An overview of the engagement of higher education institutions in the implementation of the UN Sustainable Development Goals

Walter Leal Filho [a,b], Amanda Lange Salvia [a,c,*], João Henrique Paulino Pires Eustachio [d]

[a] *European School of Sustainability Science and Research (ESSSR), Hamburg University of Applied Sciences, Germany*
[b] *Department of Natural Sciences, Manchester Metropolitan University, Chester Street, Manchester, M1 5GD, UK*
[c] *Graduate Program in Civil and Environmental Engineering, University of Passo Fundo, Passo Fundo, RS, Brazil*
[d] *School of Economics, Business Administration and Accounting at Ribeirão Preto, University of São Paulo (USP), Avenida dos Bandeirantes 3900, 14040-905, Ribeirão Preto, SP, Brazil*

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ABSTRACT

Higher education institutions provide valuable inputs toward implementing the UN Sustainable Development Goals (SDGs). Yet, it is unclear how this engagement is taking place across the world. This study addresses this problem, by reporting on a survey involving a sample of 209 experts from 65 developing, in transition, and developed countries, which sheds light on the involvement of the participants and the overall landscape of implementation of the SDGs in teaching and research. In both contexts, the results indicate the SDGs are recognised as an opportunity for increased collaboration within the university and between different universities. On the other hand, more attention should be paid to the need for revising teaching curricula and research programmes/projects so that they include the SDGs. Also, students do not seem to be proactive in requesting more teaching content and research opportunities related to the SDGs. The results support the recommendation of further actions higher education institutions need to undertake to assist in delivering the SDGs, including intensified networking efforts and engagement with local partners.

1. Higher education institutions and the sustainable development goals

In 2015, the United Nations Member States approved the 2030 Agenda for Sustainable Development and adopted the Sustainable Development Goals (SDGs). The Agenda is considered a global action plan to eradiate poverty and promote sustainable development across five areas: people, planet, prosperity, peace and partnership (United Nations, 2015). The SDGs comprise a group of 17 goals and 169 targets that demand transformation on economic, social and environmental aspects, in both developing and developed contexts (Hák et al., 2016; Sachs et al., 2019).

The goals have gained considerable visibility in recent years. The SDGs also involve improving education, counting on the support of higher education institutions (HEIs), which have the ability to engage in sustainability and promote the achievement of the goals (Chankseliani and McCowan, 2021).

Higher education assists in the implementation of a wide range of SDGs. These vary from goals related to social aspects (such as poverty - SDG1, hunger - SDG 2, health and well-being - SDG3; and gender equality - SDG5), economic aspects and infrastructure (such as energy - SDG 7, decent work and economic growth - SDG 8, industry - SDG 9, sustainable cities – SDG 11, and production and consumption – SDG 12), and other urgent matters related to climate change – SDG 13, and peace and justice – SDG 16. One particular goal, namely SDG 4, involves several strong positive correlations with other goals (Fonseca et al., 2020), and aims at promoting equal and fair access to education at the primary, secondary and tertiary levels, in addition to lifelong learning opportunities for all. However, to allow the SDGs to be achieved, the provision of education at HEIs needs to be equitable in all parts of the world to ensure the progress of the goals.

HEIs assist in the implementation of the SDGs in several ways. One way is using sustainability research, which play a vital role in development. Research usually takes place within a single discipline or in multidisciplinary or interdisciplinary manners, with researchers from different areas working independently on the same project or combining their expertise (Collin, 2009). Sustainability research has the advantage of being able to focus on problems that threaten the livelihood and

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integrity of various groups (Miller et al., 2014). It is also key in documenting experiences, supporting solutions, and integrating different types of knowledge – from academic to indigenous, from policy development to practice (Smith et al., 2018) and in revisiting priorities in the wake of local or global crises (e.g., the Coronavirus pandemic, Ranjbari et al., 2021). As investigated by Salvia et al. (2019), the use of the SDGs in academic research is supporting experts in addressing global and local challenges, with general priority in areas related to education, sustainable cities and climate change (SDGs 4, 11 and 13). By means of a focus on areas such as the study of human-natural systems, it provides much-needed insights and draw attention to problems that require sustainable solutions (Miller et al., 2014).

The second way via which HEIs help in the implementation of the SDGs is through teaching. Amongst the strategies to incorporate the SDGs in the curriculum are the development of new courses or modules that target sustainable development, or the revision of existing curricula to include sustainability-related topics (Pallant et al., 2020; Weiss et al., 2021). SDGs are usually integrated into Education for Sustainable Development (ESD), which is extensively explored in the literature (Ferrer-Estévez and Chalmeta, 2021; Fonseca et al., 2018; Lozano et al., 2015; Zguir et al., 2021) and a specific target within SDG 4.

Students are prompted to engage in sustainability through learning and, by doing so, their competencies in the process of problem-solving in their regions and work area are developed (Álvarez et al., 2021). The SDGs also represent an opportunity for managers, teaching staff, course coordinators and students to reflect on the competencies needed for teaching and learning about sustainable development (Baena-Morales et al., 2022; Brundiers et al., 2021; Dlouhá et al., 2019). In analysing opportunities to address the SDGs, HEIs can assess their curricula and check opportunities for collaboration within and outside the university (Chang and Lien, 2020; Kioupi and Voulvoulis, 2020; Willats et al., 2018).

In other instances, HEIs engage in lifelong learning, which is among the actions areas of SDG 4 (Ferguson and Roofe, 2020) and allows universities to create programmes that promote learning out of formal education (Ouane, 2011; Taşçı and Titrek, 2020). Ordinary citizens and community members are encouraged to learn about sustainability through day-to-day practices including knowledge dissemination through ad hoc courses, and also by simply talking with friends. This practice does not have age barriers and includes the exchange of intergenerational knowledge (Nicolau et al., 2018; Simándi, 2018). Similarly, the approach of HEIs as living labs also increases learning opportunities for different groups, promotes open communication and engages stakeholders from several areas (Leal Filho et al., 2022).

Furthermore, HEIs promote the creation of regenerative societies. Firstly, they bring about changes in scholarly behavior through transdisciplinary work – when experiences from different areas are combined and used as an overarching conceptual framework towards addressing a specific challenge (Collin, 2009). Secondly, they promote sustainability on a global scale by influencing ideologies and perspectives regarding environmental problems. Lastly, education for sustainable development allows academics to advance the integrative dimensions that promotes sustainability in society (Sonetti et al., 2019), also encouraging other positive types of changes. On the other hand, reaching these outcomes is not without challenges. The SDGs are not a package that can be simply applied to higher education settings, and sustainability-related decisions involve balancing political, moral and epistemic priorities (Chankseliani and McCowan, 2021). As presented by these authors, there is a need to further document the several approaches universities have been using to promote sustainable development, in order to understand their impacts and combined effects in the different areas within the university.

HEIs also foster sustainable development through the transformation of their campus operations. This can be implemented by creating green operations and include approaches such as the use of renewable energy, optimising energy in buildings and encouraging energy conservation (Gui et al., 2021). Furthermore, courses have the opportunity to prompt students to develop innovative renewable energy systems that may be used on campuses (Wang and Guo, 2021). Moreover, campuses are also encouraged to optimise their solid waste management, as this is often neglected and hinders sustainability (Rimantho et al., 2019).

Additionally, campuses could attempt to decarbonise themselves by optimising transportation systems with the institution. This includes inter-campus and intra-campus travel and comprise of usage of buses and other means of public transport. In order to reduce their carbon emissions and contribute to SDGs such as SDG13 (Climate Action), HEIs could also encourage carpooling and clean energy transportation methods e.g., cycling and walking (Logan et al., 2020).

In general, HEIs are well placed to support the implementation of the SDGs and no matter if they are in a developed, or a developing country. One important aspect is identifying the means via which current efforts are being implemented, a matter dealt with in the next sections of this paper.

2. Methods

To understand the landscape of the teaching and research opportunities and approaches universities and academics have regarding SDGs implementation, a world survey was conducted to gather information from experts from different countries. The questionnaire was built on previous work that analysed how HEIs implement the SDGs in teaching and research (Chankseliani and McCowan, 2021; Salvia et al., 2019; Sanches et al., 2021), as these authors agree on the importance of further exploration.

Fig. 1 summarises the data collection stages as well as the main methods and techniques used to analyse data, which are also explored in the following two subsections.

2.1. Data collection and sample description

In order to collect data, the authors developed the questionnaire based on the SDGs and HEIs literature. The questionnaire was built into three blocks of questions. The first intended to explain to the participants the research purpose and ask them to read the informed consent form before answering the questions. If they agree, they move to the second section, which aims to understand the demographic characteristics of the participants and then the third, containing questions related to the participant's level of agreement according to statements in two dimensions: teaching and research. The possible answers for the statements were based on a five-point Likert scale, varying from 1 (strongly disagree) to 5 (strongly agree). The statements are available in Table A1 (Appendix).

Data collection took place through an online survey. The initial contact with the participants was established through the Inter-University Sustainable Development Research Programme network (IUSDRP, 2022), as experts were invited by e-mail to answer the survey. In the second moment, the snowball sampling technique was also adopted since the respondents were encouraged to contribute by sharing the survey with colleagues engaged in teaching and research.

The online survey remained open for responses from 19 October to 23 December 2021 and received a total of 209 complete answers from experts who hold research and teaching positions at universities from developed and developing or transition countries. Table 1 presents the description of the sample respondents and the HEIs they belong.

Once the survey was closed, the authors exported all the complete answers in a single Excel spreadsheet, identified which countries belong to the categories analysed and prepared the answers for the data analysis stage.

2.2. Data analysis strategy

The data analysis relied on descriptive statistics and frequency analysis to understand and discuss the answers obtained. In addition,
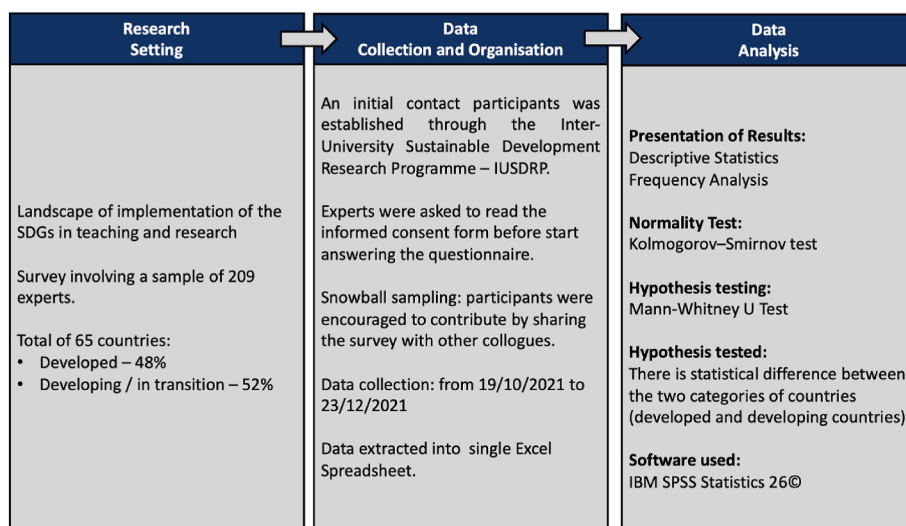
Fig. 1. Research setting.

Table 1
Sample description.

Categories		Responses	Percentage
Country Category	Developed	101	48%
	Developing or In Transition	108	52%
Gender	Female	88	42%
	Male	119	57%
	Other	2	1%
Knowledge area (multiple choice)	Education	124	59%
	Arts and humanities	20	10%
	Social sciences, journalism and information	44	21%
	Business, administration and law	33	16%
	Natural sciences, mathematics and statistics	38	18%
	Information and communication technologies	13	6%
	Engineering, manufacturing and construction	38	18%
	Agriculture, forestry, fisheries and veterinary	27	13%
	Health and welfare	15	7%
	Services	3	1%
	Other	32	15%
Institution Category	Private Higher Education Institution	54	26%
	Public Higher Education Institution	155	74%
HEIs' number of students	more than 40.000	29	14%
	up to 40.000	30	14%
	up to 20.000	40	19%
	up to 10.000	43	21%
	up to 5.000	67	32%

Note: 209 respondents.

because this study also aimed to understand the extent to which there are differences between developed and developing/in transition countries, hypothesis testing was adopted to check whether the distribution of answers was significantly different between the categories of countries. The hypothesis adopted to test each one of the questions was: *There is a statistical difference between the two categories of countries.* The idea behind comparing developed and in transition/developing countries was based on previous studies which suggest the differences in the SDGs implementation in these two categories of countries as well as the barriers and potential of adoption (Ferguson and Roofe, 2020; Halog and Anieke, 2021).

In this sense, non-parametric independent-samples Mann–Whitney *U*

Test was performed since data of variables are not normally distributed ($p < 0.05$). Table A2 (Appendix) shows the results of the normality test (Kolmogorov–Smirnov). The authors used IBM SPSS Statistics 26© to conduct the analysis and obtain the results (IBM SPSS Statistics 26, 2019), which are presented though tables and graphs with the significance levels of 0.05 and 0.01 identified.

3. The world study on the SDGs in higher education

A total of 209 complete answers were received from experts who hold research and teaching positions at universities. Out of the 209, 26 experts are from North America, 31 from Latin America/Caribbean, 25 from Africa, 41 from Asia, 74 from Europe, and 12 from Oceania. The sample is also well distributed among developed countries (48%) and in transition and developing countries (52%), considering the UN's current classification criteria (United Nations, 2021). The country distribution and the number of responses per country are presented in Fig. 2.

Table 2 summarises the results of the Independent-samples Mann–Whitney U tests. Among the 13 hypotheses, two of them indicate that the categories of countries are statistically different at a significance level of 0.05 and four of them at a significance level of 0.01. Fig. 3 complements Table 2 and reports on the opinions of respondents regarding the extent to which they believe the SDGs are relevant to be incorporated into strategies and practices related to teaching and research. The descriptive statistics of each question of the questionnaire is presented in Table A1 (Appendix).

From the teaching perspective, the respondents indicate that the SDGs are an opportunity for increased teaching collaboration between different universities, stakeholders (e.g., communities and businesses), and units/programmes inside their universities; however, when asked about the students' perspective, the respondents suggest that students are not proactive in requesting more teaching content related to the SDGs on their classes. In addition, when it comes to the formal curricula of programmes, the respondents indicate that they have, to some extent, voluntarily revised the content of their classes to add more issues connected to the SDGs. In contrast, when asked about the formal perspective of curricula revision of the courses they teach, the average of answers was considerably lower.

These results are aligned Zamora-Polo and Sánchez-Martín (2019), who refer to the occasional lack of recognition to the work of professors in implementing the SDGs in their teaching, and the need for assistance from managers and politicians so that guidelines and institutional support can be offered. Authors also highlight the power of collaboration among the academic and local communities in implementing
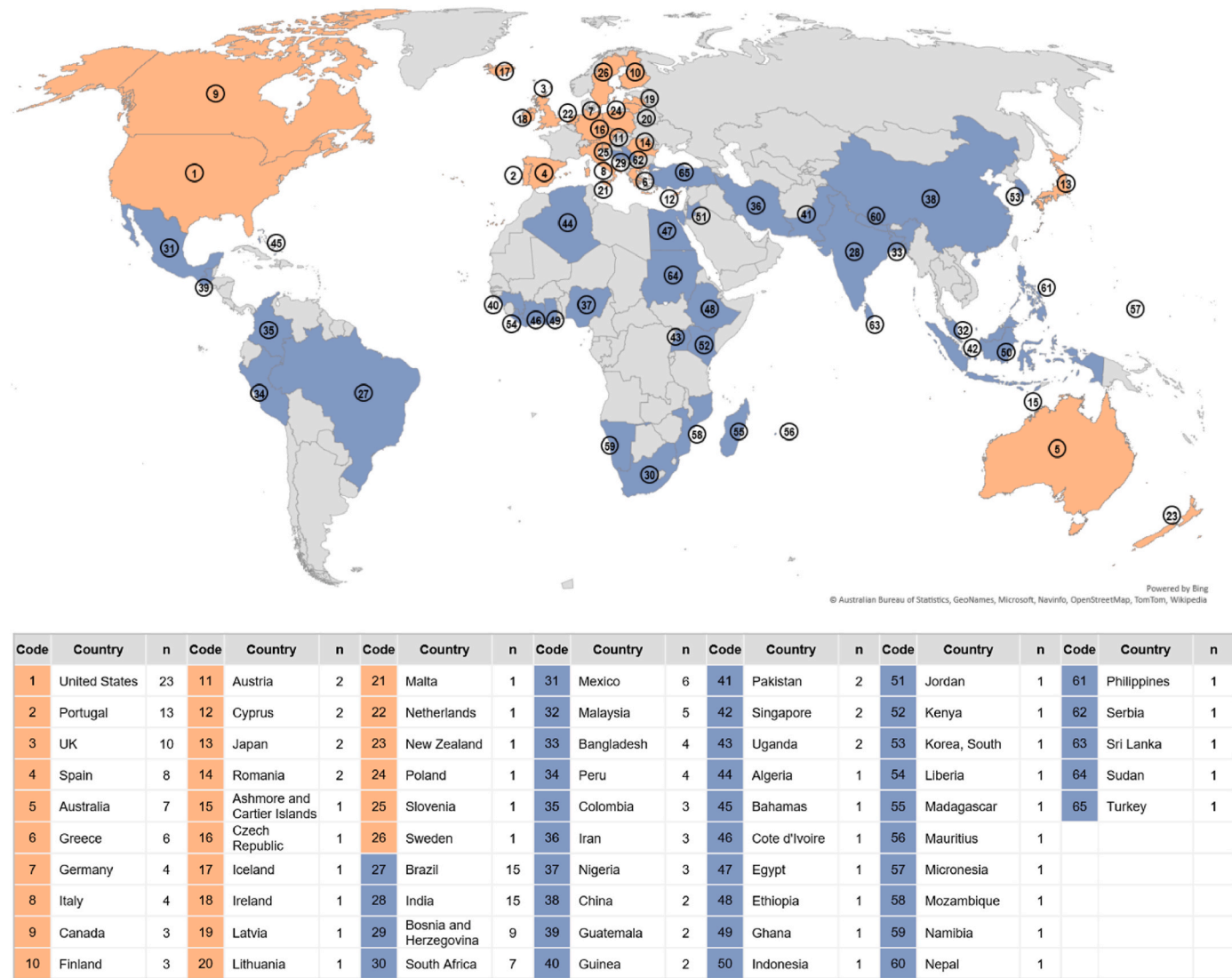
Fig. 2. Country distribution of responses.

Code	Country	n	Code	Country	n	Code	Country	n	Code	Country	n	Code	Country	n	Code	Country	n	Code	Country	n	Code	Country	n
1	United States	23	11	Austria	2	21	Malta	1	31	Mexico	6	41	Pakistan	2	51	Jordan	1	61	Philippines	1
2	Portugal	13	12	Cyprus	2	22	Netherlands	1	32	Malaysia	5	42	Singapore	2	52	Kenya	1	62	Serbia	1
3	UK	10	13	Japan	2	23	New Zealand	1	33	Bangladesh	4	43	Uganda	2	53	Korea, South	1	63	Sri Lanka	1
4	Spain	8	14	Romania	2	24	Poland	1	34	Peru	4	44	Algeria	1	54	Liberia	1	64	Sudan	1
5	Australia	7	15	Ashmore and Cartier Islands	1	25	Slovenia	1	35	Colombia	3	45	Bahamas	1	55	Madagascar	1	65	Turkey	1
6	Greece	6	16	Czech Republic	1	26	Sweden	1	36	Iran	3	46	Cote d'Ivoire	1	56	Mauritius	1			
7	Germany	4	17	Iceland	1	27	Brazil	15	37	Nigeria	3	47	Egypt	1	57	Micronesia	1			
8	Italy	4	18	Ireland	1	28	India	15	38	China	2	48	Ethiopia	1	58	Mozambique	1			
9	Canada	3	19	Latvia	1	29	Bosnia and Herzegovina	9	39	Guatemala	2	49	Ghana	1	59	Namibia	1			
10	Finland	3	20	Lithuania	1	30	South Africa	7	40	Guinea	2	50	Indonesia	1	60	Nepal	1			

sustainable development (Leal Filho et al., 2019, 2021a; Zamora-Polo and Sánchez-Martín, 2019).

The respondents also answered about their perceptions of the adoption of the SDGs on research. The questions related to SDGs as an opportunity for increased collaboration in several domains also presented higher scores as well as the one exploring the participants' willingness to connect the SGDs with their research or creating new research based on the goals. On the other hand, the questions about the experts' perception about the research programmes they are involved in being revised to include the SDGs and the one about their perception of students asking for more research opportunities related to the SDGs received the lowest scores both from experts in developed and in developing/in transitions countries.

In this context, individual initiatives have the potential to strengthen the impact of research around sustainability and the SDGs. These can include participation in sustainability networks and events (Leal Filho et al., 2021b). Regarding the involvement of students, other studies reported on higher level of interest or engagement (Aleixo et al., 2021; Lee et al., 2022), indicating there are opportunities for further developments in this area, especially by promoting more practical initiatives and student empowerment.

The two categories of countries (developed and developing/in transition) were also assessed and compared. Considering the set of questions related to the teaching dimension, the ones related to the SDGs as an opportunity for increased teaching collaborasíon showed a higher average score for the participants belonging to developing and in transition countries than those belonging to the developed countries. This scenario is confirmed when the distribution of the answers of developing countries showed to be significantly different from the developed ones ($p < 0.01$). The last question was also statistically significant between the categories of countries ($p < 0.05$), where the experts, on average, indicate the students in developing countries ask for SDG-related teaching content more than the students in developed countries.

For the research dimension, the distribution of answers showed to be statistically different for the questions related to the extent to which the participants see the SDGs as an opportunity for increased research collaboration between universities in their region/country ($p < 0.05$), and whether they can articulate their research performance and impact in the context of the SDGs ($p < 0.01$). In both cases, developing/in transition countries have indicated higher scores for these statements.

Fig. 4, in turn, is related to the frequency of which the participants believe to be the best approach to promote research and teaching about the SDGs in the higher education context.

Regarding the teaching perspective, most participants from both the developed (72%) and developing (60%) countries consider that the best approach would be the distribution among all courses and subjects.

Table 2
Summary of tests – developed *vs.* developing/in transition countries.

Dimensions	Null Hypothesis	Sig.
Teaching	The distribution of *I have voluntarily revised the content of my classes to add more issues connected to the SDGs* is the same across categories.	0.106
	The distribution of *The curricula of the courses I teach at my university have been revised to include the SDGs* is the same across categories.	0.606
	The distribution of *In the courses I teach, students usually ask for more teaching content related to the SDGs* is the same across categories.	0.012*
	The distribution of *I see the SDGs as an opportunity for increased teaching collaboration between different units/ programmes at my university* is the same across categories.	0.003**
	The distribution of *I see the SDGs as an opportunity for increased teaching collaboration between universities in my region/country* is the same across categories.	0.002**
	The distribution of *I see the SDGs as an opportunity for increased teaching collaboration with communities, businesses and NGOs* is the same across categories.	0.004**
Research	The distribution of *I have voluntarily connected the SDGs with my research or created new research studies based on the goals* is the same across categories.	0.055
	The distribution of *The research programmes/projects I am involved in at my university have been revised to include the SDGs* is the same across categories.	0.169
	The distribution of *I articulate my research performance and impact in the context of the SDGs* is the same across categories.	0.007**
	The distribution of In the courses *I teach, students usually ask for more research opportunities related to the SDGs* is the same across categories.	0.078
	The distribution of *I see the SDGs as an opportunity for increased research collaboration between different units/ programmes at my university* is the same across categories.	0.094
	The distribution of *I see the SDGs as an opportunity for increased research collaboration between universities in my region/country* is the same across categories.	0.035*
	The distribution of *I see the SDGs as an opportunity for increased research collaboration with communities, businesses and NGOs* is the same across categories.	0.217

Notes: Independent-samples Mann–Whitney U test. $*p < 0.05$; $**p < 0.01$.
Categories: 1) developed countries; 2) developing or in transition countries.

Next, 14% of experts from developed countries and 24% from developing countries believe that a compulsory discipline should be offered for all courses. The options considering that an optional discipline should be offered to all courses and other not-identified approaches were less prevalent in both developing countries (16%) and developed countries (14%). Different views were provided in the option 'Other', including the need for SDGs to be mandatory within courses, the use of both approaches, the application of case studies, the goals being aligned with each taught course. A couple of responses indicated also the need to critically teach about the SDGs (instead of positively teaching) and to a radical revision rather than their promotion.

The responses when it comes to the best approach to promote research on the SDGs are even more balanced across developed and developing countries. Most of the respondents of developed (48%) and developing (46%) countries indicated the option "distributed across all research projects/programmes", followed by the option of having an institutional centre dedicated to supporting and connecting research on the SDGs (43% and 44%). The remaining 9% (developing) and 10% (developed) of respondents of both categories answered 'Other'. Of the comments received on this option, one-fourth stated that both approaches are necessary and that they must go hand-in-hand. Additional responses supported the engagement of SDGs Champions, the promotion of interdisciplinary work and community engagement, and the need for more dedicated funding and making research on the SDGs mandatory.

When comparing the categories, it is also relevant to observe the difference of twelve percentage points on the option related that the SDGs should be distributed across all programmes and disciplines and ten percentage points for the option described that a mandatory discipline should be offered to all courses. Interestingly, when asked which seems to be the best approach to promote research about the SDGs in their higher education context, the frequency of answers remained practically the same compared to the two categories of countries.

Other authors are also assessing or reporting on the extent to which ESD and the SDGs are present in the university curricula and research. The results of Lozano et al. (2015) are somewhat aligned with the ones presented here, as the implementation of sustainable development in teaching was reported to happen in combining efforts from different faculties and integrating sustainable development courses to existing programmes. On the other hand, in research, higher preference was seen in having a dedicated sustainability research centre.

Fia et al. (2022) indicates the prevailing strategies in teaching include designing specific courses and reorienting overall curricula to address the Agenda 2030, particularly SDG 4. Online resources are also an increasingly used strategy to deliver single courses on the SDGs and reach wider audiences (Ferguson and Roofe, 2020; Fia et al., 2022; Holmes et al., 2021). In terms of research, macro-levels interventions are more commonly reported in the literature, as programs focused on the whole Agenda (Fia et al., 2022), but these larger initiatives tend to be hindered by challenges such as lack of support from the university administration and lack of resources (Ávila et al., 2017).

4. Conclusions and further action needed

This study offers a broader understanding of the opportunities that teaching and research have been offering in the context of higher education, to support the implementation of the SDGs. As the results have shown, the sample indicated that several opportunities are already being taken – as the voluntary revision of teaching and research materials to better cover the goals in higher education. On the other hand, other aspects seem to be receiving less attention, such as the need to revise teaching curricula and research programmes/projects – so that they include the SDGs –, and the demand from students to access more content on them. Some questions could arise in terms of the reason for involving students in teaching-research activities, as a) from the scientific-educational context, the SDGs may not offer much room for debate, b) more efforts should be paid to implementing the goals rather than investigation levels of motivation, and c) the different potential routes followed by the principles related to the SDGs could imply in other sectors being responsible for learning and engagement (e.g., family, society). Nevertheless, this study considered the higher education sector as a key player in promoting engagement on the SDGs across different sectors and in training students to practice sustainability in their personal and professional lives.

The study has some limitations. The first one is the fact that the empirical part was undertaken over a short period of time. A further limitation is related to the fact that the sample, with 209 respondents, was not large and comprehensive enough to allow definitive conclusions to be drawn. Also, the study did not have a significant presence from Gulf States or Arab countries as a whole and this is also a limitation, which offers an opportunity for future studies. The researchers are organising a symposium on sustainability in Arab countries, with a strong presence from Gulf and northern Africa and Middle East countries, representing the Arab world.

The study provides nonetheless a welcome contribution to the literature since it has analysed and documented trends related to the SDGs in HEIs in 65 countries, which makes this study one of the most comprehensive ones on the topic. The geographical distribution of the sample offers a rough profile of how the SDGs are perceived at universities across all continents, hence helping to foster a broader understanding of the international implications of this important topic. Future studies can aim at investigating similarities or differences between this international overview and specific regions.

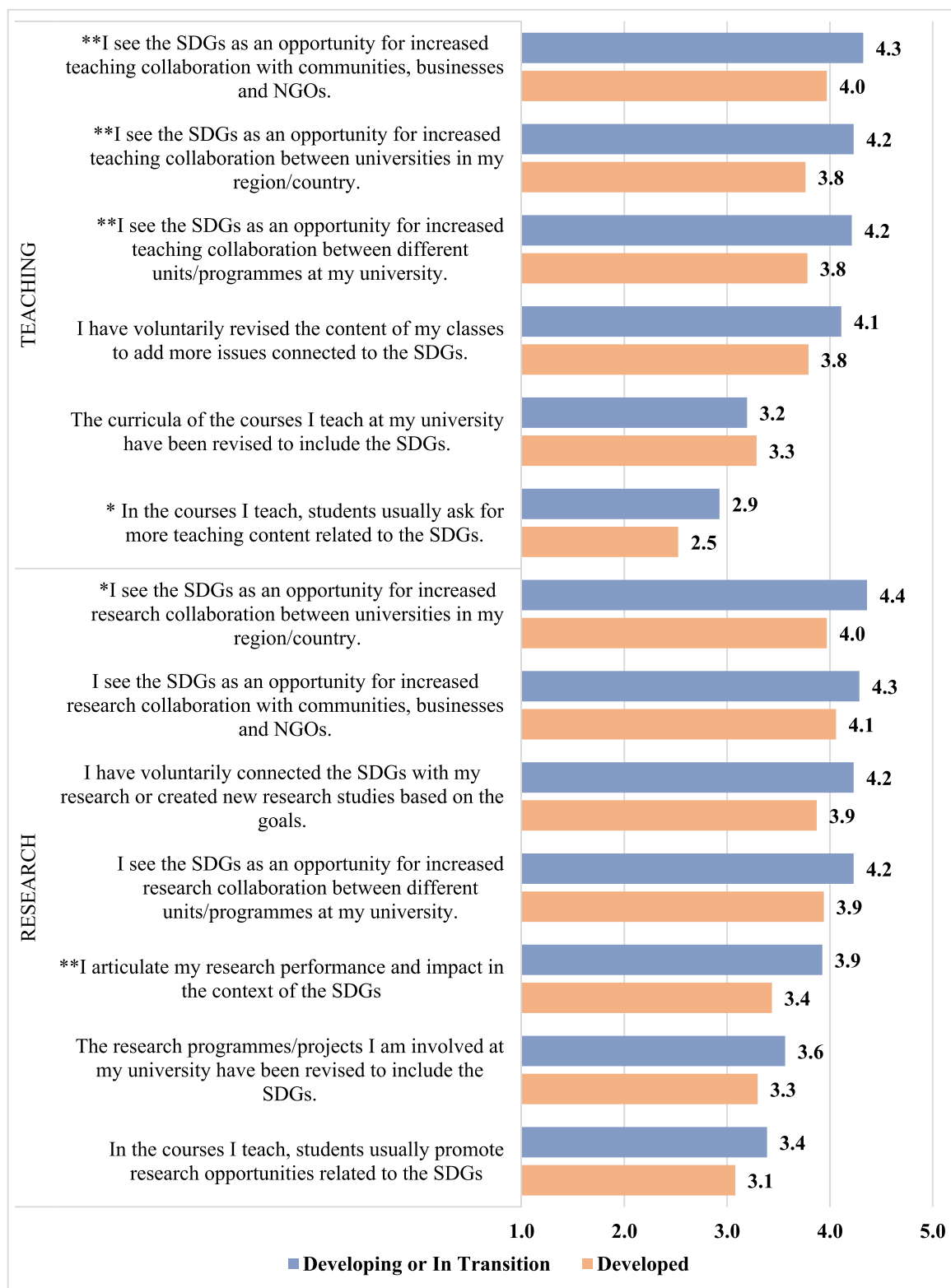Based on the outcomes of the study, there are some actions that could

Fig. 3. SDGs' Teaching and Research Opportunities
Note: Average of answers
*p < 0.05; **p < 0.01 – Independent-Samples Mann–Whitney *U* Test
1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree.
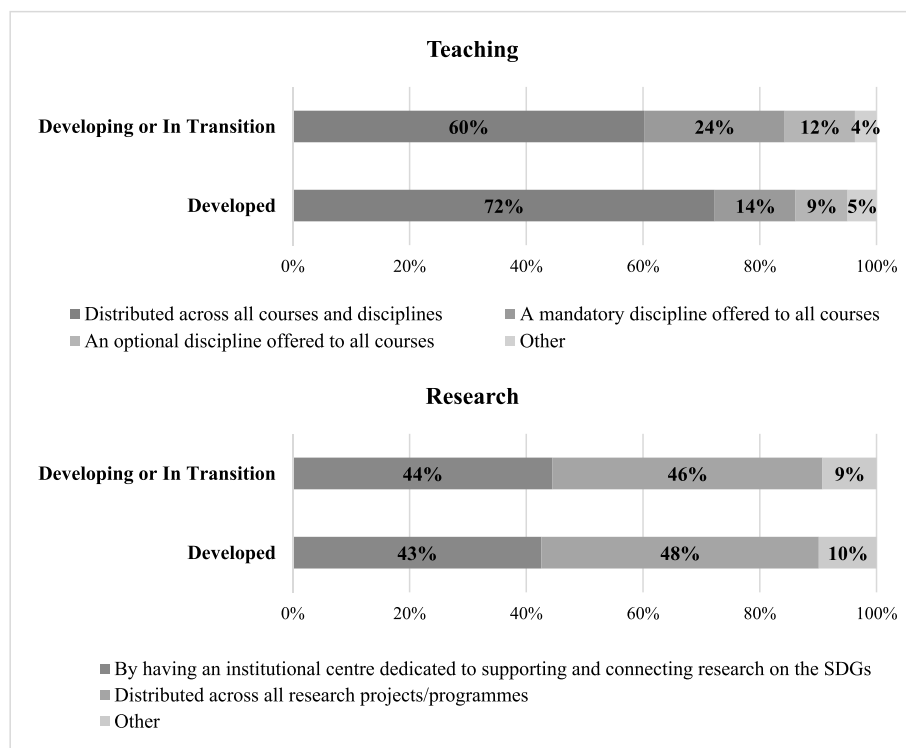
Fig. 4. Teaching and research approaches to promoting the SDGs.

be promoted to accelerate the implementation of the SDGs in teaching and research programmes. These include:

   i. Greater collaboration across university units, so that opportunities for action are shared, including teaching tools and greater access to research grants to fund SDG-related programmes;
  ii. Intensifying networking efforts across universities, using both existing national or international networks, which create or deepen collaborations and promote shared teaching lectures and participation in combined research projects;
 iii. An increased engagement and greater collaboration among HEIs with local communities, businesses, and NGOs. These enrich the training students currently receive on sustainability and connect teaching and research with outreach opportunities.

Finally, increased opportunities for students to engage on the SDGs – which include internships, participation in events and students' movements for sustainability, and better use of campus operations to inform about the goals-should be taken advantage of, ensuring that university students are "SDGs-literate", meaning they are fully aware of the SDGs, and of their relevance. These actions and opportunities are aligned with the concept of 'cleaner production' – which covers reduction of energy waste, energy consumption and carbon emissions as the implementation of the SDGs is expected to contribute to a more sustainable world and to increased efficiency in economic, environmental and social aspects. By reinforcing the engagement of higher education around these topics and on the SDGs, the whole academic community is expected to be better prepared for applying the principles of cleaner production.

CRediT authorship contribution statement

Walter Leal Filho: Conceptualization, Supervision, Writing-Reviewing. **Amanda Lange Salvia:** Writing-Reviewing, Methodology, Discussions. **João Henrique Paulino Pires Eustachio:** Writing-Reviewing, Methodology, Formal analysis.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix

Table A1
Descriptive Statistics

Dimensions	Questions	Mean	Std. Deviation
Teaching	I see the SDGs as an opportunity for increased teaching collaboration with communities, businesses and NGOs.	4.15	1.08
	I see the SDGs as an opportunity for increased teaching collaboration between universities in my region/country.	4.00	1.13
	I see the SDGs as an opportunity for increased teaching collaboration between different units/programmes at my university.	4.00	1.15

(*continued on next page*)

Table A1 (*continued*)

Dimensions	Questions	Mean	Std. Deviation
	I have voluntarily revised the content of my classes to add more issues connected to the SDGs.	3.96	1.25
	The curricula of the courses I teach at my university have been revised to include the SDGs.	3.24	1.37
	In the courses I teach. students usually ask for more teaching content related to the SDGs.	2.73	1.23
Research	I see the SDGs as an opportunity for increased research collaboration between universities in my region/country.	4.17	1.02
	I see the SDGs as an opportunity for increased research collaboration with communities. businesses and NGOs.	4.18	1.03
	I have voluntarily connected the SDGs with my research or created new research studies based on the goals.	4.06	1.19
	I see the SDGs as an opportunity for increased research collaboration between different units/programmes at my university.	4.09	1.04
	I articulate my research performance and impact in the context of the SDGs	3.69	1.25
	The research programmes/projects I am involved at my university have been revised to include the SDGs.	3.44	1.35
	In the courses I teach. students usually promote research opportunities related to the SDGs	3.24	1.31

Note: 1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree.

Table A2
Normality tests

Categories	Questions	Country Classification	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
			Statistic	df	Sig.	Statistic	df	Sig.
Teaching	I have voluntarily revised the content of my classes to add more issues connected to the SDGs.	Developed	0.231	101	<0.001	0.808	101	<0.001
		Developing or In Transition	0.273	108	<0.001	0.753	108	<0.001
	The curricula of the courses I teach at my university have been revised to include the SDGs.	Developed	0.161	101	<0.001	0.882	101	<0.001
		Developing or In Transition	0.198	108	<0.001	0.889	108	<0.001
	In the courses I teach, students usually ask for more teaching content related to the SDGs.	Developed	0.174	101	<0.001	0.890	101	<0.001
		Developing or In Transition	0.209	108	<0.001	0.896	108	<0.001
	I see the SDGs as an opportunity for increased teaching collaboration between different units/programmes at my university.	Developed	0.274	101	<0.001	0.823	101	<0.001
		Developing or In Transition	0.275	108	<0.001	0.731	108	<0.001
	I see the SDGs as an opportunity for increased teaching collaboration between universities in my region/country.	Developed	0.290	101	<0.001	0.820	101	<0.001
		Developing or In Transition	0.283	108	<0.001	0.752	108	<0.001
	I see the SDGs as an opportunity for increased teaching collaboration with communities, businesses, and NGOs.	Developed	0.312	101	<0.001	0.761	101	<0.001
		Developing or In Transition	0.324	108	<0.001	0.693	108	<0.001
Research	I have voluntarily connected the SDGs with my research or created new research studies based on the goals.	Developed	0.262	101	<0.001	0.787	101	<0.001
		Developing or In Transition	0.308	108	<0.001	0.742	108	<0.001
	The research programmes/projects I am involved in at my university have been revised to include the SDGs.	Developed	0.189	101	<0.001	0.882	101	<0.001
		Developing or In Transition	0.214	108	<0.001	0.868	108	<0.001
	I articulate my research performance and impact in the context of the SDGs	Developed	0.199	101	<0.001	0.872	101	<0.001
		Developing or In Transition	0.230	108	<0.001	0.830	108	<0.001
	In the courses I teach, students usually promote research opportunities related to the SDGs	Developed	0.198	101	<0.001	0.891	101	<0.001
		Developing or In Transition	0.177	108	<0.001	0.883	108	<0.001
	I see the SDGs as an opportunity for increased research collaboration between different units/programmes at my university.	Developed	0.253	101	<0.001	0.804	101	<0.001
		Developing or In Transition	0.284	108	<0.001	0.785	108	<0.001
	I see the SDGs as an opportunity for increased research collaboration between universities in my region/country.	Developed	0.252	101	<0.001	0.791	101	<0.001
		Developing or In Transition	0.318	108	<0.001	0.754	108	<0.001
	I see the SDGs as an opportunity for increased research collaboration with communities, businesses, and NGOs.	Developed	0.281	101	<0.001	0.755	101	<0.001
		Developing or In Transition	0.293	108	<0.001	0.751	108	<0.001

Note: Lilliefors Significance Correction.

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