Assessing the provisions for sustainability in economics degree programmes

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Abstract

The inclusion of sustainability in economics degree programmes is becoming increasingly important as organisations and governments seek to implement environmental policies. As such, universities and other higher education institutions are increasingly offering courses and programmes that focus on sustainability in economics. These courses and programmes often combine traditional economic principles with sustainability considerations, such as resource management, climate change and pollution control. In addition, many institutions are offering courses on sustainable development, which examine the economic, social and environmental dimensions of sustainable development. There is a perceived need for research that may foster a better understanding of how this trend is evolving. Against this background, this paper investigates the presence of **sustainability** components in **degree programmes** in the field of **economics**. By means of a **review of the literature** and a **selection of case studies**, the paper sheds some light on the level of emphasis given to sustainability as part of economic degree programmes in a sample of **universities**, which has an impact on the ways in which future economists may tackle sustainability issues. The results suggest that, whereas the inclusion of sustainability components in this field is a growing trend, much still needs to be done in order to ensure that matters related to sustainable

development are part of the routine of university students studying economics. Some recommended actions are proposed towards addressing the problems identified.

1. Introduction

The 2030 Agenda for Sustainable Development, launched in 2015 by the United Nations General Assembly, gave a significant impulse to the idea of redirecting the economy to a sustainable path through the establishment of 17 sustainable development goals (SDGs), which depict an action plan to "end poverty in all its forms" by 2030 "and balance the three dimensions of sustainable development: the economic, social, and environmental". In order for the SDGs to be achieved, various actors around the world need to engage in a long-term process to bring about change (United Nations, 2015). Higher Education Institutions (HEIs) are bound to have a prominent role in this agenda (Leal Filho et al, 2019). According to the Sustainable Development Solutions Network (SDSN, 2015), the universities' extensive learning and teaching activities give them a unique opportunity for SDG implementation and for extending Education for Sustainable Development (Shiel et al., 2020). Education is itself a specific goal, SDG4, but it is also mentioned in the targets of five goals, and it is linked to almost all other goals in some way (Leal Filho et al, 2019). In its guide, "Getting started with the SDGs in Universities", the SDNS argues that, "It is likely that none of the SDGs can be fulfilled without the involvement of this sector" (SDSN, 2017, p. 3).
The literature that explores how universities are engaging with the SDGs has experienced a boom in recent years. There is a general approach to the SDGs from a global dimension, but SDG 4 (Education) is the goal that receives more attention. Research and education are the university areas from which SDGs are mostly addressed (Alcantara-Rubio et al, 2022). The literature also suggests that the systematized implementation of SDGs, their integration with curriculum and learning, and their dissemination through training actions that are aligned with the strategic mission of HEIs constitute a set of initiatives that should be adopted in order to facilitate the integration of SDGs in universities (Serafini et al, 2022).

The relevance of the role of universities in the implementation of the UN Sustainable Development Goals (SDGs) should be apparent, given their access to a large community with the possibility to influence the society. Some recent studies analyse how HEIs are engaging in this task. The implementation of SDGs in universities may come through several approaches (Leal Filho et al, 2023). One way is sustainability research, which involves many areas and different types of knowledge and is mostly related to education, sustainable cities and climate change (Salvia et al, 2019). Universities can also incorporate the SDGs as guidelines for their campus operations and management, prioritising the use of renewable energy or reducing their carbon emissions (Gui et al, 2021; Logan et al, 2020). Another key area in which SDGs can be embedded is civic engagement and community outreach (Leal Filho et al, 2019). A fourth and most relevant way to incorporate the SDGs in universities is through teaching. There are several strategies to introduce SDGs in the study programmes and

provide the students with the necessary competencies to address them. These strategies can be categorised depending on whether they are conceived for the institution as a whole (the macro level) or if they are oriented to specific courses or disciplines (the micro-level) (Fia et al, 2022).

Efforts at the macro level range from projects to integrate training in sustainability competencies into the Spanish University System (Albareda-Tiana et al, 2020) to inter-university collaborative programmes in Africa (Nyerere et al, 2021), but most papers are primarily directed to designing specific courses and transforming curricula to address the SDGs (Weiss et al., 2021; Zguir et al., 2021). A majority of them are concerned with SDG 4 through Education for Sustainable Development and try to build a culture of sustainability based on the idea that achieving SDG 4 indirectly contributes to many other SDGs (Fia et al, 2022). While many institutions are aware of the importance of sustainable development, there is a lack of emphasis on the SDGs and a shortage of training opportunities on the topic for the university staff (Leal Filho et al, 2023b). Given these difficulties, some authors have proposed frameworks to guide academic institutions into a more systematic introduction of the SDGs in university programmes and assessment tools that can measure a programme's success and evaluate the results (Kioupi and Voulvoulis, 2020; Ferrer-Estévez and Chalmeta, 2021; Leal Filho et al, 2021; Albert and Uhlig, 2022).

At the micro level, the introduction of sustainable development concepts in university curricula induces students to engage in sustainability through learning, while they get the competences needed to gain their degrees. Depending on the discipline, the focus lies on different SDGs. Engineering is a field especially concerned with sustainable development, as shown by the numerous studies assessing the presence of the SDGs or the better ways to incorporate them in the study programmes (Álvarez et al., 2021; Zanitt et al, 2022; Beagon et al, 2022; Sigahi and Sznelwar, 2023). But other disciplines are also reflecting on the necessary sustainability-related competences that their curricula should include (Baena-Morales et al, 2022; Huebscher et al, 2022; Kanapathy et al, 2021; Stough et al, 2021) and are introducing innovative solutions and technologies for teaching. For example, work-integrated learning and real-life university experiences enhance students' sustainability competencies (Alm et al, 2022), while student-led initiatives to organize SDG-related activities improve student engagement and motivation (Lee at al, 2023). Other studies report the use of active methodologies and Problem Based Learning (PBL) as useful tools to train students in sustainability (Valdivia et al, 2023; Llach and Bastida, 2023).

The discipline of economics is somehow required to address the sustainability and environmental problems created by the economic system. Both the UN and the literature reserve a prominent role for economics in achieving the SDGs. The aim of this paper is to explore how these issues are being approached in economics education programmes. As will be shown in the following sections, while there is a substantial amount of work on the inclusion of sustainability concepts in the area of business, very little attention has been paid to the discipline of economics.[1] Furthermore, the research on the area takes the form of isolated case studies and there is no systematic review on the topic.

This study aims to fill that gap in the literature, investigating the presence of sustainability concepts in economics degree programmes. The next section reflects on the key role of economics in the sustainable transition and describes the advantages of introducing sustainability components in economics education programmes. Section 3 describes the methodology and reviews the specific literature, Section 4 presents and discusses the results, and Section 5 concludes.

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[1] See for example the systematic review on implementation of the SDGs in business schools (García-Feijoo et al, 2020)

2. Sustainability in Programmes in Economics

The economy, understood as the set of human activities of production, consumption and distribution, has been and continues to be a main driver of environmental unsustainability. The current severe environmental crisis and climate emergency has its origins in population growth and intense economic growth (Figure 1) since the industrial revolution, which has led to an intensive use of resources and of ecosystem services (Millennium Ecosystem Assessment Board 2005; Steffen 2005). The contribution of the economic system to the widespread environmental degradation was already highlighted almost forty years ago in the Brundtland report: "Today the scale of our interventions in nature is increasing and the physical effects of our decisions spill across national frontiers. The growth in economic interaction between nations amplifies the wider consequences of national decisions. Economics and ecology bind us in ever-tightening networks. Today, many regions face risks of irreversible damage to the human environment that threaten the basis for human progress" (Brundtland 1987, 39). The planet transformations that have been caused by human activity are evident, intense and on a global scale. This has justified the widespread acceptance of the Anthropocene as the new geological era in which we live, characterised by a human-dominated planet (Steffen 2005; UNDP 2020). The pressure on the planet's resources and on environmental services, as measured by the ecological footprint (Wackernagel and Rees 1996), has exceeded its capacity since 1970, standing at 1.75 Earths in 2018 (Figure 1). However, sustainability implies the existence of restrictions on human activity because the planet has limits (Holden, Linnerud, and Banister 2017). Some of those 'Planetary Boundaries' have already been exceeded, with consequences on the Earth system such as greenhouse gas emissions that contribute to climate change, chemical pollution, loss of biosphere integrity and plastic pollution (Persson et al. 2022; Steffen 2005; Steffen et al. 2015).

At the same time, economics, as a scientific discipline, also has a key role to play in understanding sustainability and in designing policies and initiatives to achieve sustainable development (Figure 1). Since 1972, United Nations has promoted several initiatives to address environmental problems and sustainable development (Figure 1). These include, among others, the IPCC in 1988, Rio Conference (1992), Agenda 21, Millenium Ecosystem Assessment (2000), Millenium Development Goals (2000),

Decade of Education for Sustainable Development (ESD), and, in 2015, the 2030 Agenda and the seventeen Sustainable Development Goals (SDGs). The key role of economics appears in these pro-environmental initiatives and has also been highlighted in the literature (Costanza and Daly 1987; Dasgupta 2021; Folke et al. 2021; Millennium Ecosystem Assessment 2005). The contribution of the economy is considered crucial to meeting the challenges of social sustainability, in terms of reducing inequality and poverty and to overcoming the unsustainable relationship that society has with nature, mainly through consumption and production. In this sense, initiatives such as green economy (Altenburg and Assmann 2017) and circular economy (Stahel 2016) aim to transform the system to advance sustainability.

The role of the economy is also evident in the prevalent conception of the three pillars of sustainability: economic, social and environmental (Purvis, Mao, and Robinson 2019). At the same time, the environment has also received the attention of the economic discipline with new lines of economic research being established with a focus on the environment, such as ecological economics and environmental economics (Figure 1). There is, therefore, sufficient reasons to affirm, as stated by Polasky et al., (2019, 5233) that, "The discipline of economics arguably should play a central role in meeting the sustainable development challenge".

Consequently, the benefits of introducing sustainability components in economic education programmes go far beyond those associated with the key role generally attributed to education in the sustainable transition (UNESCO 2017). Education can promote remarkable changes in individual and social values, attitudes and behaviours, as well as the dynamic nature of society to introduce changes at the organisational and institutional level in order to act collectively. There is no doubt that ESD must be present in all university degrees, and that the necessary adaptation of the programmes will have positive effects in terms of pro-environmental changes in society. But it is also obvious that the linkage and involvement of economics degrees and of the multiple professions that their students pursue in the private and public, business and non-business spheres in achieving sustainability is key (Figure 2). It should be noted that without the contribution of the economy (including production, consumption, companies and markets), sustainability cannot be achieved. Economists must play a leading role in policy-making for sustainable development strategies and in communicating to society the necessary transformations for a sustainable transition. In a synthetic and concise format, Figure 2 combines the role of economics education in managing the economic system with the notion of the three pillars of sustainability. The two-way arrows indicate the transmission of pro-environmental impulses to markets, society and biosphere by students, economists and practitioners. They also indicate the foreseeable and necessary dynamics of learning and adaptation (from HEI, programmes, economists, etc.), considering ESD key competencies as anticipatory and strategic competencies "for thinking and acting in favour of sustainable development" (Leicht et al., 2018, 44).

To solve this crisis of unsustainability and in response to the climate emergency and the international commitments assumed (UNESCO, 2005, 2017, SDG 4), the HEIs must adapt their degrees' educational programmes and ask themselves about the learning

needs of students as actors in the economic system. The answer offered in Sterling (2008, 66) is: "This is a perfectly valid and important question, but it begs a prior and deeper question: what changes, and what learning needs to take place amongst policymakers, amongst senior management, amongst teachers, lecturers, support staff, amongst parents, amongst employers, etc., so that education itself can be more transformative and appropriate to our times?" The specificities of economists, who are present in all sectors of economic activity, on company boards and in the cabinets of national and regional governments around the world, amplify the importance of providing an appropriate response.

If, as Albert Einstein said, "We cannot solve our problems with the same thinking we used when we created them", we need to change what and how sustainability is taught. For this, transformative learning can contribute meaningfully (Davelaar 2021; Mezirow 1997; Sterling 2011). This is a learning process that affects not only ideas, concepts and theories, but also worldviews, beliefs and values (Sterling 2011), taking into account the depth and complexity of sustainability, as well as the difficulties and contradictions it represents. It is, therefore, of great interest to know how sustainability is included in economics programmes, how this learning is promoted, and how to design strategies that facilitate rapid and genuine progress.

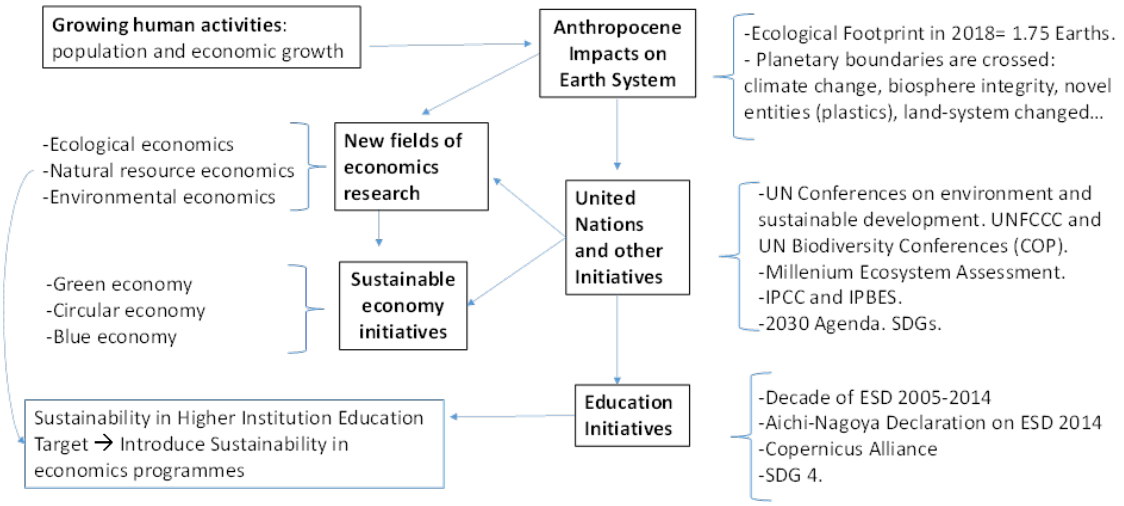


Figure 1. The key role of the economy in unsustainability and in the transition to sustainability.

Source: own elaboration from Alliance Copernicus, 2011; Crutzen & Stoermer, 2000; Millennium Ecosystem Assessment Board, 2005; Persson et al., 2022; Rockström et al., 2009; W. Steffen et al., 2015; W. L. Steffen, 2005; UNESCO, 2005; (International society for ecological economics n.d.; OECD n.d.; Stockholm Resilience Centre n.d.; The Blue Economy n.d.)

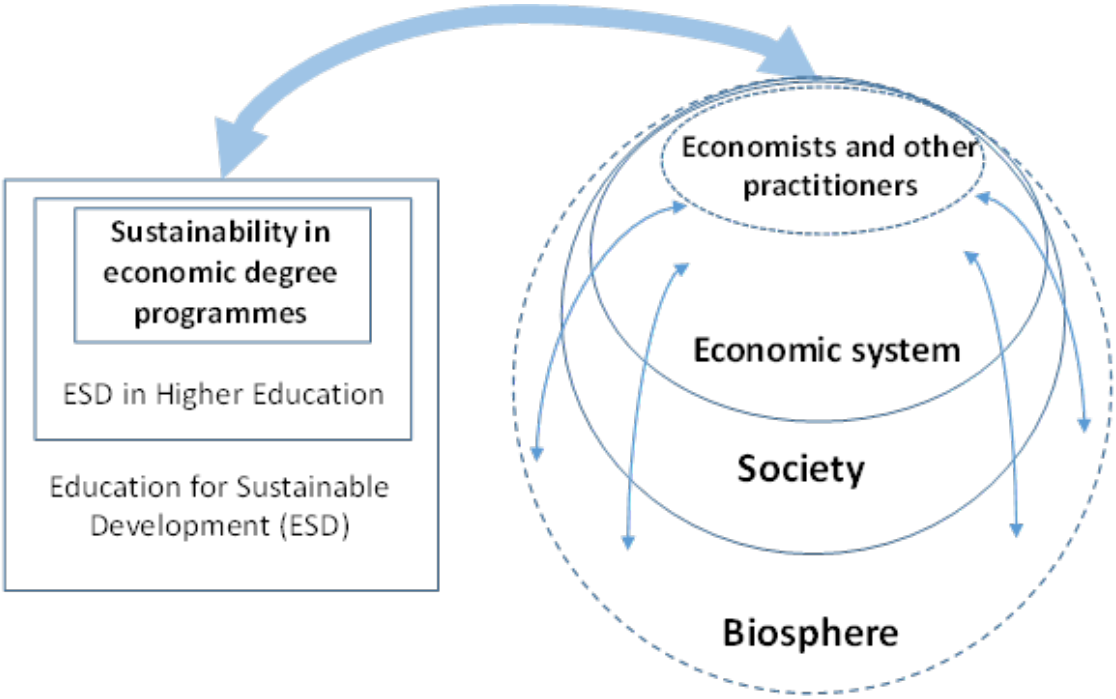


Figure 2. The potential impact of introducing sustainability in economic education programmes on sustainable development.

Source: authors

3. Methods

Departing from case studies from some higher education institutions (HEIs) offering economic education programmes on all continents, this study aimed to collect information on the level of emphasis given to sustainability as part of their programmes. A total of 28 pertinent case studies were gathered from both the literature and universities' websites to demonstrate the consideration of sustainability in higher education institutions' economic education programmes. The rationale for this project is based on the global endeavours of Higher Education and Research for Sustainable Development (SD), which are inspired by the Sustainable Development Goals (SDGs) 4 (Inclusive and Equitable Quality Education), 13 (Urgent Action to Combat Climate Change), 16 (Peaceful and Inclusive Societies) and 17 (Global Partnership) (International Association of Universities – IAU, 2023; United Nations, 2023a, 2023b). In this research, Goal 4 is particularly relevant, especially target 4.7 ("By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development"), and more specifically the indicator 4.7.1 ("Extent to which (i) global citizenship education (GCED) and (ii) education for sustainable development (ESD), including gender equality and

human rights, are mainstreamed at all levels in: (a) national education policies, (b) curricula, (c) teacher education and (d) student assessment") (United Nations, 2023c).

The case study approach has been used to gain comprehensive insight into the phenomenon and reinforce the analytical results of the investigation (Yin, 2009). Case study research is an effective tool for obtaining a large amount of data from multiple sources, while also producing new, contextualised insights (Eisenhardt & Graebner, 2007; Miles & Huberman, 1994; Yin, 2009). For selecting the case studies, in a first stage two methods to search were used, as some authors recommended (Adams et al., 2016; Brophy & Bawden, 2005). The first method was searched for peer-reviewed publications indexed in the Web of Science (WoS) that were related to sustainability in economic degrees. In the second method, a popular internet search engine (www.google.com) was used to find universities that include sustainability in their economic degrees programmes. The quality of results from WoS is excellent, and results from Google are more accessible and cover a wider range of topics, making it an ideal choice for wider searches. The level of precision between the two systems is comparable, so for the best coverage it is recommended to use a combination of both, as they each have items that are exclusive to their respective databases (Brophy & Bawden, 2005).

Therefore, the first method used in the first stage was a bibliometric analysis conducted using peer-reviewed publications indexed on the WoS. This database was chosen due to its extensive selection of high-quality scientific literature. A search string was created to identify publications related to sustainability, economics, education/training, and universities: TS=(("sustainability" or "SDG" or "SDGs") and ("economics") and ("education" or "training" or "curricula" or "curriculum") AND ("universit*" OR "higher education institut*")). The search was done on March 18, 2023 and returned 156 articles. Figure 3 shows the publications grouped by WoS Categories (only those categories with more than 5 articles). A larger rectangle area represents a larger proportion of articles in this WoS category. The number displayed in each box corresponds to the total number of publications for that discipline. 71 are included in the "Education Educational Research" WoS category, and 15 in the "Economics" category. All the articles included in the "Education Educational Research" and "Economics" categories were read and analysed in detail. For the other articles, the title and abstract were read, and if they were related with this research all articles were read and analysed.

Figure 3. A tree map chart of publications grouped by WoS categories with more than 5 articles

Source: Web of Science (2023).

Subsequently, the second method used in the first stage utilised Google to search for universities that include sustainability in their economic degrees. Google was chosen since it is the most searched and used search engine in the entire world (Alexa, 2023). To collect relevant information from Google, a search was developed that includes terms related to sustainability in economics degrees: "sustainability" and "economic" and "degree". The search was done on March 20, 2023 and returned 132.000.000 results. When searching for information on Google, it is important to note that the search engine algorithm is designed to prioritise the most relevant and authoritative results. This means that the most relevant and authoritative results will generally appear on the first page of search results (Brake, 2017). Of the results shown by Google, the first 6 pages were analysed, which represented a total of 60 search results, without counting the sponsored ones. It was decided not to continue the search because the results displayed were no longer related to the research objective.

Therefore, after selecting multiple case studies based on the relevance of each HEI's economic education programme that considers sustainability a part of their programmes, two tables were created to provide specific information. They include the name of the university, the country, the programme, the scope and the source. Table 1 lists all the cases of universities found in the peer-reviewed publications that are indexed in the WoS that consider sustainability as part of their economic education programmes. It is worth noting that in the literature review, other articles were found that talked about universities in certain countries but did not specify which ones (e.g., Winter, Zhai, & Cotton, 2022), others focused on the specific study of a subject (e.g., Arnold, 2022; Gálvez-Rodríguez et al., 2017), and others analysed the perception about sustainability orientation among undergraduate and/or master's students in economics (e.g., Aikowe & Mazancova, 2023; Buchtele and Lapka, 2022; Delgado et al., 2019; Gallardo- Milanés, Olivera-Pátaro, &

Mezzomo, 2019), so they have not been considered for the case study. On the other hand, Table 2 lists all the cases of universities found in the Google search based on university web pages. This has led to an initial selection of 28 case studies.

In a second stage, we searched for all economics degrees for cases 1-16 identified in the WoS, as they refer to universities (Table 1), and the degrees already identified for cases 17-28 in Google (Table 2) to create a database with 285 potential case studies (112 undergraduate and 173 graduate degrees). After discarding all business degrees, as this research focuses on economics programmes to fill the gap identified in the literature, the total number of degrees analysed was 64 (34 undergraduate and 30 graduate). Specific information on sustainability was searched for on the main websites of the degrees and on their programmes, based on the titles and, when available, on the description and contents of the subjects. When the required information was not found on the websites of the degrees, it was requested by e-mail in order to complete the database for analysis.

4. Results and Discussion

The main findings regarding the presence of sustainability concepts in economic degree programmes are presented as follows. First of all, results from the analysis of the 16 universities found in the peer-reviewed publications indexed in the WoS are presented in Table1. Secondly, the common results from the Google search based on universities web pages (Table 2) is presented. Finally, the specific results with regard to the economic degrees of the 28 cases selected in Table 1 and 2 are discussed.

Regarding the articles found in in the peer-reviewed publications indexed in the WoS, they were published in the last decade, with the oldest published in 2013. All of these papers, except Novo-Cortis et al. (2018), are based on qualitative data: case studies, pilot studies or in-depth interviews.

Green (2013) and Novo-Cortis et al. (2018) collected data from the students. Green (2013) conducted qualitative interviews with 54 students from three different Canadian universities who recently completed introductory economics courses. Novo-Cortis et al. (2018) used a quantitative approach when surveying 1,250 students from nine Rumanian universities. Both papers conclude that there is still a long way to go in introducing sustainability in Economics degrees, since actual courses put little emphasis on the environment and sustainability, failing to substantially increase students' understanding of sustainability and linkages between the environment and the economy (Green, 2013). According to Novo-Cortis et al. (2018), although public universities are more involved than private ones in the implementation of programmes, projects, debates and courses on sustainable development, and although students' reactions are positive; the efforts still required to be made are significant. They conclude that all undergraduate, postgraduate and PhD programmes require a change of attitude and mentality.

The other analysed works of Table 1 describe the steps to be taken on the road to sustainability and serve as guidelines on how to integrate sustainability into HEIs' economic education programmes. Sandoval et al. (2017) present the experience of the

social-environmental sustainability office, EcoFEN, of the School of Economics and Business at University of Chile during the period of 2007-2015, and focus on the efforts made on integrating sustainability with its 4 lines of action: research, teaching, extension and management. This paper might be useful for other campuses seeking to develop their own formative environment that promotes sustainable and ethical training of professionals. Nevertheless, these authors recognise the challenge to measuring the percentage of students who achieve the expected standard of the Sustainability Competence and point it out as necessary future research, in line with the work of Figueiró & Raufflet (2015), who said no article of their review was aimed to contribute to the assessment of both advancement of sustainability in management education as well as the assessment of learning.

Molera et al. (2021) provide a solution to such a challenge by developing a guide to introducing sustainability competence in economics degrees by creating a Sustainability Competency Map, together with a series of learning resources that can help teachers to include sustainability contents in their teaching practice. These authors present the experience of the Working Group on Curricular Sustainability of the Faculty of Economics and Business of the University of Murcia (Spain), carried out within the framework of a pilot project of teaching innovation whose objective was the incorporation of sustainability in the degree in Economics. The practical resources proposed in their paper might serve as a base model to implement sustainability in an easy way. The Open Educational Resources include the SDG associated with each activity, the objectives to be pursued, the statement, the activities to be carried out by the students, the methodology to be used, the reflection questions to be answered by the learner, the material needed for the implementation of the activity, and any other information. However, this educational paradigm change they called upon cannot be implemented without the necessary commitment of all professors, because the integration of sustainability in the academic environment implies additional effort and extra motivation (Molera et al., 2021).

Based on a case study of a Belgian university, Stough et al. (2020) show that a 'broad, horizontal' approach to sustainability curricular assessments better captures the contributions of a business/economics faculty in integrating sustainability. Limited, vertical assessment approaches potentially overlook the contributions of business and economics education to sustainability. In addition, these authors show that programmes with a specific focus on sustainability themes could act as anchor programmes, positively affecting sustainability integration in other programmes through cross-pollination. The effect of instructor characteristics, specifically age, on horizontal sustainability integration should be also further investigated, since it seems that younger faculty indeed struggle to relate the theme of their course to greater societal issues.

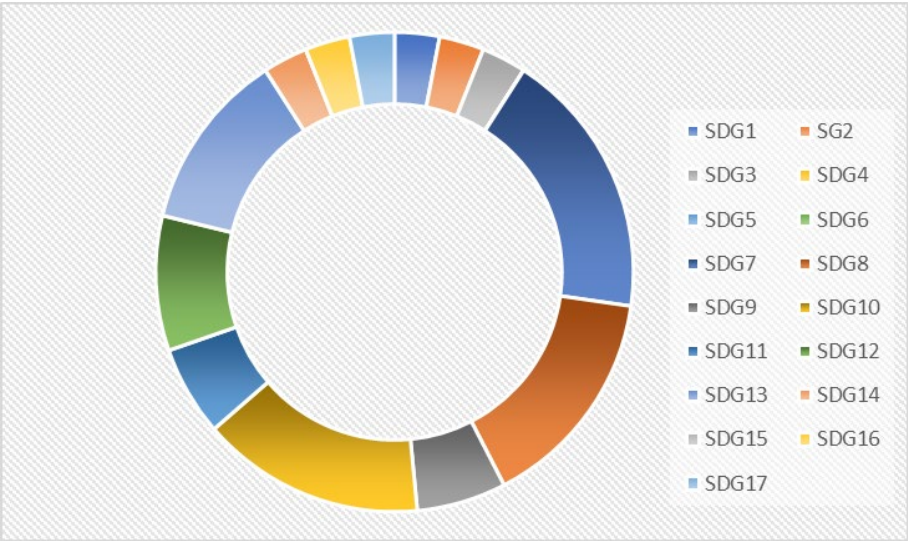
Finally, Griffith and Moore (2020) compared the approaches used in two different disciplines – economics and sociology – to highlight innovative teaching strategies (like the flipped classroom) that are employed to engage students, different ways of integrating sustainability into the curriculum and linking taught units to the sustainable development goals (SDGs), as well as how students confront these issues in a Jamaican university.

Therefore, the works of Table 1 point out both problems (Green, 2013; Novo-Cortis et al., 2018) and potential solutions for integrating sustainability into economics education at different levels, ranging from the university or campus level (Sandoval et al, 2017) to the faculty or degree programme (Molera et al., 2021; Stough et al., 2020) and subject level (Griffith and Moore, 2020).

The above research works serve as a preliminary assessment that provides a glimpse of the need for professors to engage in implementing sustainability content in university programmes. It also shows that it is necessary to advance in research on this issue in order to acquire a deeper understanding of the situation and to carry out better evaluations that would allow design strategies to advance in the insertion of sustainability content in the courses taught in economic university programmes. This requires knowledge of the courses taught in these programmes.

Concerning the findings from the Google search on universities web pages (Table 2), they show that studies on sustainability are offered mostly at the graduate level (7 out of 12). Although sustainability contents are present in most of the studies from a general point of view, the main scope of each programme is varied in such a way that they contribute to different areas that can be related to the 17 SDGs. Figure 4 shows the importance given to the different SDGs in the economic studies analysed (Figure 4). In particular, it was found that undergraduate studies focus mainly on sustainability issues related to reducing inequalities through economic decisions (SDG10-4 undergraduate studies) and also on the use of affordable and clean energy (SDG7-3 undergraduate studies). At the graduate level, the description of the studies addresses equally the problems derived from affordable and clean energy (SDG7), decent work and economic development (SDG8) and responsible consumption and production (SDG13).

Figure 4. Importance of SDGs in Economic Studies



Source: authors

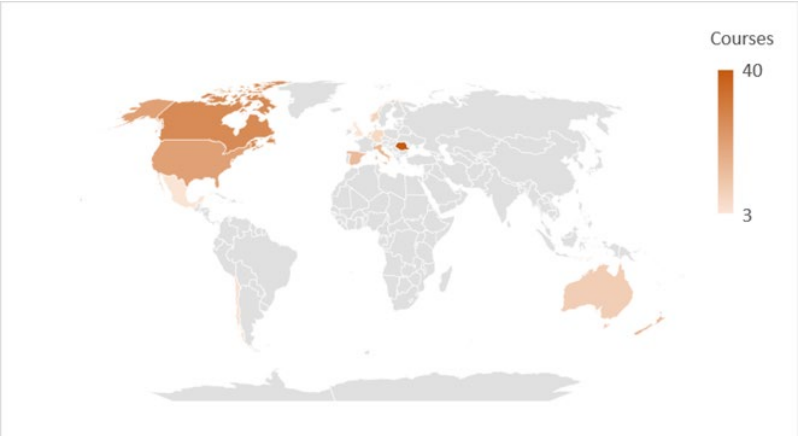
Finally, Table 3 shows a total of 34 undergraduate and 30 graduate economic degrees in the selected universities based on the literature review and the Google search. It summarises whether sustainability was mentioned in the general description of the degree, whether it was included in the titles and the syllabus of the degree courses, and whether it was integrated in the competencies to be acquired by the students (the last two when available).

A simple glance reflects a surprising reality. Despite the fact that the universities analysed were selected based on literature in search engines on sustainability, only 23 out of 64 degrees included it in the general description of the degrees they teach. Sustainability is included in 92 undergraduate and 87 postgraduate courses, with subject syllabuses available only in the degrees of Food and Resource Economics, International Economics, and Philosophy, Politics and Economics from the University of British Columbia; in the Master in Economics from the Simon Fraser University; the Master in Development Studies from the University of the West Indies; the Master in Economics from the KU Leuven University; and in all the degrees from the University of Murcia and the University of Technology Sydney. That means that it was possible to find detailed information about the content of the courses in less than one-sixth (9 out of the 64) of the analysed degrees.

Only in two undergraduate degrees was it possible to find the inclusion of sustainability among the competencies to be acquired by their students: the Economic degree of Universidad Autónoma de Nuevo León and the Agrifood and Environmental Economics degree of the Bucharest University of Economic Studies. Most universities do not make competences visible on their website, which may be a signal of the importance attributed to them in the learning process.

It is also interesting to note that according to the information obtained, sustainability courses seem to be highly concentrated in 6 countries, out of 15 on 3 different continents, (Figure 5). Romania leads the offers of these courses (40), followed by Canada (27), USA (21), New Zealand and Italy (15) and Spain (14).

Figure 5. Sustainability courses by countries



The above information has to be analysed with caution, as the number of degrees analysed in each university is very different, varying from 29 in Romania to only 1 each in Norway,

the UK, the Netherlands and Mexico. Moreover, when the intensity of the sustainability courses in the studies is observed, the picture changes, and the countries with the highest number of courses by degree are USA (21), New Zealand (15), Norway (8), Italy (7,5) Germany (6), the Netherlands (5) and Spain (4,67). All other countries show a symbolic presence of sustainable courses, even if for some of them the degrees specifically designed to study sustainability have been analysed (Agrifood and Environmental Economics BA, Ecological Economics MA, Sustainable Development Business and Economic Organizations MA in Romania; Economics and Sustainability MA in UK; Sustainability and Environment Economics BA, Economics and Sustainability MA in Australia).

Figure 6. Intensity in sustainability courses by countries

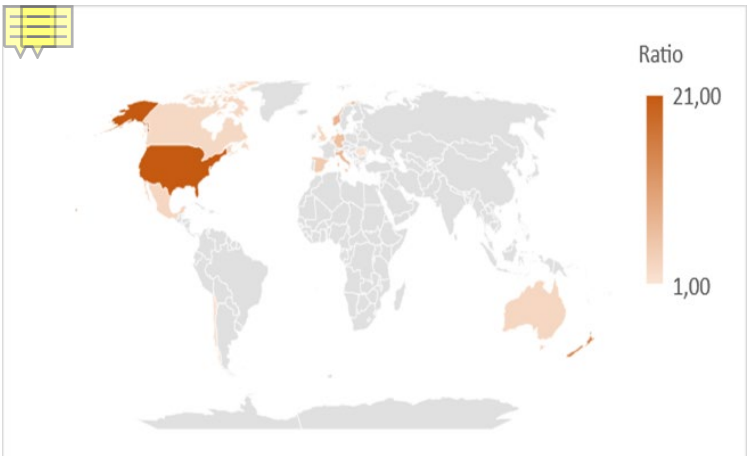


Table 1. Case studies selected based on the literature review from WoS

Case study	Programme offered and scope	Reference	Type of study and implications
The University of British Columbia (Canada) Simon Fraser University (Canada) The University of Victoria (Canada) – Gustavson School of business	Have signed the Talloires Declaration, committing themselves to promoting sustainability and creating expectations that they will integrate sustainability across the curriculum, especially in their introductory economic courses. The Talloires Declaration and the signatories can be viewed at the website of the secretariat for the declaration, the Association of University Leaders for a Sustainable Future (ULSF, 2023).	Green (2013)	Qualitative study based on 54 students interviews about the introductory economics recently completed at one of the three universities. Findings suggest that the current introductory economics curriculum undermines the universities' sustainability commitments.
Universidad de Chile	Universidad de Chile has signed the Talloires Declaration and participates in the "EcoFEN for a Sustainable Campus" (FEN, 2015), which has four lines of action of an internationally recognised Sustainable campus. The line of action in teaching is focus on: - Social responsibility as a generic competence at undergraduate curricula. The School of Economics and Business has defined five common generic competences for its three undergraduate programs. Among these is the competence of social responsibility.	Sandoval, Hasbún and García (2017); FEN UCHILE (2023)	Qualitative study based on the experience of the social-environmental sustainability office, EcoFEN, of the School of Economics and Business at University of Chile during the period of 2007-2015. In terms of teaching, the policy promotes the incorporation of curricular activities with a focus on sustainability; at a management level, it encourages changes in consumption practices of the institution; and at the extension level, it encourages various activities with the university community and sustainable entrepreneurs. One of the future

	- Ten tips to promote sustainable classrooms. - Study cases for sustainability. - Sustainability courses for undergraduate students. - Social internship. One of the undergraduate programmes is Economics, which offers a strong emphasis on ethical practice, transparency, and economic and social wellbeing.		challenges of the School is to formalise a permanent line of research in sustainability.
Bucharest University of Economic Studies, "Constantin Brancusi" University from Targu-Jiu, Bucharest University, Politehnica University of Bucharest, Hyperion University, Cantemir University, and University from Craiova, Alexandru Ioan Cuza University and Stefan cel Mare University from Suceava (Romania)	Economic higher education system in Romania has started with small steps to adapt to the environmental requirements. They organise programmes, projects and debates on sustainable developmental issues.	Novo-Corti et al. (2018)	Quantitative study based on a sample of 1,250 respondents – students, master and PhD –enrolled in Romanian public and private economic faculties. To identify differences between some groups, t-test analysis and ANOVA were conducted. It was observed that all undergraduate, postgraduate and PhD programmes require a change of attitude and mentality. Romanian public universities are more involved than private universities in the implementation of programmes, projects, debates and courses on sustainable development, and students' reactions are positive.
University of the West Indies (Jamaica)	Economic planning provides students with the skills necessary to develop plans at the organisational, region, or broader	Griffith and Moore (2020)	Based on a case study that compares the approaches used in two different disciplines – economics and sociology –.

	macroeconomic level. The majority of topics studied address many of the SDGs, and students are introduced to the concept of the SDGs throughout the course.		It demonstrates the necessity of integrating sustainability and the SDGs into course delivery.
University of Murcia (Spain)	The experience of the Working Group on Curricular Sustainability of the Faculty of Economics and Business of the University of Murcia (Spain) was carried out within the framework of a pilot project for the implementation of Curricular Sustainability in the Degree in Economics.	Molera et al. (2021)	Qualitative study based on a pilot project of teaching innovation, whose objective was the incorporation of sustainability in the degree in Economics. It provided a guide to introduce sustainability competence in the economics degree by creating a Sustainability Competency Map together with a series of learning resources that can help teachers to include sustainability contents in their teaching practice.
KU Leuven Faculty of Economics and Business (FEB) (Belgium)	Bachelor in Economics, Master of Business Economics- Leuven, Master in Economic Policy, Master of Economics- Leuven, Master in Economics, and Master of Economics. This university integrates ethics, responsibility, and sustainability (ERS) into curricula in their business faculty.	Stough, Ceulemans and Cappuyns (2020)	Qualitative study based on a case study at a Belgian university. The results show that the 'broad, horizontal' approach better captures the contributions of a business/economics faculty in integrating sustainability themes in course content. It also highlights how such an approach yields insights useful for internal strategy development (i.e., by identifying programmes with high and low levels of integration, and by understanding how variables, such as instructor characteristics or specialised sustainability programmes affect levels of integration).

Table 2. Case studies selected based on the search from Google

Case study	**Programme offered and scope**	**Source**	**Impacts**
Barcelona School of Economics (Spain)	Master's Degree in Specialized Economic Analysis: Economics of Energy, Climate Change, and Sustainability Program, covering an advanced understanding of the rapidly changing energy sector, to learn how economic theory and data tools can be used to understand their functioning and trends.	BSE (2023)	1 Graduate level SDG 7, 13 7 subjects
Università Degli Studi Dell 'Insubria (Italy)	Degree in Economics and management of innovation and sustainability gives graduates an adequate knowledge of the methods to analyse and understand the functioning of enterprises, focusing on innovation and sustainability.	UNINSUBRIA (2023)	1 Undergraduate level SDG 3, 7, 8, 10 6 subjects
University of Technology Sydney (Australia)	Bachelor of Economics, Bachelor of Sustainability and Environment offer students the analytical and quantitative skills required for an in-depth understanding of key economic principles and the multidisciplinary knowledge of sustainability required to operate within the green economy.	UTS (2023)	2 Undergraduate level SDG 10, 11, 13 5 subjects

Norwegian University of Life Sciences (Noruega)	Master in Applied Economics and Sustainability, covering core microeconomic and macroeconomic theory, empirical methods, and public economics and sustainability.	NMBU (2023)	1 Graduate level SDG 1, 10, 12, 13 8 subjects
Northumbria University (Newcastle, United Kingdom)	Master in Economics and Sustainability provides students with state-of-the-art training in economics and policies for sustainability and climate change, as well as a broad grounding in environmental and resource economics.	Northumbria (2023)	1 Graduate level SDG 12, 13 3 subjects
The Ohio State University	Environment, Economy, Development and Sustainability major is a multi-disciplinary major that focuses on the economic, business and social dimensions of sustainability. This cutting-edge major provides the core knowledge and skills students need to launch a career in sustainability in the private, public or non-profit sectors.	OSU (2023)	1 undergraduate level SDG 2, 7, 10, 11, 12 19 subjects
Torrens University Australia	Master of Economics of Sustainability teaches the high-level skills and knowledge needed to advance a career in sustainability economics. Covers advanced concepts in ecological economics, modern monetary theory, and financial systems and develops your critical thinking, problem-solving and reasoning.	Torrens (2023)	1 Graduate level SDG 7, 8 4 subjects
Ca‘ Foscari University of Venice (Italy)	Master’s in Economics, Finance and Sustainability covers knowledge about the impact of climate change and on sustainable development objectives, combining finance with sustainability. Students learn to assess, understand and manage the dimensions of sustainable development by considering risks and opportunities, with regard to single institutions and to the economic and financial system.	UNIVE.IT (2023)	1 Graduate level SDG 7, 14 8 subjects

Universität Oldenburg (Germany)	Bachelor's degree program in Sustainable Economics focuses on the economic causes and approaches to solving the most pressing issues in the transformation to a sustainable and economically responsible society.	UOL (2023)	1 Undergraduate level SDG 7, 10 6 subjects
Wageningen University & Research (The Netherlands)	Master's Economics of Sustainability focuses on the interactions between economic actors and the natural environment. Students are trained in quantitative economic techniques and economic theories at micro, behavioural, and institutional level.	WUR (2023)	1 Graduate level SDG 8, 9, 17 5 subjects
Massey University (New Zealand)	The Master of Sustainable Development Goals (Economics for Sustainability) focuses on the theory and practice of the United Nations Sustainable Development Goals (SDGs). This programme addresses the most pressing imperative facing humanity and the planet: sustainability.	Massey (2023)	1 Graduate level SDG 8, 9 5 subjects
Universidad Autónoma de Nuevo León (Mexico)	Bachelor in Economics, whose objective is to train graduates with a comprehensive profile and who are committed to social welfare with a global vision, qualified to join a competitive labour market at a regional, national and international level, with deductive analytical reasoning and critical thinking that allows them to propose solutions to economic and social problems faced by different economic agents (individuals, companies and government).	UANL (2023)	1 Undergraduate level SDG 8, 16 3 subjects

Table 3. Information collected about the integration of sustainability in the analysed case studies

Universities	Undergraduate studies	N	G	S	C	Graduate studies	N	G	S	C
University of British Columbia, Canada	1. International Economics	5	Yes	No	No					
	2. Economics (BA)	2	Yes	No	No					
	3. Economics (BSc)	-	Yes	No	No					
	4. Food and Resource Economics	12	Yes	Yes	No					
	5. International Economics	4	Yes	Yes	No					
	6. Mathematics and Economics	-	No	No	No					
	7. Philosophy, Politics and Economics	1	Yes	Yes	No					
Simon Fraser University, Canada	8.Economics	2	Yes	No	No	1. Economics	1	No	Yes	No
	9. Political Science and Economics Joint Major	-	Yes	No	No					
University of Chile, Chile						2.Applied Economics	1	No	No	No
						3. Economic Analysis	2	No	No	No
						4. Economics	1	No	No	No
Bucharest University of Economic Studies, Romania	10. Agri food and Environmental Economics	13	Yes	No	Yes	5. Economics and Administration of Agri-food Business	1	No	No	No

	11.Economic Cybernetics	1	No	No	No	6. Ecological Economics	10	No	No	No
	12. International Business and Economics	1	No	No	No	7. Cybernetics and Quantitative Economics	-	No	No	No
	13. Economics and Economic Communication in Business	-	No	No	No	8. Economic Informatics	-	No	No	No
	14. International Business and Economics	1	No	No	No	9. Sustainable development of business and economic organizations	11	No	No	No
						10. European Economics	-	No	No	No
						11. Economics Didactic	-	No	No	No
						12. Diplomacy International Economy	-	No	No	No
						13. International Economics and European Affairs	-	No	No	No
Constantin Brancusi University from Targu-Jiu, Romania	15. Trade, Tourism and Service Economy	-	No	No	No					
	16. Economic informatics	-	No	No	No					
University of Bucharest, Romania	17. Cybernetics, Statistics and Economic Informatics	-	No	No	No	14. Behavioural Economics	-	No	No	No
Hyperion University, Romania	18. Economics of Trade, Tourism and Service	-	No	No	No					
Dimitrie Cantemir University, Romania	19. Service and Tourism Commerce Economy	-	No	No	No					
Alexandru Ion Cuza University, Romania	21. Cybernetics, Statistics and Economic Informatics	-	No	No	No	15. Economic Informatics	-	No	No	No

	22. Economics and International Affairs.	-	No	No	No	16. Economics	-	No	No	No
						17. Economics and International Affairs	-	No	No	No
Stefan Cel Mare University, Romania	23. Trade, Tourism and Service Economy	2	Yes	No	No					
	24. Economic Informatics	-	No	No	No					
	25. General Economics and Economic Communication	-	No	No	No					
University of the West Indies, Jamaica	26. Economics.	1	Yes	No	No	18.Economics	-	No	No	No
						19. International Economics and International Law	-	No	No	No
						20. Development Studies	3	No	Yes	No
University of Murcia, Spain	27. Economics	4	No	Yes	No	21. Economic Development and International Cooperation	3	Yes	No	No
KU Leuven University, Belgium	28. Economics	3	Yes	No	No	22. Economic Policy	-	No	No	No
						23. Economics	3	No	Yes	No
Barcelona School of Economics, Spain						24. The Economics of Energy, Climate Change and Sustainability	7	Yes	No	No
University Degli Study Dell'Insubria, Italy	29. Economics and management of innovation and sustainability	6	Yes	No	No					

University of Technology Sydney, Australia	30. Economics	1	No	Yes	No					
	31. Sustainability and Environment/Economics	4	Yes	Yes	No					
Norwegian University of Life Sciences, Norway						25. Applied Economics and Sustainability	8	Yes	No	No
Northumbria University, UK						26 Economics and Sustainability	3	Yes	No	No
The Ohio State University, USA	32. Environment, Economy, Development and Sustainability	21	Yes	No	No					
Torrens University, Australia						27. Economics and Sustainability	4	Yes	No	No
Ca' Foscari University of Venice, Italy						28. Economics, Finance and Sustainability	9	Yes	No	No
Universität Oldenburg, Germany	33. Sustainable Economics.	6	Yes	No	No					
Wageningen University & Research, Netherlands						29. Economics of Sustainability	5	Yes	No	No
Massey University, New Zealand						30. Sustainable Development Goals	15	Yes	No	No
Universidad Autónoma de Nuevo León, Mexico	34. Economics	3	Yes	No	Yes					
	Undergraduate sustainability subjects	**92**				**Graduate sustainability subjects**	**87**			

N= number of subjects that include sustainability G= if sustainability is included it in the general description of the degrees S= if the syllabus of the subject were available C= if the competencies integrate sustainability

It can be seen that the situation is critical even in this analysis, which considers 15 degrees specifically focused on sustainability (10 bachelor's and 5 master's degrees). On most of the websites of the degrees studied, which presents the 'letter of introduction' of the

proposed studies, there is no direct or indirect mention whatsoever of sustainability. And in very few cases is there any information on competencies, a key issue if the aim is to influence the way in which future economists deal with sustainability issues. But also in undergraduate studies, the Jamaican university includes sustainability only in electives, and 3 of the 16 degrees offered by Romanian universities include sustainability only in electives. In regards to Master's degrees, this is again the case in Jamaica and in 3 of the degrees analysed in Romania.

5. Conclusions

The importance of education, especially in universities, in achieving the UN SDGs is widely recognised. Whereas education is a specific goal in itself, it is also a target in five of the other goals. This is of great importance for universities as they have access to a large community, and therefore they also have the opportunity to influence society and promote sustainability.

Research in universities is clearly contributing to the implementation of the SDGs, but teaching is also having a great influence on students. The incorporation of sustainable development concepts in university curricula is essential for students to engage in sustainability through learning and acquire competencies in sustainability while gaining others to obtain their degrees.

Despite the substantial amount of work done on the inclusion of sustainability concepts in businesses, the area of economics has received comparatively less attention in this regard. Yet, the inclusion of sustainability components in economic education programmes is essential, given the responsibility of economists in the development of sustainable strategies for policy-making that can contribute to the necessary transformations to a more sustainable society. This training will provide students with the competencies required to address the challenges posed by sustainable development and will prepare them to take an active role in shaping the future of society.

The aim of this study was to investigate the presence of sustainability concepts in the degree programmes in the field of economics. Our results show that sustainability contents are mainly introduced at the undergraduate level.

Moreover, the focus of the teaching programmes varies, ranging from reducing inequalities through economic decisions and the use of affordable and clean energy. In comparison, post-graduate studies usually handle a more complex combination of themes, such as affordable and clean energy, decent work and economic development, as well as responsible consumption and production. These results mainly show that while some progress has been made in introducing sustainability concepts into economic education programmes, more efforts are needed so as to provide a more complete perspective of the sustainability goals that can induce stronger changes in the attitudes and competencies of economic students in relation to sustainability.

This paper has some limitations. The first one is the fact that the bibliometric analysis focused on economics-related study programmes, and not on related areas (e.g. business education). The second limitation is that the 28 case studies reviewed did not entail examples from many developing countries. Moreover, they only build a profile of current trends and cannot claim to provide a full picture of the situation right now.

Despite these limitations, this paper provides a welcome addition to the literature and draws attention to some of the specific features that economics education programmes should have, which may enable them to take better advantages of the many opportunities a focus on sustainable development may offer to their students.

The implications of this paper to theory and practice are two-fold. First, the paper illustrates the fact that there are challenges to be faced in implementing the SDGs in economics degree programmes. Addressing them may require changes related to curriculum design and delivery. Secondly, the inclusion of sustainability in study programmes in economics needs to address various operational problems associated with full timetables and busy schedules. Moreover, in some cases the teaching staff may require additional training and resources to effectively incorporate sustainability contents and activities into their teaching and be able to regularly update the contents, so as to cope with the dynamics of the topic.

Moving forward, collaboration - among universities and between them and relevant stakeholders such as industry and public organisations - may be helpful in overcoming some of the challenges outlined in this paper. By means of the establishment of partnerships, they may create a supportive ecosystem that educates economics students, thereby providing society with economists that will become agents of change in promoting a more equitable, just and sustainable world.

There are some further areas where research is needed. For instance, future research should address the specific pedagogical approaches and teaching methods that best integrate SDGs into economics curricula. Also, research is needed in respect of fostering a better understanding of students' understanding and awareness of sustainability issues, as well as how their current behaviour and future professional practices change as a result of their training in sustainability. From an international perspective, future research should explore the challenges of implementing SDGs in economics degree programmes in different regions, which may help to develop study programmes and teaching strategies towards a more sustainable economics education around the world.

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