmental issues.

Among the limitations of using Virtual Exchange (VE) to integrate sustainability into pedagogical frameworks in higher education, students particularly highlighted the challenges posed by time zone differences, which made it difficult to coordinate meetings and maintain consistent communication. They also noted a lack of prior experience in participating in VE projects, which sometimes led to uncertainty about expectations, slower adaptation to the format, and reduced confidence in contributing effectively. These factors, as mentioned by students, can hinder the smooth implementation and full potential of VE initiatives.

Therefore, it can be concluded that VE projects provide essential support to students in building knowledge about sustainability, simplifying the learning process, fostering professional development, and promoting integration into global professional networks.

In today's world, research focusing on how higher education institutions contribute to achieving Sustainable Development Goals becomes increasingly relevant. While the SDGs are founded on global human values, their realization depends on localized practices shaped by cultural, national, and regional contexts. Thus, sustainable development practices in higher education must be adapted to local conditions. This local specificity elevates the importance of institutional transformation and restructuring within universities to support concrete contributions to sustainable development (Addo et al., 2022).

The widely accepted tripartite model of sustainable development – addressing economic, social, and environmental dimensions – assumes the possibility of harmonizing human activity with the laws of nature. Achieving this harmony requires a deep understanding of local practices. In this context, the authors argue that the SDGs must be specified and localized, with outcomes coordinated among stakeholders, taking into account innovative technologies and resource usage. Sustainable development at the local level must align with universal values that emphasize the well-being of future generations (Kwee, 2021).

Analyzing the outcomes of VE projects conducted over three years focused on integrating sustainability into pedagogical practices, the study identifies several key contributions to higher education:

- ✓ Strengthening socio-economic and international development;
- ✓ Promoting multiculturalism and inclusion within university environments;
- ✓ Applying environmental sustainability in infrastructure planning;
- ✓ Developing smart, sustainable campuses and reducing energy consumption (Baroni et al., 2019).

Despite their global scope, VE projects must consider regional contexts through interdisciplinary approaches that allow universities to incorporate sustainable development into all facets of institutional activity. These include training educators, creating educational programs grounded in sustainability principles, and encouraging student leadership in regional sustainability initiatives.

To effectively implement sustainability practices at the local or regional level, certain organizational conditions within universities are critical: establishing a sustainable institutional culture centered on inclusion, equity, accessibility, and cultural diversity, rooted in shared ethical values and adapted to national specifics; and embedding sustainability into university curricula through interdisciplinary courses and incorporating SDG-related content into project-based learning and practice.

Such interdisciplinary integration fosters competencies required to achieve the SDGs across professional fields while project-based learning enables students to apply theoretical knowledge in real-world contexts (Tyran, 2017).

The UN-supported Principles for Responsible Management Education (PRME) provide a valuable framework for aligning higher education with sustainability (Figure 2). These principles advocate for the development of future leaders capable of generating sustainable value for society and the environment. Through the PRME principles – Purpose, Values, Teach, Research, Partnership, Practice, and Share – universities are encouraged to foster responsibility, inclusivity, and environmental stewardship (PRME, 2023).

When students were asked whether they saw alignment between their participation in VE projects and the seven PRME principles, nearly 95% confirmed that such engagement reflected these values. This consensus highlights that sustainability-focused VE projects not only support academic objectives but also instill values essential for responsible global citizenship.

Since its formalization, sustainable development has evolved into a central principle of global advancement, addressing environmental, economic, and social challenges. In recent years, it has also come to encompass the goals of peace and international cooperation. The 2030 Agenda reinforced this broader vision by incorporating lessons learned from previous decades (Verkhovna Rada Ukraine, 2019).

Ultimately, the integration of sustainability into pedagogical practices through VE projects contributes meaningfully to higher education's role in shaping socially responsible, environmentally aware, and professionally prepared global citizens.



Figure 2. The Principles for Responsible Management Education borrowed from <https://www.unprme.org/what-we-do/>

Conclusions

To sum up, universities could contribute to integrating sustainability into pedagogical practices through their research. Today, the development programs of Ukrainian universities concern mainly development in the field of natural and technical sciences, which provides opportunities to create new VE projects on sustainable development. It is necessary to pay attention to increasing the importance of interdisciplinary research in university science with the participation of humanities scientists based on the interdisciplinary approach. As noted, the interdisciplinary approach, by developing and specifying ways to achieve the goals of sustainable development, is aimed at creating VE projects within educational systems that maintain balance with the natural and social environment and are favorable for the general and professional development of all participants in the educational process.

Thus, this study represents preliminary research, focusing solely on the attitudes and personal perceptions of students who participated in VE. While limited in scope, we believe it provides a valuable starting point for the future development of methodologies aimed at the large-scale integration of VE projects into pedagogical frameworks in higher education.

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Conflict of interest

The authors state no conflict of interest.

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