



Anna ADAMUS-MATUSZYŃSKA • Beata KOLNY

STUDENT KNOWLEDGE OF ESG: IMPLICATIONS FOR STUDY PROGRAMS

Anna ADAMUS-MATUSZYŃSKA (ORCID: 0000-0003-3234-4599) – University of Economics in Katowice

Beata KOLNY (ORCID: 0000-0002-9162-1704) – University of Economics in Katowice

Correspondence address:

1 Maja Street, 40-278 Katowice, Poland

e-mail: adamus@ue.katowice.pl

ABSTRACT: Purpose: The objective of the research under discussion is to examine the extent of students' knowledge and to develop solutions for economics curricula that incorporate or will incorporate ESG topics within the academic content of diverse social science disciplines. Methodology/approach: The research used an online survey method involving a purposeful sample of 400 students from Polish universities. The respondents primarily consisted of students in economic and social science fields who encounter ESG-related business and legal solutions during their studies. Findings: While a significant portion of students correctly decoded the ESG acronym and identified the CSRD directive, this does not reflect comprehensive or in-depth knowledge. The study revealed substantial gaps in familiarity with specific regulatory documents, such as the EU Taxonomy, and measurement indicators. However, the results confirm a positive educational effect: as students progress through their studies, the percentage of „never heard of it” declarations regarding ESG concepts systematically decreases, helping to ensure graduates do not enter the labour market with significant knowledge gaps. Research limitations/implications: The research was carried out using the convenience technique, which means that it is not possible to generalise it to other universities in Poland or abroad. Originality/value: This research provides empirical data that facilitates the enhancement of educational programs to better address labour market demands and the challenges of a modern, regulated economy. It offers practical insights for higher education institutions (HEIs) aiming to transition toward more sustainable academic frameworks.

KEYWORDS: ESG, CSRD, higher education institution (HEI), education for ESG

Introduction

ESG (Environmental, Social, Governance) is an acronym increasingly taken into account by economic entities in developing corporate strategies aimed at sustainable development and social responsibility. It is a relatively new paradigm that directs the economy and its entities towards different business goals than before. A dozen or so years ago, companies did not include these factors in their strategies. At present, this principle of economic conduct has effectively attained the status of a principle: initially imposed through quality standards, subsequently reinforced by stakeholder expectations and broader societal pressure, and ultimately codified as a normative framework regulated by legal instruments.

In connection with the above, a research problem was born regarding students' knowledge of issues related to ESG in three areas, including: concepts, documents and indicators measuring ESG and the possibility of implementing these issues in study programs (Smaniotto et al., 2020). Knowledge is usually the first step in the process of understanding socio-economic phenomena and is the accumulation of facts, data, skills, and experiences (Smaniotto et al., 2020). In Bloom's taxonomy, knowledge is conceptualised as the most fundamental cognitive domain. It encompasses the retention and recall of specific, discrete units of information, including factual data, definitions, and procedural methodologies, such as the ordered sequence of actions in a stepwise process (Bloom, 1956).

The integration of ESG principles within the realm of higher education has attained considerable progress, fostering sustainability and quality management within academic institutions. Numerous scholarly examinations emphasise the essentiality for systematic frameworks to enhance ESG initiatives and evaluate their implications for both educational outcomes and broader societal challenges (Puzzonia, 2018; Lin et al., 2023; Finatto et al., 2024). Many universities are methodically introducing both dedicated subjects and fields of study, as well as incorporating ESG-related issues into other subjects. Teaching on Sustainable Development Goals (SDGs), ESG, and other solutions for sustainable and socially responsible economies in universities can be effective through the implementation of innovative educational strategies that actively engage students and deepen their comprehension of these matters and their significance for their future lives and professions. Several studies explore the incorporation of ESG education into university curricula and reveal its beneficial impacts on students' learning outcomes as well as societal issues (Wan et al., 2023). Higher education institutions (HEIs) are increasingly familiar with their role in the development and implementation of a sustainable paradigm (Finatto et al., 2024). There have been some research done how ESG principles applied to higher education (Cavalcante Forte, 2024).

This study aims to analyse the implementation and integration of ESG practices in relation to the United Nations Sustainable Development Goals (SDGs) within the context of Polish higher education institutions. Through this analysis, the study endeavours to recommend how universities might effectively integrate aspects of sustainable and socially responsible business into their educational curricula. Consequently, the primary objective of this research is to systematically evaluate students' level of knowledge and to develop robust instruments for assessing the degree to which higher education institutions (HEIs) incorporate ESG principles into their educational curricula.

The objective of the survey research presented herein was to assess students' understanding of issues related to ESG within three domains: theoretical concepts, relevant documents, and ESG measurement indicators (Smaniotto et al., 2020). Additionally, the study sought to formulate recommendations for incorporating ESG topics into the curriculum of economics programs, either currently or in the future, within various social science disciplines.

An overview of the literature

The approach currently recognised by the acronym ESG represents a paradigm of thought and conduct that was initially articulated during the Global Compact Leaders Summit in June 2004 (Global Compact Leaders Summit, 2004) and the term ESG was officially included in the report titled "Who Care Wins" (2004). Implementing an ESG framework entails the assimilation of environmental, social, and governance factors into corporate decision-making and strategic methodologies. Never-

theless, it is important to underscore that the consideration of these categories among both academic researchers and business professionals possesses a longstanding history. The study of education for sustainable development and social responsibility is indispensable for comprehending environmental changes in the context of fostering student character development (Prabawani et al., 2020).

In Poland, a total of 160 universities have endorsed the declaration on university social responsibility, thereby pledging to integrate sustainability into their operations, outreach activities, educational programs, and research initiatives. Nonetheless, notwithstanding this declaration of positive intentions and the advancement of policy measures at the national, regional, and international levels, there has been limited progress in effectively incorporating education for sustainable development in a comprehensive manner within the curriculum. For instance, within the report concerning the projected evolution of higher education in Poland, the acronym ESG appears on two occasions in a declarative context, whereas the term sustainable development is mentioned six times, and the phrase social responsibility is referenced three times, including twice within the titles of the cited works (Woźnicki, 2024).

As the prominence of the ESG approach expands, there is an increasing necessity to educate both professionals engaged in tasks related to the implementation of ESG principles within companies and graduates who will comprehend this approach in their future careers. An examination of the body of literature on ESG education reveals that the quantity of scholarly articles on this subject is consistently increasing on an annual basis. In 2020, approximately 6,470 articles developing this issue in various ways were published, and in 2024, this number had risen to 26,400 scholarly articles (Google Scholar). Incorporating research relating to sustainable development (SD) and Corporate Social Responsibility (CSR) into this figure would likely result in a considerable augmentation in the total number of studies and publications. However, the question arises as to how students and graduates are prepared to absorb knowledge on this issue and whether study programs fully reflect not only the need for such knowledge, but also the understanding of the importance of these issues for the future of generations.

The process of integrating ESG education is associated with a multitude of other factors, such as the prerequisites for achieving sustainable development within an educational institution (Akopyants et al., 2024). A special role in the development of the ESG approach in business has and will be played by graduates of financial and accounting studies (Vu, 2025). They will transform the company's impact on the environment, society and governance into appropriate numbers illustrating this impact. That is why it is so important that the programs are adapted to the implementation of this task (Sheehan et al., 2022). Much research is focused on study programs that can contribute to increasing the involvement of future generations in the active implementation of ESG and SDG strategies (Nurillayev, 2025). The research also confirms the hypothesis that appropriate ESG education not only affects the preparation of staff but also, in the long term, is important for the development of the SD or ESG concept itself (Rey-Garcia & Mato-Santiso, 2020). ESG education facilitates the adoption of sustainable practices, which in turn leads to a measurable reduction in emission volumes (Nurillayev, 2025).

The integration of these principles and SDGs into university curricula is increasingly recognised as essential for equipping graduates to address global sustainability challenges. The examined literature reveals frameworks, practices, and reporting strategies for enhancing ESG and SDG engagement in higher education institutions. For example, Alenezi and Alanaz (2024) proposed a framework for incorporating ESG principles into higher education. The University of Southern Santa Catarina (UNISUL) has successfully implemented various sustainability-related actions across all SDGs, but noted governance practices are lacking, indicating areas for improvement (Finatto et al., 2024). Other research indicates that effective reporting on SDG achievements significantly influences universities' rankings, with top institutions being more committed to sustainability outcomes (de la Poza et al., 2021).

Whereas traditional environmental literacy models (Roth, 1992) concentrate primarily on ecological systems, the institutionalisation of ESG criteria as a professional standard necessitates the development of an expanded "ESG literacy" framework. In this study, concepts, documents, and indicators are incorporated under the term "ESG literacy," and understood as a multidimensional construct encompassing: (a) the comprehension of the interrelationships among theoretical concepts that introduce environmental and social perspectives into economic development; (b) familiarity

with key documents that constitute the relevant legal and regulatory framework; and (c) the ability to interpret and apply indicators designed to assess ESG practices. Collectively, these dimensions are taken to represent students' structural knowledge and their multidimensional competence at the interface of theory and practice. The findings of Yassim et al. (2025) indicate that HEIs should prioritise systemic awareness-raising, inter- and intra-institutional collaboration, integration of sustainability principles into the curriculum, and the development of long-term strategic programs. The authors recommend the implementation of adequately funded sustainability initiatives, the formal incorporation of sustainability content across academic programs, the establishment of structured communication strategies, the creation of specialised governance or advisory committees, the provision of ongoing professional development for staff, the fostering of external partnerships with relevant stakeholders, and the adoption of robust monitoring and evaluation frameworks.

Research, as indicated by Smaniotto et al. (2020), reveals a deficiency in students' knowledge, thereby underscoring the need for the implementation of appropriate modifications concerning ESG and other related issues into university curricula, regardless of the disciplines offered. The acquisition of knowledge related to environmental, social, and governance (ESG) issues is contingent upon the specific approach adopted for curriculum integration (Fogarty, 1991). This study employs Integration Theory to investigate whether ESG content is implemented as a permeating "infusion" throughout the university curricula or confined to a discrete, stand-alone "boutique" module. The "Boutique" approach treats ESG like an isolated elective or a token "sustainability module" attached to the end of a degree. It may deliver focused content, but it rather sends a message: ESG is a side quest, not a core business skill. Conversely, the "Infusion" approach aims to integrate ESG principles into the foundational structure of each core discipline. Rather than being addressed in a standalone course, sustainability functions as an analytical lens through which all subjects are examined. The outcome is a more comprehensive and integrative form of ESG literacy, in which students do not merely possess declarative knowledge about ESG but conceptualise it as an indispensable and structurally embedded dimension of contemporary professional practice.

In line with Bernstein's (2018) theory of pedagogic identity, the degree of boundary separation between ESG-oriented content and core technical subjects is posited to shape the extent to which students develop an integrated professional identity, thereby enhancing their capacity to engage with and manage the complex trade-offs among environmental impact, social responsibility, and corporate governance. Testing for knowledge of ESG concepts, documents, and indicators serves as a diagnostic tool for curriculum integration. While proficiency in specific documents may reflect a specialised "Boutique" education, the ability to link these documents to functional indicators and broader conceptual frameworks suggests an "Infusion" approach. True integration is revealed when students do not view indicators as external compliance data but as internal decision-making tools essential to all business disciplines. Recent scholarship underscores the necessity of systemic transformations across both educational institutions and industry. Universities are urged to implement experiential learning methodologies, deepen collaboration with industrial partners, and provide flexible, inclusive access to green education (da Costa et al., 2025). Particular emphasis should be placed on integrating diverse forms of environmentally oriented content into the curricula for future managers (Huttmanová et al., 2024). Furthermore, Vítečková and Houdek (2025) argue that, in the absence of a substantial shift toward more active, student-centred teaching methods, ESG-oriented education risks resulting merely in superficial verbal commitments by students rather than in a substantive reconfiguration of their underlying business values.

Research methods

The knowledge of Polish students on ESG-related issues was examined using the survey research method, in three research areas concerning concepts, documents and indicators related to ESG. The questionnaire was composed of 29 items, which were chosen by the authors from the previous research (Smaniotto et al., 2020), theoretical concepts and models found in the existing literature on ESG, SDGs, combining environmental, social and economic elements. There were 8 items in the concept area, 5 items in the documents area and 4 in the indicators area. In each of these areas, students were asked to declare their knowledge on a 5-point scale, including answers saying that: (1) they had

never heard about the topic they were asked about, (2) they had heard, (3) they had talked about it at the university, (4) they had studied this issue at the university, (5) they had been informed about it by other sources, regardless of the university. Before starting the analysis, the scale's reliability was confirmed using Cronbach's α coefficient. The obtained value of Cronbach's α of 0.886 indicates that the scale used is characterised by a high level of reliability (Tavakol & Dennick, 2011).

Additionally, in order to examine the knowledge in these three research areas in more detail, students were asked to decode the acronym ESG, then indicate which of the European Union documents introduces sustainability reporting standards for enterprises and what is the main goal of the Responsible Development Index¹, giving a choice of four possible answer variants in each of these three questions, of which only one was correct.

The conceptual model for this research integrates Environmental Literacy Theory and Curriculum Integration Theory to evaluate the progression of ESG knowledge among students. Hypothesis H1 reflects „Nominal Literacy” (recognition) and the findings for H2 (CSRD/Taxonomy) as „Functional Literacy” (understanding complex systems) in reference to Roth's theory (Roth, 1992). Hypothesis 1 serves as a proxy for the “Infusion” of basic ESG knowledge across the general student body, predicting a positive correlation between academic exposure (Year of Study) and nominal knowledge. Hypothesis 2 further investigates this progression by examining the transition to “Functional Literacy” at the Master's level. Together, these hypotheses test whether the academic environment facilitates a shift from simple acquaintance with ESG concepts to a sophisticated understanding of regulatory frameworks (e.g., CSRD and EU Taxonomy), thereby shaping the students' professional identity as sustainable practitioners. Hypothesis 3 specifies the “zero point” of ESG literacy. A consistently decreasing annual proportion of respondents indicating that they have “never heard of” ESG (i.e., a statistically significant negative linear trend) would constitute strong evidence that ESG content is being systematically integrated across the curriculum, rather than being presented as a one-off, isolated “boutique” offering.

Three research hypotheses were formulated and employed as the analytical framework for this study:

H1: There is a statistically significant correlation between a student's year of study and the accuracy with which they decode the ESG acronym.

H2: Master's degree students demonstrate a significantly higher level of knowledge regarding ESG regulatory documents (e.g., CSRD Directive, EU Taxonomy) compared to first-year undergraduate students.

H3: As educational progress increases (from the first year of undergraduate studies to the second year of Master's studies), the percentage of “never heard of it” declarations regarding selected ESG concepts decreases.

Data analysis was conducted using SPSS software. To verify the research hypotheses, the chi-square test for linear trend was employed to identify shifts in knowledge levels, while logistic regression was utilised to determine the impact of educational progression on ESG knowledge accuracy.

Characteristics of the research sample

In order to diagnose students' knowledge of ESG, direct research was conducted using an online survey technique between 25 March 2025 and 29 April 2025 among 400 students of Polish universities. The sample was dominated by students of the University of Economics in Katowice (79.5%). The remaining 20.5% were students of six other universities (including: University of Lower Silesia DSW in Wrocław, University of Szczecin, University of Silesia in Katowice, Academy of Fine Arts in Katowice, Higher School of Information Technology in Katowice and Poznań University of Economics).

In the sample, 59.5% were women, 38.8% were men, and 1.7% declared another gender. Almost half were people aged 21 and under (49.5%), and half were 22 and over (50.5%). The majority of the respondents were full-time students (71.8%), the rest (28.2%) were part-time students. Considering

¹ The Responsible Development Index represents a Polish perspective in the discourse surrounding Gross Domestic Product (GDP) as the most prevalent indicator of economic growth, which fails to account for the environmental consequences of economic activities.

the year of study, the respondents were classified into three groups. The first group included first-year bachelor's students who had just started their education at a university (27.8%). The second group, numbering 39.0%, included those who were studying in the second and third year of bachelor's studies, and the third group included students of the first and second year of master's studies (33.2%).

The sample was also divided into four groups according to the field of study, by classifying the fields declared by students into their corresponding scientific disciplines. Therefore, the most numerous in the sample were students related to the field of study of Economics and Finance (29.0%), followed by Management and Quality Sciences (28.5%) and Social Communication and Media Sciences (26.0%). The fewest students studied the field of study related to Technical Information Technology and Telecommunications (16.5%).

Results of the research

Analysing the students' responses regarding their knowledge of ESG-related concepts, it was found that concepts like "Greenhouse effect" and "Human rights" are relatively well-known, with 37.5% and 41.8% of students, respectively, reporting they were informed about them by other sources, and a low percentage (2.8% and 0.8%) having never heard of them. "Carbon footprint" is also widely recognised, with 31.8% learning about it from other sources and only 7.2% having never heard of it. Concepts more directly related to corporate responsibility, such as "ESG Strategy" and "Non-financial reporting", show high percentages of students who have never heard of them (52.3% and 56.0%, respectively). This suggests a significant lack of exposure to these business-specific ESG elements. "Sustainable Development Goals and Agenda 2030" are unknown to 40.5% of students (table 1).

Table 1. Students' knowledge of ESG-related concepts (in %)

Terms	I was informed about it independently of the university through other sources	I have never heard of it	I talked about it at university	I heard	I studied this topic at university
Sustainable Development Goals and the 2030 Agenda	6.0	40.5	14.0	31.3	8.3
ESG strategy	5.8	52.3	13.0	18.0	11.0
Carbon footprint	31.8	7.2	14.8	38.8	7.5
Greenhouse effect	37.5	2.8	16.0	39.5	4.3
Human rights	41.8	0.8	18.3	30.3	9.0
CSR	5.0	40.5	14.8	15.8	24.0
Non-financial reporting	7.0	56.0	10.5	20.0	6.5
Sustainability	20.5	7.8	19.5	28.2	24.0

Source: authors' work based on the prepared questionnaire.

Taking into account the year of study, it was noted that with the transition to higher levels of education, students declare a higher knowledge of the concepts studied, and the percentage of students who studied the analysed concepts at the university increases, the number of students who have never heard of them decreases. Among the concepts analysed by us, the exceptions are human rights (10.8% of those declaring from the first year of studies, 7.7% from the second and third year of studies and 9.0% of master's students). This may be due to the commonness of this topic, which results in not repeating these issues during classes at the university. The greatest differences in the increase in knowledge on a given topic were noted in relation to CSR (55.0% of first-year students had never heard of it compared to 22.6% of master's students), however, this does not apply to all the

concepts that should be paid attention to in education, such as ESG strategy and non-financial reporting.

Less than half of the surveyed students (48.3%) correctly identified the full meaning of the ESG acronym as Environmental, Social, Governance. A significant portion (35.3%) incorrectly associated it with “Efficiency, Stability, Economy” (pol. “Efektywność, Stabilność, Gospodarka”). This indicates a foundational knowledge gap among a large segment of the student population. Generally, students in higher years of study (II & III Bachelor’s, I & II Master’s) demonstrate better knowledge of ESG concepts, documents, and indicators, and are less likely to have “never heard” of them. For example, 65.4% of Master’s students correctly identified the ESG acronym, compared to 37.8% of first-year Bachelor’s students. Interestingly, with respect to the correct understanding of the ESG acronym, students enrolled in the discipline “Technical Information Technology and Telecommunications” demonstrated the highest proportion of correct responses (63.6%), whereas students from the discipline “Social Communication and Media Sciences” achieved the lowest proportion of correct responses (31.7%).

There is a remarkably low knowledge on specific ESG-related documents, especially those relevant to business and policy. A vast majority of students have *never heard* of the „Kyoto Protocol” (77.5%), „UE Taxonomy” (69.3%), „CSRD directive” (75.3%), and „CSDDD Directive” (85.0%). Even for the „Paris Agreement on Climate Change”, 37.8% of students had never heard of it. Only a very small percentage of students reported having studied these specific documents at the university level. For instance, only 1.8% of students studied the CSRD Directive at university, and 1.5% studied the EU Taxonomy (table 2). Analysing students’ responses regarding their knowledge of ESG-related documents by year of study, the same relationship was observed as in the question about ESG-related concepts. The percentage of students who have heard of these documents increases with each year of the educational path.

Table 2. Students’ knowledge of ESG-related documents (in %)

Documents and regulations	I was informed about it independently of the university through other sources	I have never heard of it	I talked about it at university	I heard	I studied this topic at university
Kyoto Protocol (1997)	2.3	77.5	2.3	16.5	1.5
Paris Agreement on Climate Change (2015)	9.8	37.8	6.5	42.8	3.3
EU Taxonomy	3.0	69.3	3.3	23.0	1.5
CSRD Directive	2.8	75.3	3.3	17.0	1.8
CSDDD Directive	1.8	85.0	2.8	8.8	1.8

Source: authors’ work based on the prepared questionnaire.

Approximately 63.7% of the surveyed students accurately identified the European Union document that introduces new sustainability reporting standards for enterprises (Students were instructed to select the correct acronym from among the four options provided in order to identify the corresponding European Union (EU) document.). With respect to the understanding of which EU legal act establishes these standards, it was found that Master’s students, as well as students enrolled in the “Economics and Finance” and “Management and Quality Sciences” programmes, exhibited a higher likelihood of correctly identifying the CSRD Directive.

With regard to the final research area addressing ESG-related indicators, the findings indicate that, analogous to the results on students’ knowledge of ESG documentation, there are considerable deficiencies in their understanding of ESG-related indicators. Over 60% of students have *never heard* of the „Responsible Development Index” (63.2%) and „Index of Sustainable Economic Welfare” (61.3%). The Human Development Index and the Better Life Index are slightly better known, with 38.3% and 41.5% respectively having never heard of them (table 3). When analysing the students’ responses according to their year of study, a similar trend was observed as in the two previous research areas (concepts and documents), indicating that as one moves to the next year of study, the

percentage of people who have never heard of the analysed indicators decreases, and the number of respondents who have heard of them increases.

Table 3. Students' knowledge of ESG-related indicators (in %)

Indicators	I was informed about it independently of the university through other sources	I have never heard of it	I talked about it at university	I heard	I studied this topic at university
Responsible Development Index (I)R	2.0	63.2	4.3	27.8	2.8
Human Development Index – HDI	11.3	38.3	7.8	30.5	12.3
Index of Sustainable Economic Welfare – ISEW	3.8	61.3	6.8	24.8	3.5
Better Life Index	8.0	41.5	9.5	34.8	6.3

Source: authors' work based on the prepared questionnaire.

Although the overall level of knowledge was low, 81.5% of respondents who provided an answer correctly identified the primary objective of the Responsible Development Index as the comprehensive evaluation of a country's development across economic, social, and environmental dimensions. The percentage of respondents correctly defining this indicator increased with the year of study (from 73.9% correctly answering in the first year of studies, through 81.4% from the second and third years of studies, to 88.0% of master's students). Within the distribution of academic disciplines, the highest proportion of respondents who correctly identified the primary objective of this indicator – recorded at 83.6% – were students enrolled in programs in “Economics and Finance”.

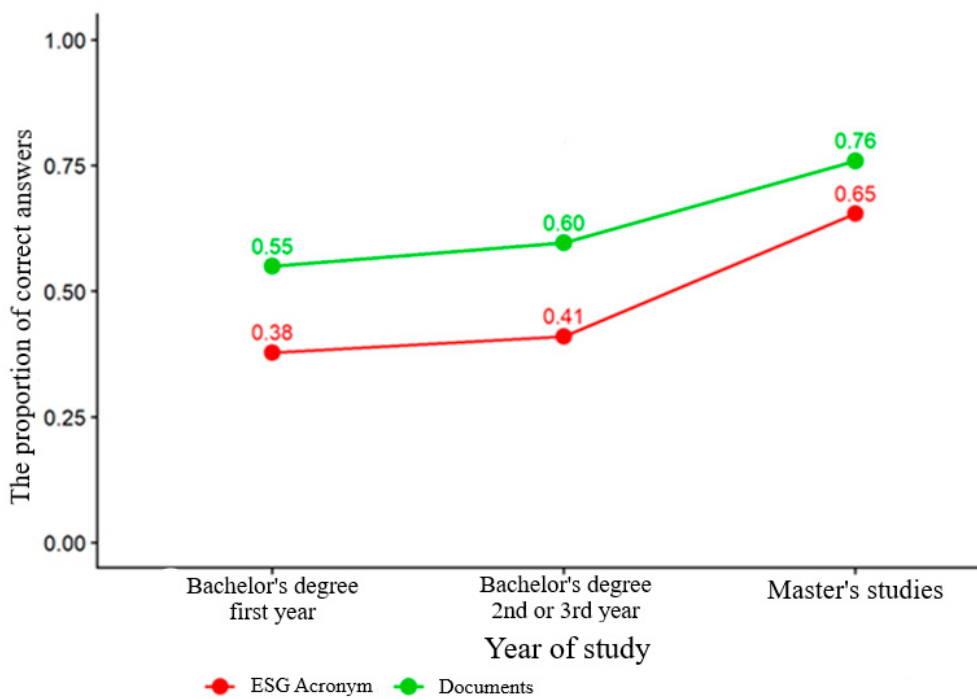
Hypotheses H1 and H2 were tested using two complementary statistical methods: the chi-square test for linear trend and logistic regression. Detailed results for these analyses are presented in Table 4. Regarding H1, both the linear trend test and the logistic regression revealed a significant increase in the probability of providing a correct answer for the ESG acronym with each subsequent year of study. The logistic model indicates that each additional year of education increases the odds of a correct answer by 1.79-fold (95% CI [1.38, 2.33]), $p < 0.001$). Specifically, while only 38% of first-year students provided correct answers, the predicted probability rose to approximately 52% in the second year and 66% by the third year – a total increase of 28 %. The χ^2 test of the linear trend revealed a significant ordinal relationship, $\chi^2(1) = 19.50$, $p < 0.001$. Although the effect size was small ($r = 0.22$, 95% CI [0.13, 0.32]), these findings confirm a systematic educational effect on basic ESG literacy, thereby supporting H1.

The second hypothesis (H2) examined differences in knowledge concerning European Union regulatory documents (e.g., CSRD Directive, EU Taxonomy). Consistent with H2, results showed that Master's students demonstrate a significantly higher level of proficiency than their undergraduate counterparts. Logistic regression identified a moderate increase in the odds of a correct answer associated with the year of study (OR = 1.60; 95% CI [1.22; 2.09]; $p < 0.001$). The percentage of correct responses increased from 23.9% (first year) to 36.5% (second/third year), reaching 39.6% at the Master's level. This overall increase of 15.7 percentage points was further validated by the χ^2 linear trend test ($\chi^2(1) = 12.03$; $p < 0.001$) with a small effect size ($r = 0.17$; 95% CI [0.08, 0.27]). Notably, while the educational effect remains positive, the data suggest that the rate of knowledge gain slows down at the Master's level.

Tabela 4. Verification of hypotheses H1 and H2

Hypothesis	H1	H2
χ^2 test of linear trend		
χ^2	19.50	12.03
p (for the trend)	p < 0.001	p < 0.001
r (effect size)	0.22	0.17
95% PU for r		
Lower limit	0.13	0.08
Upper limit	0.32	0.27
Interpretation r	small	small
Precision r	moderate	moderate
Logistic regression		
Odd Ratio (OR)	1.79	1.60
95% PU for OR		
Lower limit	1.38	1.22
Upper limit	2.33	2.09
Interpretation OR	moderate growth	moderate growth
Precision OR	low	low
p for logit	p < 0.001	p < 0.001

Explanations: PU was calculated using the percentile bootstrap method of 5 thousand draws.
Source: authors' work based on the prepared questionnaire.

**Figure 1.** The trajectory of the trends

Source: authors' work based on the prepared questionnaire.

Figure 1 presents the trajectory of both trends: the proportion of respondents correctly decoding the ESG acronym and the proportion providing correct answers regarding EU documents across successive years of study.

The analyses demonstrate a statistically significant educational effect. The most pronounced effect (i.e., the highest χ^2 value and odds ratio) is observed for familiarity with the ESG acronym. For document-related outcomes, the effect sizes are smaller yet remain statistically significant and indicate a systematic increase in competence with higher levels of study.

The correlation between year of study and the level of ignorance regarding selected ESG concepts was examined using the χ^2 test for linear trend and logistic regression. This analysis enabled the assessment of the direction, magnitude, and robustness of the educational effect in order to test hypothesis H3 (Table 5).

A statistically significant linear trend was found for the following variables: Sustainable Development Goals and 2030 Agenda ($\chi^2 = 17.29$; $p < 0.001$; $r = 0.21$), ESG Strategy ($\chi^2 = 21.81$; $p < 0.001$; $r = 0.23$), Carbon Footprint ($\chi^2 = 10.51$; $p = 0.005$; $r = 0.16$), CSR ($\chi^2 = 29.02$; $p < 0.001$; $r = 0.27$), Non-financial reporting ($\chi^2 = 11.11$; $p = 0.004$; $r = 0.17$) and Sustainability ($\chi^2 = 6.59$; $p = 0.037$; $r = 0.13$).

All significant effect sizes were small in each case ($r = 0.13$ – 0.27), indicating a weak but systematic decline in ignorance with subsequent years of study. Confidence intervals for r were moderately wide, indicating the stability of the estimates.

No significant trend was found for the variables: Greenhouse effect ($p = 0.224$; $r = 0.09$) and Human rights ($p = 0.442$; $r = 0.06$), where the effect size was negligible. It should be noted that ignorance in these areas was very low from the beginning (Table 5); it can be assumed that this knowledge is generally available and well known to people aspiring to higher education.

Logistic regression analysis confirmed the direction of effect for most variables. Odds ratios (ORs) ranged from 0.44 to 0.71, indicating a 29% to 56% reduction in the risk of incorrect responses with each additional year of study.

The strongest effect was recorded for the Carbon Footprint variable (OR = 0.44; \downarrow 56%), while the relatively weakest was observed for Non-financial reporting (OR = 0.71; \downarrow 29%). The effects for CSR (OR = 0.49; \downarrow 51%) and Sustainable Development Goals (OR = 0.59; \downarrow 41%) also indicate moderate to large risk reduction.

Statistical significance in the logistic model was obtained for most variables ($p < 0.01$), except for Greenhouse Effect and Human Rights, which is consistent with the results of the linear trend test.

The obtained results indicate that the level of ignorance regarding ESG-related concepts systematically decreases in subsequent years of study, but the magnitude of these effects is small. Therefore, an educational effect exists, but its intensity is limited.

Tabela 5. Trend for “Never heard of” responses for selected ESG concepts (H3)

Concepts	C1	C2	C3	C4	C5	C6	C7	C8
χ^2 test of linear trend								
χ^2	17.29	21.81	10.51	2.99	1.63	29.02	11.11	6.59
p	$p < 0.001$	$p < 0.001$	0.005	0.224	0.442	$p < 0.001$	0.004	0.037
r	0.21	0.23	0.16	0.09	0.06	0.27	0.17	0.13
95% PU								
Lower limit	0.12	0.14	0.10	0.03	0.05	0.18	0.08	0.06
Upper limit	0.30	0.33	0.24	0.16	0.14	0.36	0.26	0.21
Interpretation r	Low	Low	Low	Insignificant	Insignificant	Low	Low	Low
Precision r	Moderate	Moderate	Moderate	Moderate	High	Moderate	Moderate	Moderate
Logistic regression								
Odd Ratio (OR)	0.59	0.64	0.44	0.57	0.51	0.49	0.71	0.64
95% PU dla OR								

Concepts	C1	C2	C3	C4	C5	C6	C7	C8
Lower limit	0.45	0.49	0.26	0.24	0.00	0.37	0.54	0.41
Upper limit	0.77	0.82	0.69	1.10	1.00	0.64	0.91	0.98
Risk decrease	↓ 41%	↓ 36%	↓ 56%	↓ 43%	↓ 49%	↓ 51%	↓ 29%	↓ 36%
Effect size	Moderate	Moderate	Big	Moderate	Moderate	Big	Small	Moderate
Precision OR	Low	Low	Low	Low	Low	Moderate	Low	Low
p	p < 0.001	p < 0.001	0.003	0.166	0.400	p < 0.001	0.009	0.068

Explanations: C1 -Sustainable Development Goals and the 2030 Agenda; C2-ESG strategy; C3-Carbon footprint; C4-Greenhouse effect; C5-Human rights; C6-CSR; C7-Non-financial reporting; C8-Sustainability

Source: authors' work based on the prepared questionnaire.

The statistical analysis provides strong evidence to support both H1 and H2. The logistic regression models and chi-square tests for trend yielded significant results ($p < 0.001$), confirming that both the year of study and the level of degree (Bachelor's vs. Master's) are positive predictors of ESG literacy. Specifically, the odds ratios (OR = 1.79 for H1 and OR = 1.60 for H2) demonstrate a consistent and significant progression in student knowledge as they advance through the curriculum.

The results of the chi-square test for linear trend confirm H3, revealing a statistically significant downward trend in 'unfamiliarity' declarations as students progress through the curriculum ($p < 0.001$). The data shows a consistent decline in the percentage of students who had 'never heard of' core ESG concepts, moving from the first year of undergraduate studies to the completion of the Master's degree. This allows for the rejection of the null hypothesis, confirming that educational advancement is fundamentally linked to the elimination of absolute unawareness regarding sustainability terminology. However, it must be underscored that, in the present context, no statistically significant association can be demonstrated between the greenhouse effect and human rights.

The statistical analysis confirmed that educational progression is a key driver of ESG literacy among students.

- Hypothesis 1 is confirmed. There is a significant positive correlation between the year of study and the ability to correctly decode the ESG acronym. Each additional year of study increases the odds of a correct answer by 1.79-fold.
- Hypothesis 2 is confirmed. Master's students demonstrate a significantly higher level of knowledge regarding documents like the CSRD Directive and EU Taxonomy compared to first-year undergraduates. The odds of a correct answer increase by 1.60-fold with educational progress.
- Hypothesis 3 (Ignorance Gap) is confirmed. As students advance from the first year to the Master's level, the percentage of „never heard of it" declarations for core ESG concepts systematically decreases. For example, the risk of being unfamiliar with the Carbon Footprint concept drops by 56% per year of study.

Discussion/Limitation and future research

The ability to correctly expand the acronym ESG does not necessarily imply that a student possesses substantive knowledge of the underlying concept. Although a relatively high proportion of students accurately decoded the ESG acronym, correctly identified the CSRD directive, and recognised the objective of the Responsible Development Index, these outcomes do not provide sufficient evidence of a comprehensive or in-depth understanding of ESG-related issues.

Students in advanced stages of study (first- and second-cycle master's programmes), as well as those enrolled in degree programmes in Management and Quality Sciences, Economics and Finance, and Technical Information Technology and Telecommunications, exhibit marginally higher levels of knowledge regarding selected ESG-related issues compared with students in earlier years of study and those pursuing programmes in Social Communication and Media Sciences.

Students exhibit heterogeneous levels of knowledge regarding specific ESG-related concepts, regulatory documents, and performance indicators. For example, a large percentage of students have never heard of concepts such as ESG Strategy (52.3%) or Non-Financial Reporting (56.0%). Similarly, a high percentage of students have never heard of documents such as the Kyoto Protocol (77.5%), the EU Taxonomy (69.3%) or the CSDDD Directive (85.0%). In the case of indicators, 63.2% of students have never heard of the Responsible Development Index.

The empirical validation of H1 and H2 suggests that the university's "infusion" approach to ESG education is functioning effectively. By confirming that knowledge levels increase significantly with academic seniority, the results indicate that students are not only acquiring "Nominal Literacy" (H1) but are also successfully transitioning toward "Functional Literacy" (H2) regarding complex regulatory frameworks like the CSRD and EU Taxonomy.

The data strongly supports the stated goal of the research: to develop solutions for economic study programs that integrate ESG issues into various social science subjects. There is a clear need to enhance students' knowledge of ESG concepts, crucial documents, and relevant indicators. Given the low exposure to certain key concepts and documents within university settings, it appears that current curricula may not be sufficiently preparing students for the increasing importance of ESG in the professional world.

Despite the significant findings regarding the progression of ESG knowledge, this study is subject to several limitations that should be considered when interpreting the results. First, the research utilised a convenience and purposeful sampling technique at a single university in Poland. Consequently, the findings represent the specific academic context of one institution and cannot be broadly generalised to all higher education institutions in Poland or internationally. Second, the study relies on self-reported knowledge and students' subjective declarations of their awareness. Future research could benefit from objective competency testing or case-based assessments to verify the practical 'functional' application of this knowledge. Finally, while the study identifies a correlation between the year of study and ESG proficiency, it does not account for external variables such as professional experience, internships, or non-academic media consumption, which may also contribute to the students' literacy. Future longitudinal studies would be valuable to track the evolution of ESG competencies as students transition from academia into the professional labour market.

Acknowledging the limitations inherent in convenience sampling, subsequent research may incorporate qualitative methodologies, such as focus groups and in-depth interviews with students and academic teachers, to obtain more profound insights into student perceptions, learning barriers, and university perspectives regarding curriculum integration. This approach would yield a more comprehensive understanding. Furthermore, a mixed-methods approach could assist in validating the survey instrument and ensure it thoroughly encompasses the entire spectrum of ESG knowledge.

Conclusions

The research presented provides initial empirical data on an essential element of the progression towards sustainable development within the context of higher education in Poland. It specifically underscores a deficiency in students' comprehension across various ESG concepts, documents, and indicators. This finding corroborates prior research by Smaniotto et al. (2020), which also disclosed a low level of students' understanding concerning sustainable development goals and associated matters.

In summary, hypotheses H1 and H2 were empirically supported, indicating that advancement within the educational trajectory constitutes a principal determinant of students' ESG-related knowledge and technical competencies. These results highlight the effectiveness of systematically embedding sustainability-related content across diverse social science disciplines.

The study revealed that first-year bachelor's students exhibit a deficiency in ESG knowledge, while those in their final year of bachelor's degrees and master's students exhibit some degree of knowledge and competence. Thus, students in advanced years of study generally display a greater understanding of ESG concepts, documents, and indicators, and are less inclined to have "never heard" of them. Nevertheless, the overarching deficiency in comprehensive knowledge, even among students in higher years, particularly regarding specific documents and advanced concepts, indicates that the presumed level of competence in these advanced years may remain inadequate.

The confirmation of H3 carries significant theoretical weight. It indicates that the university's current educational model successfully facilitates the first critical step in literacy development: the transition from lack of knowledge to Nominal Literacy. By significantly reducing the 'ignorance gap' across all examined ESG concepts, the institution demonstrates a successful Infusion approach, ensuring that sustainability terminology is not isolated to specific niches but is broad enough to reach the entire student body by the time they reach graduate levels.

The data confirms the articulated objective of the research: to formulate solutions for economic study programs that incorporate ESG issues into a variety of social science disciplines. It underscores a distinct necessity for universities to integrate ESG issues in a systematic and comprehensive manner within study programs, notably in domains such as economics, management sciences, finance, and social communication. This research augments the growing corpus of literature stressing the necessity of systematic frameworks to bolster ESG initiatives and assess their implications for educational outcomes.

Finally, the verification of H3 proves that the academic curriculum effectively 'breaks the silence' surrounding ESG issues. The systematic decrease in students reporting a total lack of knowledge ensures that graduates are not entering the professional landscape with blind spots regarding ESG. This supports the overarching goal of the study programs to produce informed participants in the modern, regulated economy where ESG literacy is a baseline requirement.

Upon examination of the results obtained, the subsequent recommendations can be proposed for both academic teachers and HEIs aiming to integrate knowledge pertaining to ESG. The 'infusion' approach to teaching thinking is defined as the deliberate integration and systematic incorporation of selected cognitive and metacognitive skills into the teaching-learning process. Therefore, the first recommendation is to expand this approach in ESG teaching at universities.

Recommendation 1: Integrate ESG into economic and social studies curricula:

Research indicates that a mere 8.3% of students have engaged in studies related to the Sustainable Development Goals and the 2030 Agenda at the university level, while only 11% have explored ESG strategy. This underscores a significant necessity to incorporate ESG issues into economics and other related academic programs, thereby enabling students to acquire a more comprehensive understanding of the subject, as well as to discern the interconnections among different ESG domains. It is imperative to systematically and comprehensively integrate ESG issues within study programs, particularly in the fields of economics, management sciences, finance, and social communication.

Recommendation 2: Strengthen background knowledge and connections:

Establishing a comprehensive understanding of ESG principles is imperative, commencing with an elucidation of the acronym itself and extending to a thorough comprehension of its principal objectives and implications for business, the economy, and society. Furthermore, it is crucial to highlight the interdependencies among these domains, as current student perceptions fail to recognise such connections. For instance, while 63.7% of students correctly identified the Corporate Sustainability Reporting Directive (CSRD), a mere 1.8% have engaged with it within their university studies.

Recommendation 3: Introducing dedicated courses and modules related to the field of study:

The findings indicate that a significant proportion of students lack knowledge of essential documents like the Kyoto Protocol (77.5%), the EU Taxonomy (69.3%), and the CSDDD Directive (85.0%). This underscores the necessity to implement dedicated courses or modules that will thoroughly examine these documents and other critical components of ESG, highlighting their connections with various academic disciplines.

Recommendation 4: Practical aspects and applications:

Beyond theoretical instruction, academic curricula must emphasise the practical implementation of ESG principles. This can be achieved through the examination of non-financial reports, analysis of case studies pertaining to companies applying ESG strategies, and the utilisation of indicators that assess sustainable development. It is noteworthy that a mere 6.5% of students engaged in the study of non-financial reporting during their university education.

Recommendation 5: Leveling the knowledge gap:

Consideration must also be given to the distinction of knowledge across distinct academic disciplines and academic levels. Introductory courses on ESG may be incorporated for students in the earlier years of study, with the curriculum tailored to the particularities of various fields, thereby ensuring that every graduate, irrespective of their area of specialisation, possesses foundational knowledge of ESG and comprehends its significance for the economy and society.

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The contribution of the authors

Conceptualisation, A.A.M and B.K.; literature review, A.A.M.; methodology, A.A.M and B.K.; formal analysis, B.K.; writing, A.A.M and B.K.; conclusions and discussion, A.A.M and B.K.

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Anna ADAMUS-MATUSZYŃSKA • Beata KOLNY

WIEDZA STUDENTÓW NA TEMAT ESG: IMPLIKACJE DLA PROGRAMÓW STUDIÓW

STRESZCZENIE: Cel: ESG (environmental, social, governance) to skrót coraz częściej brany pod uwagę przez podmioty gospodarcze przy opracowywaniu strategii korporacyjnych ukierunkowanych na zrównoważony rozwój i społeczną odpowiedzialność. Jest to stosunkowo nowy paradygmat, który ukierunkowuje gospodarkę i jej podmioty na inne niż dotychczas cele biznesowe. Jeszcze kilkanaście lat temu przedsiębiorstwa nie uwzględniały tych czynników w swoich strategiach. Obecnie jest to już kanon zachowań gospodarczych, najpierw wymuszany przez normy jakościowe, następnie przez interesariuszy i całe społeczeństwo, by stać się standardem regulowanym przez rozwiązania prawne. W związku z powyższym zrodził się problem badawczy dotyczący wiedzy studentów na temat zagadnień związanych z ESG w trzech obszarach obejmujących: koncepcje, dokumenty i wskaźniki mierzące ESG oraz możliwości implementacji tych zagadnień w programach studiów. Celem omawianych badań jest nie tylko poznanie wiedzy studentów, ale również wypracowanie rozwiązań dla programów studiów ekonomicznych, które uwzględniają lub będą uwzględniać problematykę ESG w treściach różnych przedmiotów społecznych. Metodologia/podejście: Metodą badawczą wykorzystaną do poznania wiedzy studentów na temat ESG były badania ankietowe przeprowadzone przy użyciu techniki kwestionariusza online, która została wcześniej opracowana i zweryfikowana w badaniach włoskich studentów (Smannotto et al., 2020). Próba badawcza jest celowa, grupa respondentów to studenci, którzy w trakcie studiów zwłaszcza ekonomicznych poznają zarówno rozwiązania biznesowe, jak i prawne dotyczące ESG. W badaniu przyjęto ogólną hipotezę badawczą, zakładającą, że student pierwszego roku studiów licencjackich nie ma wiedzy na temat ESG, a student ostatniego roku studiów licencjackich i magisterskich ma pewien poziom wiedzy i jest kompetentny, aby wypowiadać się na temat ESG.

Wyniki: Fakt, że akronim ESG jest poprawnie odczytany, nie oznacza, że student ma wiedzę na ten temat. Pomimo stosunkowo wysokiego odsetka studentów, którzy poprawnie odczytali akronim ESG, poprawnie wskazali dyrektywę CSRD i cel Wskaźnika Odpowiedzialnego Rozwoju, fakt ten nie wskazuje na kompleksową wiedzę na temat zagadnień ESG. Ograniczenia/implikacje badań: Badania przeprowadzono z wykorzystaniem techniki dostępności, co oznacza, że nie można ich generalizować na inne uczelnie w Polsce i za granicą. Niemniej jednak mogą one stanowić podstawę do opracowania narzędzia badawczego, za pomocą którego będzie można zbadać wiedzę studentów wszystkich uczelni i dokonać porównań. Oryginalność/wartość: Przedstawione badania oferują wstępne dane empiryczne na temat kluczowego elementu przejścia do zrównoważonego rozwoju w kontekście szkolnictwa wyższego. Dane te ułatwiają doskonalenie programów edukacyjnych w celu skuteczniejszego reagowania na potrzeby rynku pracy i przyszłe wyzwania. Ponadto mają one istotne praktyczne implikacje dla uczelni, studentów, firm i całego społeczeństwa w ich dążeniu do osiągnięcia bardziej zrównoważonego środowiska globalnego.

SŁOWA KLUCZOWE: ESG, CSRD, instytucja szkolnictwa wyższego (HEI)