



Systematic Review of Sustainable Development Goals in Higher Education Institutions: First Five Years of Agenda 2030

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Annotation. This paper presents a systematic review of the scientific evidence regarding the Sustainable Development Goals (SDGs) in universities at the international level in the first 5-year period since the 2030 Agenda (2015–2020). The search comprises a selection of 63 articles published in Web of Science, Scopus, and Google Academic. This study analyses the main research trends, objectives, methodologies, and research tools. The paper concludes with the identification of barriers and limitations.

Keywords: *sustainable development goal, 2030 agenda, systematic review, higher education institutions.*

Introduction

The 2030 Agenda, and particularly the SDGs, gather and reveal the main challenges we face today, which derive from global ecological, economic, and social problems, with the aim of, e.g., eradicating poverty, reducing inequality, and fighting climate change (Galdos-Frisancho et al., 2020; Murga-Menoyo, 2018). Their approval involved adopting a universal approach from the perspective of environmental and social justice

(Murga-Menoyo, 2018; Sanabria-Suárez et al., 2020), explicitly recognising in their drafting that the aim of these SDGs is to protect the human rights of everyone (ONU, 2015). However, Menton et al. (2020) state that environmental and social justice are not currently integrated in the language and spirit of the SDGs. In the same line, Wals (2021) criticises the neoliberal and economic nature of the 2030 Agenda, which is masked in certain formulations of its goals, such as SDG 1 and SDG 8.

In this sense, the scientific literature gathers some relevant critiques about the SDGs Kopnina (2020), such as the reflections of Sanabria-Suárez et al. (2020), who described some of their weaknesses, e.g., their non-binding juridical character, their content, the lack of knowledge about some root causes of the inequalities, and the lack of clear implementation and evaluation tools. These weaknesses are detected in studies such as Ferrón-Vílchez et al. (2022), which offer empirical evidence that demonstrates the existence of SDG washing, especially in international businesses, as well as in the work of Heras-Saizarbitoria et al. (2022), which concludes the existence of a superficial commitment to the SDGs of more than 1,500 international organisations publicly committed to the 2030 Agenda. Despite these critiques, the SDGs show great strengths, such as their universal and integrating character, which, from a systemic and global point of view, applies a simultaneous multi-level perspective that relates the local, regional, national, and global contexts (Vilalta et al., 2018). Similarly, the system of indicators determined to evaluate the advances of the SDGs integrates, for the first time, the ecological footprint emitted by each country, that is, the impacts that each country produces on the rest of the countries (Sachs et al., 2017).

However, five years after their launch, the advances made have been insufficient (Murga-Menoyo, 2018). The last report published by the European Environment Agency (EEA), “The situation of the environment” (European environment – state and outlook 2020 – SOER 2020), shows that the general environmental tendencies of Europe have not improved since the publication of the last report of 2015 on the situation of the environment. The actions taken to date are not only insufficient but also ineffective, which reveals the need to rethink the ways of approaching the challenges we are facing. Despite certain achievements, the EEA ratifies that Europe will not attain its goals by 2030 if it does not manage to change the course with respect to the current challenges, explicitly mentioning the urgency and the need to expand the reach of the change and to speed up the creation of solutions.

Theoretical Framework

The research results that have been published in the last few years must be analysed, in order to provide an international view of the state of the SDGs in Higher Education Institutions (HEIs) (SDSN Australia/Pacific et al., 2017). At the same time, the results

presented in the Sustainable Development Goals Report 2020 reveal that the world is not taking the necessary steps to attain the world objectives for such year (United Nations, 2020; Hernández-Castilla & Opazo, 2020; Kopnina, 2020).

In the midst of these scenarios of ecological and social pessimism, a “new” crisis appears as a consequence of the COVID-19 pandemic. As stated by Hernández-Castilla & Opazo (2020), the appearance of this virus has posed a threat and an interruption to the attainment of the SDGs and to the global efforts made in this direction; thus, the enormous sanitary, economic, and social consequences of its expansion have caused a retreat in many of the advances achieved (United Nations, 2020).

This maelstrom requires, more than ever, the deep involvement and commitment of HEIs to assume the SDGs proposed by the United Nations in their 2030 Agenda. Universities As stated by Ahmadein (2019), they are fundamental to achieving the SDGs, since they can and must provide the next generation with the necessary skills, knowledge, and understanding to address the challenges presented by sustainability, as well as to favour the scenarios to generate projects and carry out studies that pose a powerful advance in the attainment of the 2030 Agenda. Moreover, the experience and knowledge of universities are crucial for the generation of solutions to social, economic, and environmental challenges (Ketlhoilwe, Silo, & Velepini 2020; El-Jardali et al., 2018). It could be said that none of the SDGs will be met without the deep involvement of this sector (Dlouhá et al., 2019; Gusmão Caiado et al., 2018; Lazzarini & Pérez-Foguet, 2018).

Although there are numerous initiatives from HEIs aimed at providing solutions to the challenge of sustainability, the current reductionist approach must be changed considerably, expanding the spaces for participation and integrating the different voices (Galdos-Frisancho et al., 2020).

In this sense, it is worth highlighting the work conducted by Veracruz University (VU) through the Academic Observatories, from which social spaces are being created to allow for the generation of knowledge, with the aim of strengthening the social responsibility of the VU (Zavala et al., 2020). This forum contemplated the participation of everyone interested in this topic.

It is also worth mentioning the work that has been developed from the Centre of Technological Innovation for Human Development in the Politechnic University of Madrid (itdUPM) through its role of a facilitator of Multiactor Alliances (Mataix et al., 2017). The aim of this proposition lies in generating confluence spaces with agents of different contexts and nature (public and private sector, communities, and civil society organisations) who collaborate to respond to complex problems.

The scenario described above highlights the potential of university research as an essential element in involving society in addressing these challenges. According to Mader & Rammel (2015), through the knowledge derived from research, HEIs create a social impact that shows a strong potential to act as an enclave for local and global sustainability. Therefore, educational research and, particularly, university research must commit to the

search and creation of responses oriented toward the attainment of the SDGs, welcoming and encouraging diverse participation.

It is important to highlight that, although there are numerous studies on Education for Sustainable Development, there are also some ambiguity and gaps in the research about the inclusion of the SDGs in the context of university activities (Leal Filho et al., 2019). It is necessary to know, globally, what is being done from university research with regard to the SDGs, how they are being implemented and what results are being obtained. Assuming this concept leads us to delve into what is being published within the framework of the SDGs from universities. According to Calles (2020), in the process of truly integrating the SDGs in HEIs, it is necessary to know and identify what is already being done.

It is fundamental to analyse the research results reported in the last few years in order to present an international view of the state of the SDGs in HEIs (SDSN Australia/Pacific et al., 2017) that allows answering the following questions regarding the current situation: Are we on the right path? What is the role of the university, and what does it contribute to regarding the attainment of the SDGs? What significant tendencies are identified in the approach to the SDGs? What are the main findings and conclusions provided by researchers in terms of the SDGs and the role of the university?

In order to answer these questions, this study has focused on systematically analysing the scientific evidence published in the first five years of the 2030 Agenda (2015–2020), which marks the first period and the direction of the implementation of the SDGs in universities. As a result, this article presents a mapping of the contributions of researchers with respect to the involvement of universities in the attainment of the 2030 Agenda and the SDGs, attending to the criteria described in a further section of this study and which respond to our research questions. This research is part of the EDINSOST2 project “Integration of the objectives for sustainable development in the training in sustainability of the Spanish university degrees” (EDINSOST2–SDGs), financed by the “State programme of R & D oriented to the challenges faced by society” of the Spanish Ministry of Economy and Finance.

Methods

Systematic review is a rigorous and transparent methodology of literature review that provides an objective and clear process that is perfectly reproducible. Rigor, transparency, and reproducibility are achieved by following a fixed process for reviews through the adoption of broad-search strategies, predefined search chains and uniform inclusion and exclusion criteria (Mallett et al., 2012).

After an initial mapping for the realisation of the present review, we identified some literature reviews in the field of research on the SDGs and sustainability. Among them, we can highlight the one conducted by Merma-Molina et al. (2021) about the integration of

SDG 5 in university teaching. Another reference is the study of Leal Filho et al. (2019), who explored how universities are addressing the SDGs in the area of teaching. The review of Rashid (2019) is also worth pointing out; this is a systematic review aimed at identifying the extent to which research in business education and training addresses the SDGs. Another relevant study is that of Leal Filho et al. (2021), which presents a review of the tendencies of scientific publication about topics related to sustainable development. In this line, Gusmão Caiado et al. (2018) carried out a literature review on the potentials and limitations in the implementation of the SDGs. García-González & Ramírez-Montoya (2019) published a systematic review about open innovation, which analysed the opportunities for environments of sustainable training. Lastly, the systematic review conducted by Eichler & Schwarz (2019) was focused on determining which SDGs approach social innovations.

Although the results of these studies are relevant and contribute to the field of Education for Sustainable Development, we consider that our contribution not only complements them but also provides new findings, as it delves into more specific issues with respect to the research published in the scope of the SDGs in HEIs.

Procedure

For the realisation of the present study, we followed a specific methodology for systematic reviews (Meehan et al., 2019; Rodwell et al., 2018; Del Pino, Frías & Palomino, 2014; Linares-Espinós et al., 2018) under the strategy of the PRISMA declaration (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), which is a document that describes the guidelines and steps to be followed in the elaboration of systematic reviews based on 27 items (Urrútia & Bonfill, 2010).

The search includes articles published between January 2015 and October 2020 in the following databases: Web of Science (WOS) and Scopus; and Google Academic search.

Problem Formulation

The question formulated for the systematic review was generated following the PICO methodology (Table 1):

Table 1
Question Formulated From the PICO Methodology

P=Population	I=Intervention	C=Comparison intervention	O=Outcome-Results
University scope / Higher Education Institutions (HEIs)	Implementation of the SDGs and attainment of the 2030 Agenda	Does not apply	Specific actions and their contribution

Source: Urrútia and Bonfill (2010).

The question that this literature review aims to answer is: What does the scientific literature present about the involvement of universities in the implementation of the different SDGs since the latter were launched?

This question is divided into the following subquestions, which correspond to each of the objectives set (Table 2).

Table 2

Association Between Objectives and Subquestions

Objectives	Subquestions
1. To analyse the main tendencies, findings and conclusions of research on the SDGs in the university context at the international level.	1. What objectives, findings and results are identified in the articles on the SDGs in universities? 2. At what institutional level are studies carried out? 3. What type of articles are conducted on the SDGs in universities? 4. What are the foci/topics of interest of Higher Education research on the SDGs?
2. To characterise the predominating research methodologies, designs, and instruments.	5. What methodology is used in the development of the identified studies? 6. What information gathering instruments are used?
3. To reveal the limitations and barriers.	7. What limitations and/or barriers appear in the studies?

Source: developed by author.

Search Strategies

To guarantee the sensitivity of the search process, it was decided to use descriptors incorporated in a thesaurus. We chose to search in SKOS, the thesaurus of UNESCO; however, it was not updated, and terms like “sustainable development goals” did not obtain results. Therefore, we decided to check the keywords used in recent articles on this topic and extracted the terms that we then used as descriptors, thereby ensuring the thoroughness of the search. The descriptors used were “sustainable development goals”, “SDG”, “2030 agenda”, “university”, “higher education”, “college” and “faculty”, in English or in Spanish. Lastly, to cover the specificity of the search, we designed a protocol with the established terms truncated in order to ensure the reach of the search and its combination through Boolean operators (OlarTE-Mejía & Ríos-Osorio, 2015).

The specific search routes are described below:

Table 3*Specific Search Routes and Descriptors*

Search routes and descriptors	N° Articles		
	WOS	SCO-PUS	GOOGLE SCHOLAR
Route 1: TI=(universidad AND objetivo de desarrollo sostenible)	0	0	19
Route 2: TI=(Educación superior AND objetivo de desarrollo sostenible)	0	1	2
Route 3: TI=(facultad AND objetivo de desarrollo sostenible)	0	0	0
Route 4: TI=(Universit* and sustainable development goal)	15	20	0
Route 5: TI=(Higher education* AND sustainable development goal)	15	18	0
Route 6: TI=(college* AND sustainable development goal)	0	0	0
Route 7: TI=(faculty* AND sustainable development goal)	0	0	0
Route 8: TI=(sustainable development goal* AND (University* OR higher education OR college OR faculty))	10	19	4
Route 9: TI=(universit* AND “sustainable development goal*”)	15	20	0
Route 10: TI=(Higher education* AND sustainable development goal*)	16	18	0
Route 11: TI=((Facult* OR universit* OR higher education) AND (sustainable development goal*))	15	28	0
Route 12: TI=(universit* AND “Agenda 2030”)	1	3	0
Route 13: TI=(universit* AND “SDG”)	1	1	10
Route 14: TI=(Higher education* AND SDG)	1	6	12
Route 15: TI=(universidad AND “ODS”)	0	0	15
Route 16: TI=(Educación superior AND “ODS”)	0	0	11

Source: developed by author.

Inclusion and Exclusion Criteria

This review included scientific articles published in the Web of Science (WOS), Scopus and Google Scholar databases, in English or in Spanish. The search was set to the period between January 2015 (when the 2030 Agenda was drafted and the SDGs were launched) and October 2020. The search was limited to scientific articles whose title included some of the combinations of the previously defined descriptors, in order to focus the search on those studies that specifically addressed the relationship between the SDGs and HEIs. Lastly, we included the open-access articles and those that could be accessed with the licenses of our institution.

The following table presents the inclusion and exclusion criteria established:

Table 4
Inclusion and Exclusion Criteria

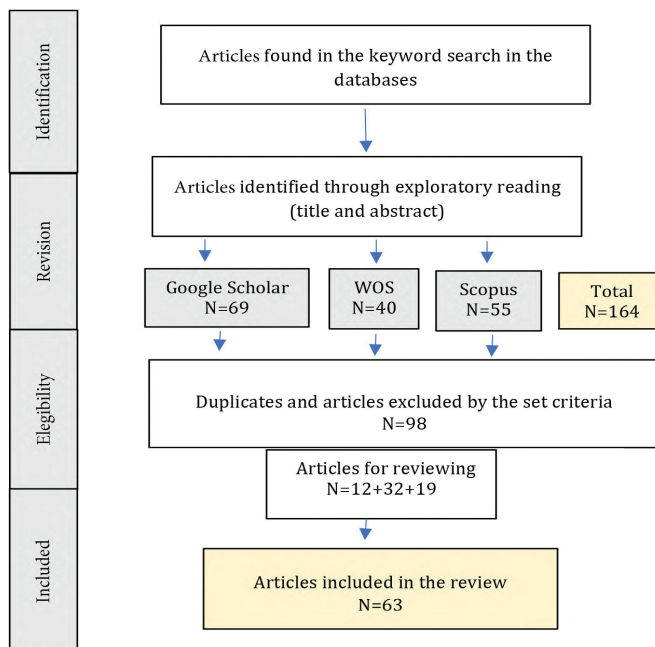
Inclusion criteria	Exclusion criteria
Articles published in the WOS, Scopus and Google Scholar databases.	Articles published in other databases.
Scientific articles.	Book chapters, recessions, conference minutes, etc.
Studies whose title contains some of the combinations of the defined descriptors.	Studies whose title does not contain the defined descriptors.
Articles in English or in Spanish.	Articles in other languages.
Articles published between January 2015 and October 2020.	Articles published before or after the study period.
Open-access articles or articles accessible with the licenses of our institution.	Articles with restricted and/or charged access and those which could not be accessed through our institution.

Source: developed by author.

Data extraction

The following flow chart shows the process of data extraction.

Figure 1
Flow Chart of the Review Process



Results

We present the results related to objective 1: Analyse the main tendencies, findings and conclusions of research on the SDGs in the university context at the international level.

Question 1: What objectives are proposed in the identified articles on the SDGs in universities?

For the analysis of the objectives and results, we used the propositions of Sterling et al. (2016) and Barth & Rieckman (2016), who presented a series of objectives that stand out as necessary for the implementation of the SDGs in universities. This proposition is specified in the numbering of ten objectives that we used to categorise the selected studies. The analysis of the articles shows the same number and type of categories for the objectives and results, which indicates a strong consistency between the objectives set and the results obtained.

The number of categories identified for the analysis of the objectives and results was 107, for a total of 63 articles (See table in the Appendix B).

The categories with the largest number of articles were: Cat2 (27.1%) (Sánchez-Carracedo et al., 2017; Slocum et al., 2019; Neary & Osborne, 2018; O’Keeffe, 2016; Leal-Filho et al., 2019; Kioupi & Voulvoulis, 2020; Kazakova et al., 2020; Heleta & Bagus, 2020; Franco et al., 2019; Franco & McCowan, 2020; Fleacă et al., 2018; Ferguson & Roofe, 2020; Cabral et al., 2019; Crespo et al., 2017; Valter & Costa, 2020; Macedo et al., 2019; Brugmann et al., 2019; Manolis & Manoli, 2021; Dlouhá et al., 2019; Cruz et al., 2020; Edwards & Ashida, 2020; Chankseliani & Tristan, 2020; Sanabria-Suárez et al., 2020; Esteban et al., 2020; Blasco et al., 2020; Neumann, 2018; Amadi et al., 2020; Paletta & Bonoli, 2019) and Cat9 (22.4%) (Rodríguez et al., 2019; Zavala et al., 2020; Zamora-Polo & Sánchez-Martín, 2019; Saha et al., 2020; Rebelatto et al., 2019; Priyadarshini & Abhilash, 2020; Zamora-Polo et al., 2019; Anasi et al., 2018; Milton, 2020; Franco et al., 2019; Franco & McCowan, 2020; Macedo et al., 2019; Albareda-Tiana et al., 2018; Aleixo et al., 2020; Maruna 2019; Bohunovsky et al., 2019; Vologzhina et al., 2020; Chankseliani & Tristan, 2020; De la Rosa et al., 2019; Neumann 2018; Paletta & Bonoli, 2019), which represent, together, 49.5% of the total sample, followed by Cat3 (15.9%), Cat8 (11.2%) and Cat5 (9.3%), which represent, together, 36.4%. Interestingly, the articles are clustered into these five categories, especially in Cat2 (studies based on foundation frameworks with greater theoretical basis and coherence in the research designs to be developed) and Cat9 (overcoming isolation and establishing strategies for coordination, discussion and analysis of results, as well as for the exchange of innovating experiences).

Table 5*Analysis of Objectives and Results*

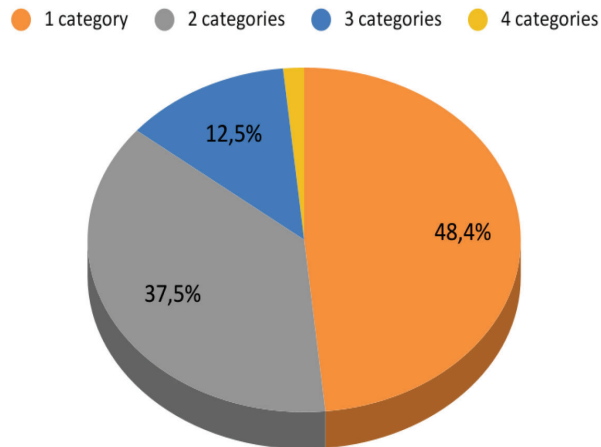
Category	Objectives and results	Data
Cat1	Promote longitudinal research on the effects of sustainability in Higher Education.	3.17%
Cat2	Research supported by more theoretically grounded frameworks and coherence in the research designs to be developed.	47.62%
Cat3	More comparative research, especially at the international level, beyond the emphasis on local and small-scale research.	26.98%
Cat4	Greater communication between non-English speaking researchers that overcomes the biases of the hegemonic prevalence of mainly American, English, North European, Canadian, Australian, and South African research.	3.17%
Cat5	Closer interaction between university and community for the purposes of greater coordination of actions and programme effectiveness and resource efficiency.	15.87%
Cat6	Increased interaction between researchers in different fields of sustainability and activist groups committed to different environmental causes.	1.59%
Cat7	More direct involvement of the different disciplines with other sectors and public agents such as NGOs, companies, the media and local and national governments.	7.94%
Cat8	Emphasising the role of research as a systematic action to facilitate transformation and promote global change in organisations through collaborative models.	19.05%
Cat9	Overcome isolation and establish strategies for coordination, debate, critique of results and exchange of innovative experiences.	34.92%
Cat10	10. Promote synthesis, reviews and meta-analysis of the scientific production on the SDGs.	9.52%

Source: Sterling et al. (2016); Barth & Rieckman (2016); Gough, et al. (2016)

A total of 33 articles have more than one of the identified categories (51.56%), with 23 articles showing two categories (37.5%) (Urazán, et al., 2016; Rodríguez et al., 2019; Zamora-Polo & Sánchez-Martín, 2019; Slocum et al., 2019; Rebelatto et al., 2019; Priyadarshini & Abhilash, 2020; Zamora-Polo et al., 2019; Perović & Kosor, 2020; López et al., 2019; Heleta & Bagus, 2020; Fleacă et al., 2018; Valter & Costa, 2020; Macedo et al., 2019; Dlouhá et al., 2019; Maruna, 2019; Bohunovsky et al., 2019; Hirsu et al., 2020; Vologzhina et al., 2020; Chankseliani & Tristan, 2020; Esteban et al., 2020; Körfgen et al., 2019; Neumann, 2018; Paletta & Bonoli, 2019); of these 23 articles, only 8 have three categories associated (12.5%) (Zavala et al., 2020; Owens, 2017; O’Keeffe, 2016; Anasi et al., 2018; Franco & McCowan, 2020; Aleixo et al., 2020; De la Rosa et al., 2019; Wagman et al., 2020) and 1 has four categories (1.5%) (Franco et al., 2019), whereas another 31 articles

show one category (48.4%). This suggests that there is a strong interrelation between some categories, more specifically between Cat2 and Cat9, which appear related in a total of 7 articles. Approximately half of the articles are associated with more than one category, which indicates the complementarity between the objectives and the results and the aim of the articles to comprise different typologies.

Figure 2
Distribution of the Articles Based on the Number of Categories



There is still much work to do in favour of Goal 4 (greater communication among non-English speaking-researchers, in order to overcome the biases of hegemonic prevalence among American, British, Northern European, Canadian, Australian, and South African researchers). Several studies tackle these realities, although they do not mention their interconnection.

Other goals that require a considerable investment of efforts are Goal 7 (more direct involvement of the different disciplines in other sectors and public agents, such as NGOs, companies, communication media, and local and national governments) and Goal 6 (greater interaction among researchers of the different fields of sustainability and groups of activists committed to different environmental causes), as well as Goal 5 (closer interaction between the university and the community to improve the coordination of actions, the efficacy of programmes, and the efficiency of resources), although the latter has a greater presence. The disciplinary and academic culture of the university is still predominant, and it offers little dialog with the community, local entities, etc., as well as few synergies between fields of knowledge that work in favour of sustainability. The service work of universities toward society, i.e., the so-called University Social Responsibility (USR), provides further institutional consistency, a chance to be more useful to society,

and the capacity to learn from the creative and instituting practices that emerge from civil society and local entities, with an emphasis on Southern countries and territories.

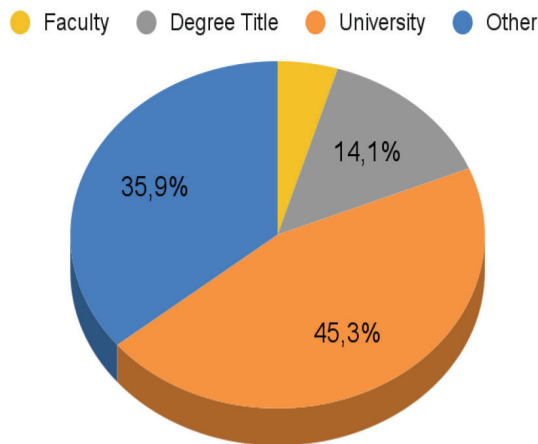
Another goal of presence is Goal 1 (to promote longitudinal studies about the effects of sustainability in HE), which requires the identification of good and bad practices. Attaining the goals implies being efficient; thus, it is not only important to achieve the goals but also to achieve them as soon as possible, using little resources, reducing the cost of the efforts, and increasing the impact. Identifying the changes caused by sustainability and, more specifically, the SDGs is crucial for the creation of new agendas from the 2030 Agenda that could be evaluated, with rigorous methodologies that provide real results, images, and narratives. All this derives from the Millennium Development Goals (MDGs). What real, measurable, quantifiable changes improve the quality of life of people and their co-responsibility as global ecocitizens in a society that is interconnected with nature?

Question 2: At what institutional level are studies developed?

Regarding the institutional level of the analysed articles, it is worth highlighting that most of them were conducted in universities in general (45.3%). Specifically, in the levels of degree and faculty, the percentage decreases significantly, with 14.1% and 4.7%, respectively. Outside the academic scope, numerous studies have been carried out, according to the obtained data (35.9%).

Figure 3

Institutional Level

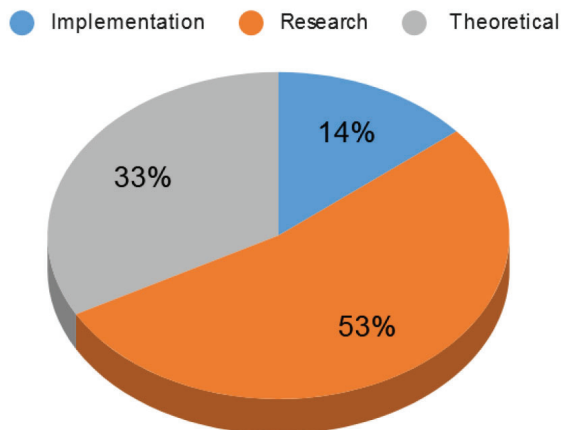


Question 3: What type of articles are carried out in the research on the SDGs in universities?

More than half of the analysed articles (53%) are research articles (Urazán et al., 2016; Slocum et al., 2019; Saha et al., 2020; Rebelatto et al., 2019; Priyadarshini & Abhilash, 2020; Neary & Osborne, 2018; Zamora-Polo et al., 2019; O’Keeffe, 2016; Purcell

et al., 2019; Anasi et al., 2018; Neary & Osborne, 2018; Zamora-Polo et al., 2019; O’Keeffe, 2016; Purcell et al., 2019; Anasi et al., 2018; Neary & Osborne, 2018; Zamora-Polo et al., 2019; O’Keeffe, 2016; Purcell et al., 2019; Anasi et al., 2018; Perović & Kosor, 2020; Leal-Filho et al., 2019; Kioupi & Voulvoulis, 2020; Kazakova et al., 2020; Franco et al., 2019; Franco & McCowan, 2020; Cabral et al., 2019; Crespo et al., 2017; Valter & Costa, 2020; Albareda-Tiana et al., 2018; Omisore et al., 2017; Aleixo et al., 2020; Brugmann et al., 2019; Maruna, 2019; Smaniotto et al., 2019; Silva et al., 2020; Hirsu et al., 2020; Esteban et al., 2020; De la Rosa et al., 2019; Blasco et al., 2020; Amadi et al., 2020; Paletta & Bonoli, 2019; Wagman et al., 2020; León, 2019). A total of 33% are theoretical articles (Cavallo et al., 2020; Cebrián, 2019; Gutiérrez & Villatoro, 2018; Anzola, 2020; Sánchez & Morales, 2020; Rodríguez et al., 2019; Sonetti et al., 2019; Owens, 2017; Milton, 2020; Heleta & Bagus, 2020; Fleacă et al., 2018; Ferguson & Roofe, 2020; Dlouhá et al., 2019; Cruz et al., 2020; Bohunovsky et al., 2019; Vologzhina et al., 2020; Edwards & Ashida 2020; Chankseliani & Tristan, 2020; Sanabria-Suárez et al., 2020; Körfgen et al., 2019) and only 14% correspond to implementation articles (Sánchez-Carracedo et al., 2017; Zavala et al., 2020; Zamora-Polo & Sánchez-Martín, 2019; Michalopoulou et al., 2019; López et al., 2019; Macedo et al., 2019; Manolis & Manoli 2021; Castro et al., 2020; Neumann, 2018). This low percentage indicates the need for a larger number of studies focused on a closer interaction between the university and the university community, in order to improve the coordination of implementation actions, the efficacy of programmes and the efficiency of resources.

Figure 4
Type of Study



Moreover, it is important to highlight the role of research studies as a systematic action to facilitate the transformation and promote a type of global changes in organisations, in decision makers and in the agents of the university community from collaborative

models that potentiate the active involvement of all sectors and make use of the alliances of researchers with the community and the different agents that integrate it, thereby promoting the confluence of interests.

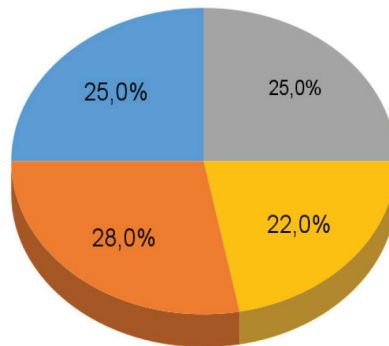
Question 4: What are the foci/topics of interest of research in Higher Education about the SDGs?

For the analysis of the topics of interest of current research about the SDGs in the university context, we followed the work of Sterling et al. (2016), who proposed a categorisation attending to the emphasis of the studies on the processes/results, organisations, programmes or people.

Figure 5

Research Focus

● Curricular and learning process change ● Systemic change in the organization and learning institutions ● Action skills or commitment
● Impact of the institution on the community and its effectiveness in promoting changes towards the SDGs.



The results show that there is no predominating focus among the analysed articles. There is a similar proportion regarding the studies focused on the curricular change and on the learning processes (25%) (Gutiérrez & Villatoro, 2018; Rodríguez et al., 2019; Slocum et al., 2019; Priyadarshini & Abhilash, 2020; Michalopoulou et al., 2019; Kioupi & Voulvoulis, 2020; Fleacă et al., 2018; Albareda-Tiana et al., 2018; Aleixo et al., 2020; Brugmann et al., 2019; Cruz et al., 2020; Blasco et al., 2020; Wagman et al., 2020), articles related to the development of action skills or commitment (28%) (Anzola, 2020; Sánchez Carracedo et al., 2017; Zamora-Polo et al., 2019; Leal-Filho et al., 2019; Kazakova et al., 2020; Cabral et al., 2019; Crespo et al., 2017; Valter & Costa, 2020; Omisore et al., 2017; Manolis & Manoli, 2021; Dlouhá et al., 2019; Maruna, 2019; Hirsu et al., 2020; Chankseliani & Tristan, 2020; Sanabria-Suárez et al., 2020; Esteban et al., 2020; Neumann, 2018), articles focused on the systemic change in the organisation and learning of HEIs, that is, changes in how teaching is organised and changes in the way of teaching in universities (22%) (Cebrián, 2019; Saha et al., 2020; Rebelatto et al., 2019; Owens, 2017; Purcell et al., 2019; Anasi et al., 2018; Perović & Kosor, 2020; Franco et al., 2019; Silva et al., 2020;

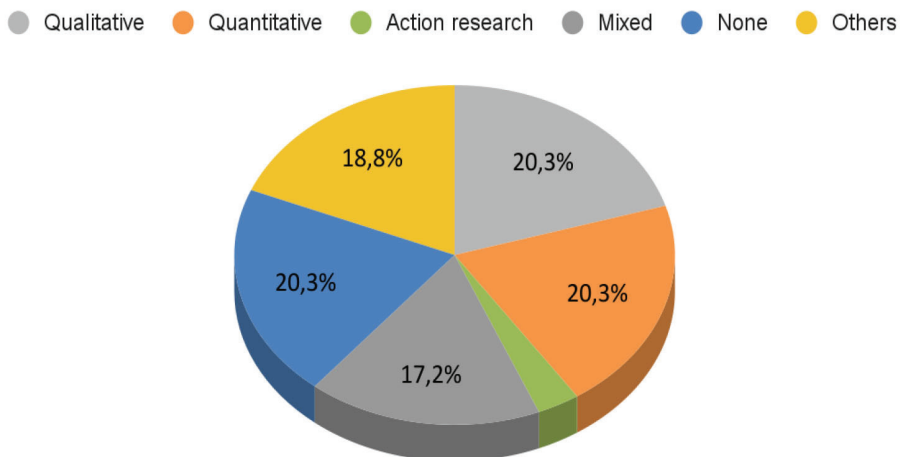
Hirsu et al., 2020; Chankseliani & Tristan, 2020; Blasco et al., 2020; Neumann, 2018) and articles focused on the impact of the institution on the community and its effectiveness in promoting changes toward the SDGs (25%) (Cavallo et al., 2020; Cebrián, 2019; Saha et al., 2020; Rebelatto et al., 2019; Priyadarshini & Abhilash, 2020; Owens, 2017; Purcell et al., 2019; Anasi et al., 2018; Perović & Kosor, 2020; Franco et al., 2019; Castro et al., 2020; Bohunovsky et al., 2019; Vologzhina et al., 2020; De la Rosa et al., 2019; Körfgen et al., 2019; León, 2019). It is important to highlight that, within the category “systemic change”, a total of 4 out of 15 articles are directly related to an improvement of the environmental management (Saha et al., 2020; Rebelatto et al., 2019; Purcell et al., 2019; Perović & Kosor, 2020). In the category “competencies”, 4 out of 18 articles are focused on the study of ideas and knowledge related to the SDGs (Zamora-Polo et al., 2019; Kazakova et al., 2020; Valter & Costa, 2020; Omisore et al., 2017).

Here we present the results related to objective 2: Characterise the predominating research methodologies, designs, and instruments.

Question 5: What methodology is used in the development of the identified studies?

The results show that there is no predominating methodology. The values identified in the qualitative, quantitative, and no methodology (theoretical studies aimed at presenting an idea) coincide with 20.3% each. Then, those studies identified as “other” (those which do not clearly define the methodology) show a value of 18.8%, followed by those that used a mixed methodology (17.2%). Lastly, the most surprising finding is perhaps the low number of studies that use action research as a methodology, i.e., those in which the participants are also part of the research process and not only a sample, with a value of 3.1%.

Figure 6
Types of Methodology

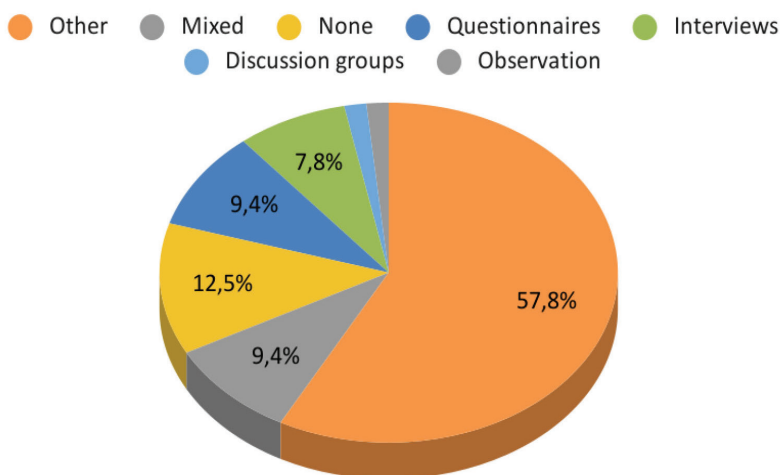


Question 6: What information-gathering instruments are used?

As in the case of the methodologies, the qualitative and quantitative information-gathering instruments used in the analysed articles are consistently repeated in the same percentage. The use of the questionnaire shows a value of 9.4%, coinciding with the use of a combination of instruments (questionnaire and interview), and the use of the interview shows 7.8%. Since observation is strongly linked to participatory or action research, it is poorly represented, as well as this type of methodology, which, as can be observed in the previous table, appears only in 1% of the analysed studies. At the same time, it is worth highlighting the low percentage of the use of discussion groups, even though it is an ideal instrument (Valderrama-Hernández et al., 2020) for qualitative analysis in educational contexts, and it is barely represented (1%). Similarly, there are a large number of studies that use other tools (57.8%). Such instruments include expert panels with discussion groups, round tables with minutes of the reflections presented, and even workshops of specific themes.

Figure 7

Instruments



Here we present the results related to objective 3: reveal the main findings and conclusions as contributions to this scientific field and characterise some limitations and barriers.

Question 7: Which are the most remarkable results? How do the results contribute to the implementation of the SDGs?

This question is approached together with the analysis of the objectives. The same analysis system was used, finding a clear correspondence between objectives and results, which is logical in publications of high impact and academic quality. However, it is worth

highlighting, more specifically, the presence of studies that present a perspective from the South, implementing actions at the institutional level and, in some cases, in relation to the community and the local authorities. Most of them are focused on analysing sustainability competencies in the curricula, conceptions of the students about sustainability and potentials of the SDGs from HEIs. There is also a tendency toward the design of methodologies, strategies, and instruments to implement sustainability in learning processes, at the institutional level and for the transformation of society.

Question 8: What limitations and/or barriers are reported in the articles?

The limitations were analysed in a total of 18 cases, since most of the articles neither included this section nor gathered information about barriers and limitations. The most important limitation is related to the local character of the studies, which are focused on a field of knowledge, population and context, institution, etc. (O’Keeffe, 2016; Cabral et al., 2019; Crespo et al., 2017; Valter & Costa, 2020; Albareda-Tiana et al., 2018; Smaniotto et al., 2019; Hirsu et al., 2020; Sanabria-Suárez et al., 2020; Esteban et al., 2020; Wagman et al., 2020). Moreover, several articles highlight the need for further studies. This is in line with an emerging field of study, since research in environmental education along with sustainability have a tradition spanning 25 and 10 years, respectively. The rest of the limitations have a very technical character associated with the sample, the instruments or the methodologies (Urazán et al., 2016; Cebrián, 2019; Sonetti et al., 2019; Slocum et al., 2019; Neary & Osborne, 2018; Leal-Filho et al., 2019; Macedo et al., 2019; Amadi et al., 2020).

Discussion and Conclusions

Regarding the main research tendencies, from the analysis of the objectives and results, the analysed articles are focused, on the one hand, on foundation frameworks with greater technical support and consistency in the research designs and, on the other hand, on the establishment of strategies for the coordination, debate, and analysis of results and the exchange of innovating experiences.

With respect to the institutional level at which the studies were carried out, there is a predominating number of articles focused mainly on the university as an institution, without an abundance of other foci, such as teacher training in sustainability (Leal Filho et al., 2021), which, however, are a priority in other specific geographic contexts, as is the case in Spain (Bautista-Cerro & Díaz, 2017; Sánchez Carracedo et al., 2017; Escámez & López, 2019; García, 2019; Solis-Espallargas et al., 2019; Valderrama-Hernández et al., 2019).

Regarding the types of articles, the results show that more than half of them are research studies, most of them concluding with recommendations for the improvement

of the SDGs. There are a smaller number of implementation studies, aimed at improving the SDGs from the practice. The theoretical articles, by having a certain descriptive character, are focused on improving some aspects of the framework of the SDGs, assuming it in a better way, or developing a better way of implementing it. This way, these works are contributing to the creation of a methodological theoretical body in research and education, which is a typical duty of universities and Higher Education Institutions in general for an emerging field of knowledge such as the SDGs (Leal Filho et al., 2021).

With respect to the main topics of interest of the analysed articles, there are studies focused on curricular change and learning processes, the development of action or commitment competencies, the systemic change in the organisation and learning of institutions, and the impact of the institution on the community and its effectiveness to cause changes toward the SDGs. In other reviews of studies on the SDGs (Alonso-Sainz, 2021), specifically in the Spanish context, there is a greater presence of articles related to training in SDGs, the generation of implementation propositions and the improvement in the challenges of Education for Sustainable Development. Contemporaneous Anglo-Saxon research through the publication of the Manifesto for a Post-Critical Pedagogy (Hodgson et al., 2017; 2020) started a strong line of studies that claim the attention to the immanent goods of education and not to their instrumental relationship to achieve extrinsic goods. This post-critical pedagogy encourages education research to pay attention to the intrinsic value of the educational actions we carry out, denouncing, at the same time, the current treatment of education, i.e., instrumentalised and deprived of its meaning (Hodgson et al., 2017), thus other systematic reviews claim that the SDGs must be at the service of pedagogy and the other way around (Alonso-Sainz, 2021).

With regard to the characterisation of the predominating research methodologies, designs and instruments, the international framework of publications related to Education for Sustainable Development is especially founded on the qualitative and quantitative methods in a balanced manner. The theoretical method, that is, studies that delve hermeneutically into sustainability, has a lower presence, falling into the category of “analysis”, “other” or “none”. Unlike the Spanish context, where there is an abundance of this type of research (Aznar & Barrón, 2017; Caride, 2017; Gil & Vilches, 2017; Murga-Menoyo, 2015a; 2018; Molina & Novo, 2017; Murga-Menoyo & Novo, 2017; Tornero et al., 2017).

In regard to the information-gathering instruments used in the 63 analysed articles, the most popular in the approach of sustainable education are the qualitative and quantitative tools. That is, mixed techniques are the most prevalent among the studies described in this review as well as in other studies that were not included here (Guzmán & Ortiz, 2019; Matas, 2019; Mesa, 2019; Navarro et al., 2015; Rojano & Jiménez, 2017; Castro, Ares-Perlas et al., 2020; Bautista-Cerro & Díaz, 2017; Sánchez-Carracedo et al., 2017; Escámez & López, 2019). Furthermore, there are very few results at the international level founded on case studies, action research, ethnographies or biographic-narrative research (Cavallo

et al., 2020; Albareda-Tiana et al., 2018), unlike in the Spanish context (Antúnez et al., 2017; Barrón & Muñoz, 2015; Collado, 2017; Coronado-Marín & Murga-Menoyo, 2018).

Regarding the limitations and barriers reported in the analysed articles, we highlight the local character of these studies, with little transcendence for civil society, as they are focused on training, innovation, and research. There is no synergy between the requirements of local authorities, entities, strategic sectors, and civil society sensitive to sustainability, except in very specific cases. It is necessary to carry out further studies of holistic character that unite fields of knowledge which work in favour of sustainability and which provide more global solutions from more integral perspectives (Annan-Diab & Molinari, 2017), creating alliances between the North and the South, and between Higher Education Institutions and society.

In conclusion, the present study offers some key ideas about which there is evidence:

a) Firstly, the objectives, findings, and conclusions of research on the SDGs in the university context at the international level are being focused, in the following order, on studies with a strong theoretical and methodological component from the perspective of research and innovation, with a scarce production of articles focused on the development of learning and training practices linked to the SDGs. There is also a predominance of strategies of coordination, discussion, and innovation focused on the university institution and the internationalisation of research, with the latter appearing as a systemic action to facilitate the transformation of institutions in favour of the development of the SDGs from collaborative models.

b) Secondly, there is no predominance of a research topic or a methodological approach, with the qualitative and mixed approaches being the most prevalent. There is a lack of studies focused on action research processes.

c) Thirdly, the most important limitations reported by the analysed articles are related to the relevance of the academic culture in the research and innovation works focused on the university community, developed from fields of knowledge or disciplines that do not contemplate a holistic perspective focusing on the curricular development (Moon et al., 2018), organization, and functioning. Other studies have a very local approach, showing no synergy with civil society or the administrations.

Limitations

The main limit in relation to the universe of the study sample is language, with English and Spanish being the languages selected in the inclusion criteria.

We are aware of the exclusion of initiatives that are currently focused on SDG implementation, either through accreditation initiatives such as STARS in the US, through rankings such as THE or as part of sustainability reporting.

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Authors' contribution

Carmen Solís-Espallargas: Validation, Formal analysis, Investigation, Writing – review & editing. Jorge Ruiz-Morales: Validation, Formal analysis, Investigation, Writing. Rocío Valderrama-Hernández: Validation, Formal analysis, Investigation, Writing. Lucía-Alcántara: Methodology, Validation, Formal analysis, Writing.

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Sisteminė literatūros apžvalga apie darnaus vystymosi tikslus aukštojo mokslo institucijose: pirmieji penkeri metai įgyvendinant DV darbotvarkę iki 2030 metų

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Santrauka

Šio tyrimo tikslas – atlikti sisteminę literatūros apžvalgą ir išanalizuoti mokslu grįstus įrodymus tarptautiniu lygmeniu, susijusius su Darnaus vystymosi tikslais (DVT) universitetuose per pirmąjį penkerių metų laikotarpį (2015–2020 m.) įgyvendinant DV darbotvarkę iki 2030 m.

Sisteminė literatūros analizė atlikta pagal PRISMA (angl. *Preferred Reporting Items for Systematic Reviews and Meta-Analyses*) išdėstytą strategiją, kurioje aprašoma sisteminės literatūros taikymo gairės ir žingsniai pagal 27 punktus. Paiešką sudarė 63 straipsniai, paskelbti *Web of Science*, *Scopus* ir *Google Academic* duomenų bazėse. Šiuo tyrimu buvo išanalizuotos mokslinių tyrimų tendencijos, atskleisti pagrindiniai tikslai, straipsnių tipai ir mokslinių tyrimų temos, apibūdintos vyraujančios mokslinių tyrimų metodikos ir priemonės, nustatyti su DVT universitetuose susiję apribojimai ir kliūtys. Tyrimų rezultatais siekiama dalytis su suinteresuotosiomis šalimis, švietimo politikos formuotojais. Taip pat tyrimo rezultatus siekiama pritaikyti ir kitose universitetų srityse.

Esminiai žodžiai: *darnaus vystymosi tikslas, darbotvarkė iki 2030 m., sisteminė literatūros apžvalga, aukštojo mokslo institucijos.*

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