

# A CRITICAL REVIEW OF CLIMATE UNIVERSITY LITERATURE

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**Abstract:**

*This paper provides a critical review of the climate university literature. Higher education institutions have increased their climate initiatives among students and society. Climate changes is becoming more and more present in daily activities. Whether it is about carbon dioxide emissions or deforestation, the social and economic consequences of climate change are challenging for each country in the world. Of all the institutions, universities play the most important role in educating people regarding the negative effects of climate change. While some universities use their own resources for this cause, others write plans and attract European projects to fund climate change objectives. The aim of this paper is to review the latest insights on Climate University. For this purpose, the paper analysed a database of scientific papers extracted from the Web of Science. The results underline the decisive role that higher education institutions play in promoting the fight against the causes of climate change. Society must understand the challenges of climate change and further develop solutions to address them. The new insights offered by this paper may be worthwhile for different stakeholders interested in climate change issues.*

**Key words:** Climate University, higher education, literature, bibliometric analysis.

**JEL classification:** E02, Q54.

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## 1. INTRODUCTION

Originally, climate change was caused naturally, as a result of solar activity or other natural phenomena. Currently, climate change is driven by human activity, through the use of fossil fuels in nearly all areas of human existence. The burning of fossil fuels releases greenhouse gas emissions into the atmosphere. Furthermore, these emissions are also produced by other human activities: such as the use of fossil fuels to fuel the cars people drive every day or to heat their households. The changes that occur in the global climate are currently influencing the economy and society. From this perspective, many organisations have initiated a move to target greenhouse gas-producing sectors of the economy to reduce their emissions. This mainly concerns industry, transport, and agriculture.

The universities are also a conducive environment for learning about climate change and for fostering innovation to introduce innovative solutions to global climate-driven problems. Climate change should be a concern for students, and universities should support them in resolving the global issues related to the climate crisis. Therefore, climate change should be a priority for universities and for young people.

On the path to mitigating climate change, universities around the world have begun a process of empowering people. Therefore, universities are in a transition process towards climate-responsive universities and are implementing various actions and projects that address the causes and consequences of climate change.

The main purpose of the paper is to review the research on Climate University. To conduct this analysis, the methodology included the review of a database with scientific papers extracted from Web of Science. This research is designed to highlight the most important authors, universities, and countries that have made significant contributions to the area of climate change. Furthermore, the research outlines the most frequently mentioned keywords found in scientific publications on climate change.

The paper is structured in multiple parts. The first section was an introduction to the field of climate change and the role that universities have in reducing it. The following section investigates the literature on Climate University and outlines the major characteristics and actions that have been undertaken. Another section will introduce the main results and discussions of the critical analysis of the climate university literature. Finally, the paper concludes with the importance of universities and students in climate change engagement.

## 2. LITERATURE REVIEW

There is a climate emergency nowadays that requires a joint effort from multiple stakeholders. An important vector within this effort is played by universities. Therefore, universities have joined on a path towards reducing global climate change through an active commitment to environmental and social protection.

At the European level, EIT Climate-KIC (2024) is an example of a successful project community that addresses climate change and fosters the implementation of innovative projects that trigger climate change mitigation. In addition, this agency is also supporting European companies that seek to implement climate solutions in their processes.

In the international level, Columbia Climate School (2024) is a best practice for universities around the world. This institution seeks to develop climate solutions for global issues that threaten the economy and society. They combine both education and research on climate issues. Some of the study programmes relate to environmental and sustainability issues. The main aim of Columbia Climate School is to foster sustainability through innovative ideas, solutions, and business models. Furthermore, the results of this institution are oriented towards informing policymakers, companies, and organisations about the importance of building a healthy planet for the people of today and for future generations.

Furthermore, the International Universities Climate Alliance (2024) is active and unites universities from all over the world. There are universities from Africa (University of Cape Town), America (New York University, California Institute of Technology), Asia (Nanjing University, Hokkaido University), Europe (Delft University of Technology, Sorbonne University, University of Oxford), and Oceania (University of Melbourne, Victoria University of Wellington). In the framework of this alliance, universities share actions, events and projects undertaken within climate and sustainability issues. For example, the Chinese University of Hong Kong hosted a conference on climate change, the University of Nairobi implemented the concept of green buildings, the University of Melbourne started to collaborate with Ørsted Company for renewable energy development, the King's College London investigated through a project the environmental impact of fashion, the

A recent study highlighted that the application of design thinking to the achievement of the Sustainable Development Goals will provide efficient solutions to the global issues that threaten our lives nowadays (Leal Filho et al., 2024). From this point of view, there are several major international universities that currently apply this study programme to their students. Harvard Business School is a case study through a personalised course in design thinking and innovation. Nowadays, design thinking is a crucial competency for developing solutions to complex societal and economic challenges. Among these global challenges, climate change is perhaps the most critical.

Climate action is one of the objectives of the SDGs. Because the climate is heating rapidly, the number of natural disasters has increased in the last few years. Droughts, storms, and high levels

of the sea are only some examples of the effects of climate change. To tackle climate change, the United Nations encourages people, companies, and organisations to work together to accomplish this objective. From this perspective, we highlight the major role that universities have within this collaboration. It is basically the pole that unites all categories of stakeholders. Climate change education can be provided by universities through intensive courses and research activities (Leal Filho et al., 2021).

Many studies have attempted to investigate the perceptions of students regarding the significance of climate change and greenhouse effects (Shepardson et al., 2011; Lombardi & Sinatra, 2012). Students consider that climate change is consequence of human activities and that the effects of climate change are real (Pharo et al., 2012; Senbel et al., 2014; Molthan et al., 2019). However, university students are not aware of the main causes that drive climate change, they only rely on human activity. Therefore, there is a need to educate students about climate change concepts, and understanding is the main section (Wachholz et al., 2014).

Interdisciplinary collaboration within universities has become a necessity for promoting sustainability and identifying climate solutions (Shields, 2019). Interdisciplinary teams (e.g., with students from engineering, economics, and medicine) can generate innovative ideas to reduce climate change or even create new business ideas that incorporate a sustainable climate component. Furthermore, universities have multiple connections with the public, private, and other stakeholders that can harness resources to develop innovative solutions to many of the global challenges.

### 3. RESEARCH METHODOLOGY

The purpose of this paper is to examine the literature on climate universities and highlight the importance of universities in tackling climate change. For this approach, we have examined 316 scientific articles retrieved from Web of Science. The search keyword introduced on this platform was Climate University. Furthermore, have been selected only scientific articles indexed in SCI-EXPANDED, A&HCI, and SSCI. Scientific publications were analysed with Microsoft Excel and VOSviewer.

For this purpose, we designed a set of research questions:

- *RQ1 - What is the development of Climate University research?*
- *RQ2 - Which authors, universities and countries have had the highest influence on Climate RW3 - University research over the years?*
- *RQ3 - Which keywords have been most explored on Climate University and how are they connected?*
- *RQ4 - Which scientific articles were most cited during the analysis period?*

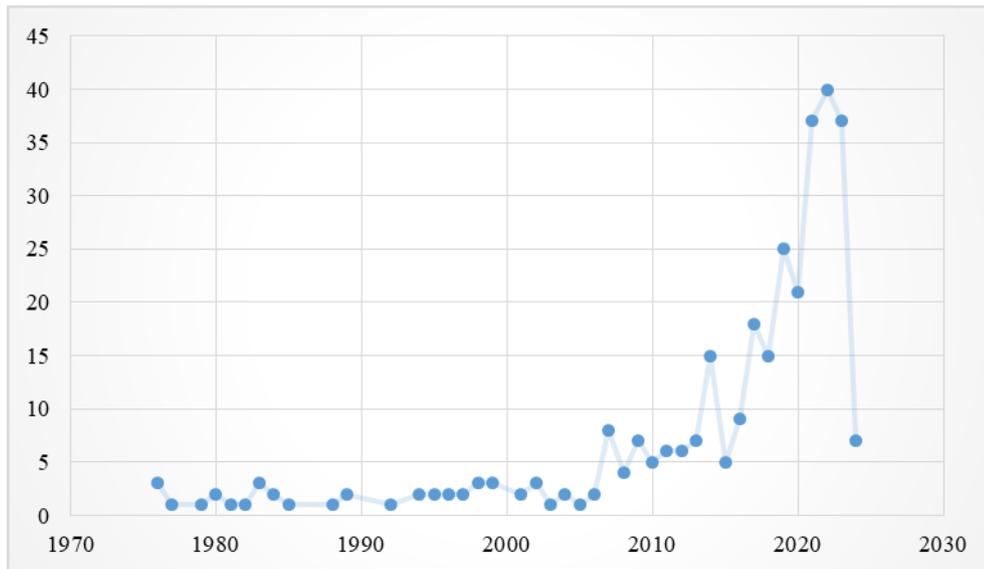
### 4. RESULTS AND DISCUSSION

Figure no. 1 shows the evolution of scientific publications on climate universities from 1976 to 2023. Therefore, between 1976 and 2013, we can observe a constant number of scientific publications that addressed the connection between universities and climate change. The interest of researchers in Climate University began in 2014, when the concerns of global economies about the effects of climate change became more visible. Consequently, universities became an important vector for climate change education and a partner for various institutions and companies needing climate solutions. Hence, the number of scientific publications increased significantly from 2014 to 2023. According to the data in Figure no. 1, the highest number of scientific publications was recorded in 2022, just after the coronavirus pandemic.

For example, after 2018, the Ministry of Education and Culture from Finland and the Finnish Innovation Fund Sitra have established a network entitled “Climate University” to foster climate education in several universities that were interested in climate awareness towards society and economy. Besides climate change, this network aims to increase sustainability concepts in universities so that students will understand its importance for the future of our planet. Alongside

teaching activities in universities focused on sustainability and climate change, research activities are also engaged in order to develop sustainable and climate-friendly solutions to many of the current global challenges.

European universities have aligned with the objectives of European Union to reach “net zero” CO<sub>2</sub> emissions by 2050. Therefore, universities started a commitment to tackling climate change by investing in green options and promoting research and innovation. The role and responsibilities of universities in combating climate change are enormous and involve multiple dimensions: the educational role, the research role, and the innovation role. Furthermore, universities promote sustainability towards society and encourage the implementation of sustainable practices within companies. Sustainability is considered to be the future of all decision-making, whether microeconomic or macroeconomic.



**Figure no. 1. Evolution of scientific publications on Climate University**

Source: Own elaboration using data from Web of Science

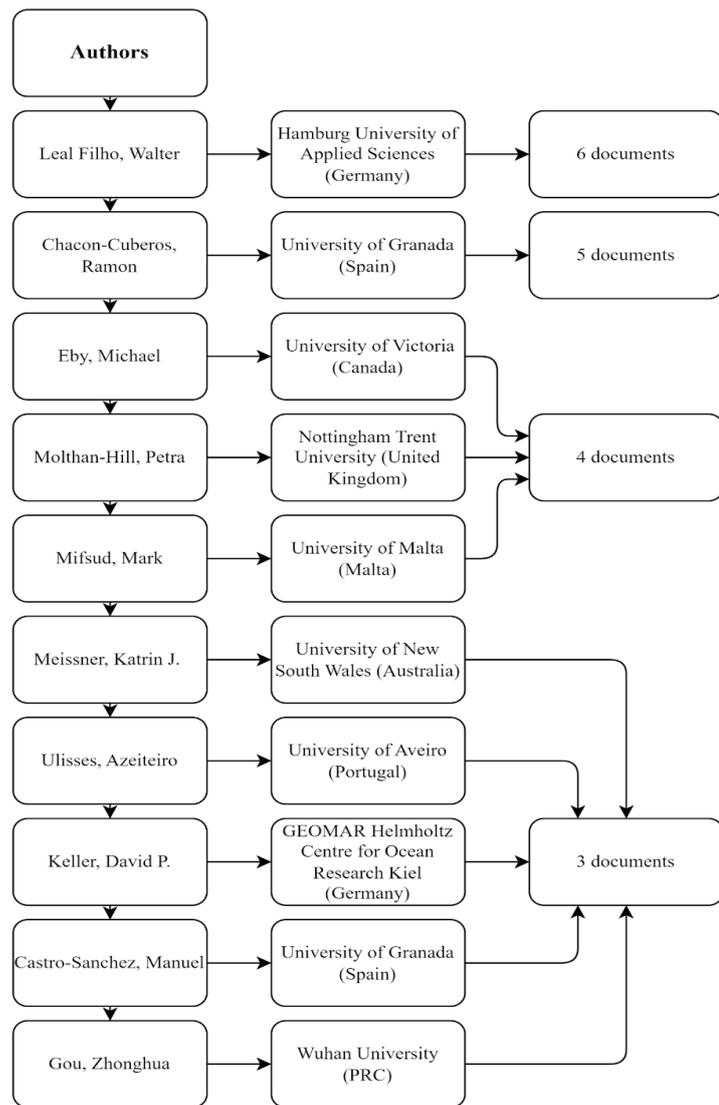
In the following, we will highlight the most important authors by number of scientific publications on Climate University (Figure no. 2). Walter Leal Filho is the author who has published the most scientific papers on Climate University. As can be seen in the figure below, he works at the Hamburg University of Applied Sciences in Germany. Some of his research papers addressed sustainability and climate actions within communities, artificial intelligence and sustainability, or sustainability within economics university programmes. According to the author, climate change generates direct and indirect effects (Leal Filho et al., 2024a). The direct effects include extreme heat, extreme weather, and disasters or changes in land use. Indirect effects refer to different illnesses or diseases produced by indirect effects. In this context, universities have an increasingly important role in reducing the effects of climate change on human health. Health issues also have a significant influence on economic development through an increase in unemployment and a reduction in the volume of production activities. Policymakers can develop partnerships between academia and the business environment through various programmes and projects that can facilitate innovation and research activities from the perspective of climate change. Furthermore, the introduction of sustainability within educational programmes in universities is considered to increase the sustainability leadership that many companies lack nowadays (Eustachio et al., 2024). In a study related to the achievement of Sustainable Development Goals (SDGs), the authors analysed the main objectives of SDGs that were approached by diverse experts in different regions (Salvia et al., 2019). The results underline the high interest of experts in quality education, climate change, and sustainable cities and communities. Therefore, climate solutions result from appropriate education aimed at reducing climate change and contributing to sustainable cities and communities.

The next author with the most scientific publications is Ramon Chacon-Cuberos (5), who is based at the University of Granada in Spain. For this author, we emphasise research papers focused on climate in universities, not climate change. His studies addressed emotional intelligence, motivational climate, academic achievement, and physical activities. Among the results, the keyword introduced in the Web of Science was Climate University, and some studies regarding a certain climate in universities were retrieved, which is not relevant for this study. The concept of Climate University is relatively recent, and some studies on this topic have not addressed climate change or sustainability.

The other authors with five scientific publications are Michael Eby, Petra Molthan-Hill and Mark Mifsud (University of Malta). Michael Eby is working at the University of Victoria (Canada), and his research interests relate to climate change, pollution, climate models, commitment to “zero emissions”, climate policy, or climate simulations. The University of Victoria has an Earth System Climate Model that contributes to studying climate changes in the long-term (Mengis et al., 2020). This aspect explicates the activity of this author in the field of climate change.

Furthermore, Petra Molthan-Hill, active at Nottingham Trent University, shows a high interest in the efforts of universities in tackling climate change, through reducing CO2 emissions, climate change education, responsible management education, and sustainability teaching. For instance, universities can contribute to the achievement of the SDGs through the implementation of climate solutions, such as renewable energy (Filho et al., 2023). Another research explores the significant role of universities in climate change (Leal Filho et al., 2021). From this perspective, universities must, first and foremost, train the teaching staff in subjects related to sustainability, climate issues, and climate change adaptation. Accurate information on climate change comes from well-trained climate change professors. A further important point is the promotion of climate change in universities originating in developing countries, due to the small awareness of climate issues within poor communities (Mbah et al., 2021).

The last author with significant research on Climate University is Mark Mifsud, from the University of Malta. Some of the research of this author concentrates on the role of climate solutions for SDG achievement or on the relationship between digitalization and sustainable development in universities. Moreover, the author investigated the perceptions of students in universities regarding the significance of climate change (Leal Filho et al., 2023). Some results highlight that the students are aware of the effects of climate change and are interested in participating in courses that provide additional knowledge on climate issues.



**Figure no. 2. Top 10 authors with scientific publications on Climate University**

Source: Own elaboration using data from Web of Science

Table no. 1 outlines the most important Web of Science categories and research areas. Therefore, we can notice that most of the scientific papers are published in connection with Environmental Sciences, Environmental Sciences Ecology and Education Educational Research. Furthermore, the scientific papers published within Green Sustainable Science Technology have reached 41. This aspect highlights that green, sustainable practices are required for a climate change approach. Sustainability is the key to economic growth through environmental protection, green manufacturing, green jobs, innovative climate solutions, and policy directions towards climate change. The scientific papers included in the aforementioned categories include research on the introduction of climate change within university programmes, universities as climate leaders, or the commitment of universities to environmental and societal protection. Climate change education can be adapted to the specifics of each university, due to the independence of each institution to establish diverse approaches towards sustainability and climate change (Molthan-Hill et al., 2019). An interdisciplinary approach to climate change is strongly promoted within universities. There are examples of university professors who established an interdisciplinary team in order to teach and train students on topics related to climate change (Pharo et al., 2012). However, such an initiative requires a long period of time because of the intensive volume of knowledge covering several fields.

**Table no. 1. Top Web of Science categories and research areas**

Web of Science category	No. of publications	Research areas	No. of publications
Environmental Sciences	62	Environmental Sciences Ecology	80
Education Educational Research	60	Education Educational Research	62
Green Sustainable Science Technology	41	Science Technology Other Topics	54
Environmental Studies	39	Engineering	34
Meteorology Atmospheric Sciences	31	Psychology	34
Public Environmental Occupational Health	26	Meteorology Atmospheric Sciences	31
Construction Building Technology	23	Public Environmental Occupational Health	26
Engineering Civil	20	Construction Building Technology	23
Psychology Multidisciplinary	18	Energy Fuels	14
Energy Fuels	14	Social Sciences Other Topics	14

Source: Own elaboration using data from Web of Science

The United States of America is the country with the highest number of scientific publications (89) on Climate University. Likewise, England (28) and Spain (26) have the next largest number of scientific publications (Table no. 2).

Table no. 2 underlines the universities from which the most scientific publications on Climate University emerged. These universities are: University of California System (7 publications), Manchester Metropolitan University (6 publications) and the State University System of Florida (6 publications). These three universities come from the United States and England.

**Table no. 2. Top countries and universities with scientific publications on Climate University**

Countries	No. of publications	University	No. of publications
USA	89	University of California System	7
England	28	Manchester Metropolitan University	6
Spain	26	State University System of Florida	6
Peoples R China	23	University of Granada	6
Australia	22	University of Michigan	6
Canada	22	University of Michigan System	6
Germany	22	University of New South Wales Sydney	6
Brazil	10	Hochschule Angewandte Wissenschaft Hamburg	5
Taiwan	10	University of Nottingham	5
Chile	9	Harvard University	4

Source: Own elaboration using data from Web of Science

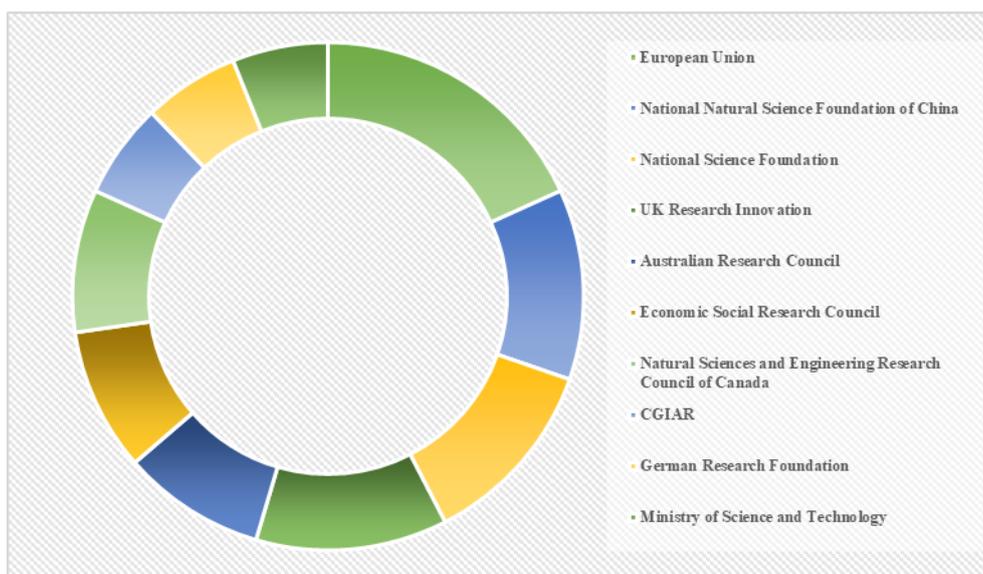
The most important publishers of scientific papers on Climate University are Elsevier (51), Taylor & Francis (43) and MDPI (33). Similarly, we can note that Sustainability (17 scientific publications), International Journal of Sustainability in Higher Education (12 scientific publications) and International Journal of Environmental Research and Public Health (9 scientific publications) have published the highest number of papers on Climate University.

**Table no. 3. Top publishers and publication titles**

Publishers	No. of publications	Publication titles	No. of publications
Elsevier	51	Sustainability	17
Taylor & Francis	43	International Journal of Sustainability in Higher Education	12
MDPI	33	International Journal of Environmental Research and Public Health	9
Springer Nature	32	Energy and Buildings	7
Wiley	13	Frontiers in Psychology	5
Emerald Group Publishing	12	Studies in Higher Education	5
Sage	12	Building and Environment	4
Amer Meteorological Soc	11	Climatic Change	4
Frontiers Media Sa	7	International Journal of Global Warming	4
Interscience Enterprises	4	Journal of Building Engineering	4

Source: Own elaboration using data from Web of Science

The European Union has funded the most scientific papers on Climate University, which is a great achievement for the representatives of the institutions that worked hard to publish important results and best practices related to climate change. The next organisation with a great impact in the field of Climate University is National Natural Science Foundation of China.

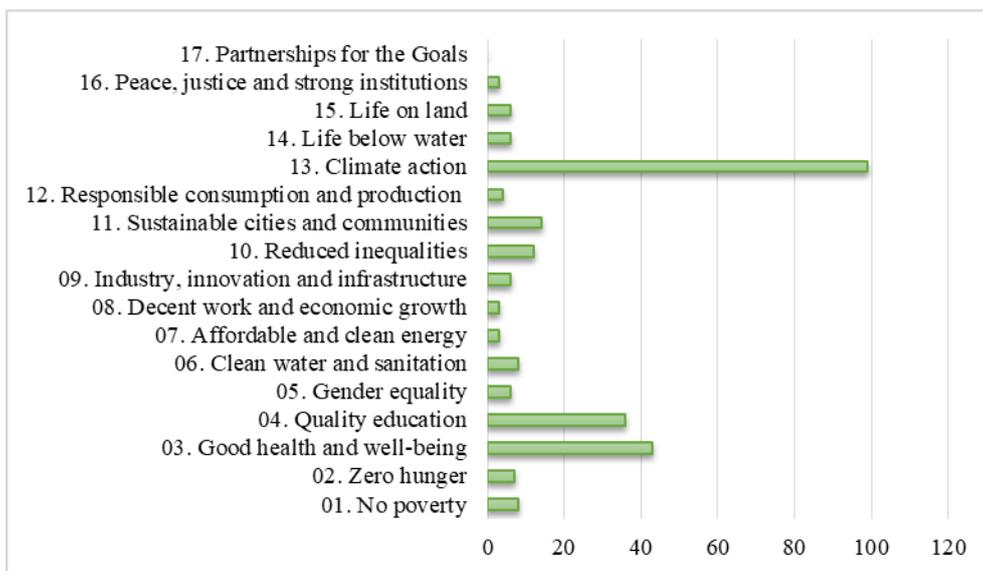


**Figure no. 3. Agencies that funded scientific publications on Climate University**

Source: Own elaboration using data from Web of Science

Figure no. 4 underlines that the majority of the scientific papers on Climate University have been published within the 13th objective of the SDGs – climate action (99 papers). Subsequently,

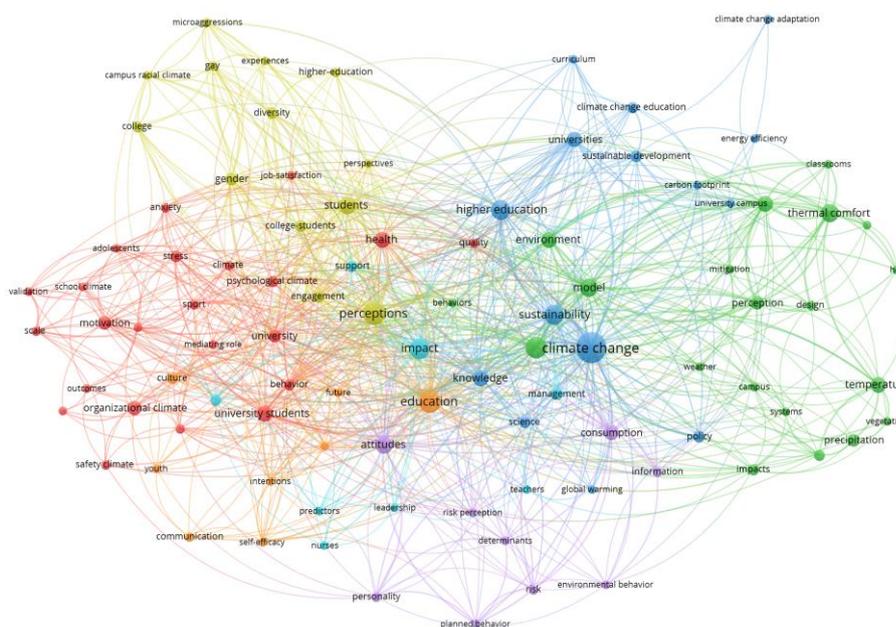
43 scientific papers have been published within the 3rd objective of the SDGs - Good health and well-being and 36 within the 4th objective of the SDGs – quality education.



**Figure no. 4. Scientific publications on Climate University by SDGs**

Source: Own elaboration using data from Web of Science

The minimum number of occurrences of a keyword was 4, and of the 1.488 keywords, 96 meet the threshold. The most common occurrences within scientific publications related to Climate University are climate change (46; total link strength: 138), perceptions (26; total link strength: 106), education (25; total link strength: 108), performance (23; total link strength: 57), impact (21; total link strength: 70), higher education (20; total link strength: 65), sustainability (20; total link strength: 65), model (17; total link strength: 59), thermal comfort (17; total link strength: 42), and attitudes (15; total link strength: 73). In terms of total link strength, we highlight climate change (138), education (108), perceptions (106), attitudes (73), students (72), impact (70), knowledge (67), higher education (65), sustainability (65), and adaptation (61).



**Figure no. 5. Keyword co-occurrence analysis**

Source: Own elaboration in VOSviewer using data from Web of Science

In the following, we will analyse the citations of the scientific publications on Climate University. The minimum number of citations for a document was 10, and of the 316 documents, 96 meet the threshold. However, some of the 96 items selected were not connected to each other, and the largest set of connected items consisted of 10 items. Figure no. 6 indicates a strong research citation network at Climate University between:

- *Green cluster: Molthan-Hill (2019), Leal Filho (2018), and Filho (2021).*

Molthan-Hill (2019) approaches climate change within universities in this paper and states that HEIs should implement more climate change issues in the curriculum of the existing faculties. This author considers that climate change is an important concept that students must be aware of nowadays. Through education and training, students can improve the natural environment, by developing business models oriented towards climate change.

The approach of Leal Filho (2018) is also focused on climate change in universities, but it relates to academic research. After conceptualising the institutional barriers to climate change research, the author performed an online questionnaire in which, among other issues, the major barriers to implementing climate change research in universities were examined. The lack of funding, the lack of experts, and the limited interest in climate change research are the main barriers in the field of climate change research.

Regarding the work of Filho (2021), we highlight the mixed approach of the authors towards examining the manner in which universities address climate change in their academic programmes. The best practices included in this paper illustrate useful information for universities that express a soaring enthusiasm for climate change teaching and research. Therefore, the strong connection between these scientific papers in terms of citations is attributable to the common approach to climate change in universities.

- *Red cluster: Ayanlade (2016), Haq (2020), and Morgado (2017).*

Within this cluster, we can observe a close link between three academic papers: Ayanlade (2016), Haq (2020), and Morgado (2017). Ayanlade (2016) performed a mixed-methods analysis for the purpose of investigating the knowledge of Nigerian students on climate change. The authors explored the perceptions and current knowledge of university students on climate change, by highlighting the role of universities in tackling climate change. The results of the study were diverse, but the most significant conclusion is that Nigerian students are aware of climate change and worry about the impact of climate change on Nigerian agriculture. Moreover, there were some discrepancies between the understanding of climate change and the academic lessons.

The paper by Haq (2020) approaches the same topic as Ayanlade (2016), but the study is performed in Bangladesh. Therefore, the outcomes of the research emphasise that Bangladeshi students are aware of climate change issues and express their beliefs that human beings are responsible for the negative evolution of climate change. The industry and the CO emissions from cars are considered to be the most serious causes of climate change.

A similar approach can be found in the paper of Morgado (2017). This research addresses the perceptions of students on climate change, but not in one area, but in three different countries across the Globe (Portugal, Mexico, and Mozambique). In terms of climate change knowledge, there was no significant difference between students in these countries. A different attitude among students was regarding who was responsible for taking action against climate change. Therefore, the Portuguese and Mozambican students affirmed that governments should implement actions against climate change. On the other side, the Mexican students set forth that individuals are the most important in tackling climate change. There is a close link between the works of these authors, as they all addressed the students' perceptions of climate change.

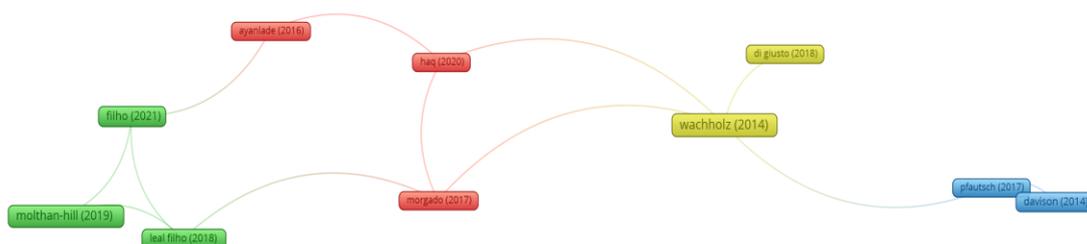
○ *Yellow cluster: Wachholz (2014) and Di Giusto (2018).*

The yellow cluster highlights a close link regarding citation between Wachholz (2014) and Di Giusto (2018). The paper of Wachholz (2014) approaches the perceptions of students on climate change. The main results emphasise that students are informed about climate change and that they consider human activities to be the main cause of its progression. Therefore, students must identify climate solutions for reducing the negative environmental footprint of individuals.

Regarding the study of Di Giusto (2018), we highlight a quantitative study focused on determining the perceptions of Taiwanese university students on climate change. The students argued that public authorities are not reacting well enough to climate change and proposed a more public opinion based on political factors regarding this issue. Therefore, the Taiwanese students consider that more climate change policies are required in this country, such as clean energy policies or programmes for the acquisition of electric cars. We can conclude that these two academic papers embrace a similar approach regarding climate change awareness among students.

○ *Blue cluster: Davison (2014) and Pfautsch (2017).*

The blue cluster includes two academic papers with a high level of citation between them. The first paper by Davison (2014) explains the important role that interdisciplinary climate change education has on society and environmental protection. The study is focused on Australian students, and the most significant results suggest that climate leadership creates stronger communities that address climate change issues. The authors concluded that universities should foster collaboration between diverse academic programmes in order to foster the implementation of climate change in the curriculum and stimulate innovation. In the research of Pfautsch (2017), it is also related to climate change awareness in Australian universities. The online survey addressed to students reveals that few of them are really aware of the actual presence of climate change around the globe. Furthermore, the students proposed some actions for reducing climate change: increasing the use of public transport, increasing education on waste recycling, or reducing dependence on fossil fuels. The students also recommended to educate all citizens on climate change urgency, so the effort to be higher.



**Figure no. 6. Citation analysis of scientific publications on Climate University**

Source: Own elaboration in VOSviewer using data from Web of Science

Table no. 4 highlights the most important 10 scientific publications on Climate University by number of citations. The paper of Park (2009) has recorded the highest number of citations, a total of 452. The approach of Park is oriented towards climate models and the paper highlights an example of climate model that was developed at the University of Washington. The development of climate models facilitates the prediction of future changes in nature and can provide climate occurrence scenarios. Research activities in universities are of great importance for developing efficient climate change models. Nonetheless, current competitive technologies can help integrate climate change models within universities.

Ekvall (1999) recorded the second highest number of citations. This paper addresses the creative climate within the Swedish University. Therefore, it is a research paper that does not concern climate change, but the general climate related to creativity.

Furthermore, Wu's (2007) paper recorded 100 citations and addresses safety climate within HEIs and colleges. The author emphasises that the safety training and accident *experience of a* specific group of employees improve the safety climate within these educational institutions, particularly in laboratories or classrooms with practical activities.

Wachholz (2014) has conducted quantitative research to identify university students' perceptions of their knowledge about climate change, their willingness to reduce carbon dioxide emissions through voluntary actions, and their satisfaction with the quantity of information on climate change they receive at the university. Furthermore, students were invited to propose actions and measures to improve the manner in which climate change information is communicated at the university.

In their research paper on climate change, Keller (2012) approaches the Earth System Climate Models, which is a component of the University of Victoria in Canada. The author states that this model is very useful for a more comprehensive understanding of the climate system. The university specialists constantly improve this model in order to achieve a better simulation of climate issues.

McCormick (2007) has a theoretical approach to addressing climate change throughout history. More specifically, this theoretical study explains the history, palaeontology, and science of the climate change system. The idea for this theoretical research originated from a Harvard University workshop on climate change.

Park (2019) describes a climate model that was developed within Seoul National University. Therefore, it can be noticed that there is a significant emphasis on climate models within universities, as a result of tackling climate change and sustainability issues.

The paper by Schroeder (2010) is oriented towards socio-political climate within the nursing programme at the University of Washington. Therefore, this article also addresses a completely different type of climate issue, not climate change as a consequence of CO<sub>2</sub> emissions.

Furthermore, Huang (2019) investigated thermal comfort in campus outdoor spaces during hot summer and cold winter climates. The author applied a questionnaire to university students, and the most significant results highlight that students prefer to practice outdoor activities during the summer. During the winters, students choose to stay indoors, so the level of outdoor activities is reduced. This approach is not towards climate change but more related to general climate status.

Finally, the investigation of Ge (2018) is oriented towards energy efficiency optimisation, which is a climate solution in terms of heating. Moreover, this solution is implemented within university buildings in China for more adaptive thermal comfort.

**Table no. 4. Top 10 most cited scientific publications on Climate University**

<i>Scientific papers</i>	<i>Keywords</i>	<i>No. of citations</i>
<i>Park (2009)</i>	<i>Global climate models, software modules</i>	<i>452</i>
<i>Ekvall (1999)</i>	<i>Creative climate, social climate</i>	<i>137</i>
<i>Wu (2007)</i>	<i>Safety climate in university</i>	<i>100</i>
<i>Wachholz (2014)</i>	<i>Knowledge and attitudes about climate change</i>	<i>97</i>
<i>Keller (2012)</i>	<i>Marine ecosystem model</i>	<i>85</i>
<i>McCormick (2007)</i>	<i>History of climate change, cultural impact</i>	<i>74</i>
<i>Park (2019)</i>	<i>Climate models, simulations</i>	<i>71</i>
<i>Schroeder (2010)</i>	<i>Socio-political climate, project</i>	<i>65</i>
<i>Huang (2019)</i>	<i>Thermal comfort, university campus</i>	<i>64</i>
<i>Ge (2018)</i>	<i>Thermal comfort, energy efficiency optimization strategies</i>	<i>58</i>

Source: Own elaboration using data from Web of Science

## 5. CONCLUSIONS

The most important results of this theoretical research indicate a positive evolution of scientific publications on Climate University. The author with the most significant contributions to this area is Walter Leal Filho, with numerous qualitative scientific articles published in the field of climate change within universities. Furthermore, we have highlighted that the USA is the country which has published the most articles on Climate University and the university with the same achievement is from the USA - the University of California System. The most important publisher is Elsevier, and the most significant journal is Sustainability. Likewise, the study shows that the European Union is the agency that funded a significant number of academic papers on Climate University topic. The majority of the scientific papers included in the analysis have been published within the 13<sup>th</sup> objective of the SDGs, named Climate Action. Furthermore, climate change, perceptions, education, performance, impact, higher education, sustainability, model, thermal comfort, and attitudes are the keywords with the most occurrences in the text of the scientific papers. The most cited scientific articles belong to Park (2009), Ekvall (1999), Wu (2007), and Wachholz (2014).

Many of the research articles examined in this research addressed climate change in universities and assessed the students' perceptions of climate change, its causes, and its effects on the environment and society. University students has the highest potential to become climate specialists and to find appropriate, sustainable and innovative solutions for current and future problems that economies and societies are confronting. To become a leader in sustainability and climate change, students must acquire knowledge and develop various skills, such as problem solving, decision-making, communication, critical thinking, or team-working.

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