

ENVIRONMENTAL SUSTAINABILITY OF FEDERAL AND STATE HIGHER EDUCATION INSTITUTIONS IN THE STATE OF MINAS GERAIS, BRAZIL



<https://doi.org/10.56238/arev6n3-372>

Submitted on: 10/28/2024

Publication date: 11/28/2024

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ABSTRACT

Some Higher Education Institutions (HEIs) are becoming a reference in environmentally sustainable practices, thus contributing not only to the training of their academics from a theoretical and practical point of view, but also to sustainable development, as they have sustainability as a guideline for managing the campuses of the Institutions. This study aimed to investigate the correlation of research published on the topic of environmental sustainability in the scientific journals of HEIs located in the state of Minas Gerais, Brazil, in the period 2016-2021. The methodology was quantitative and descriptive based on the bibliometrics technique and carried out on the platforms of the scientific journals of the selected HEIs, using the keywords: "Sustainability"; "Environmental Management"; "Sustainability and Higher Education". The results show the presence of 293 scientific journals, of which 143 have publications, and 1,065 articles related to the theme of sustainability, in 16 HEIs with the category of University, with UFU, UFV, UFMG, PUC Minas, being those with the largest publications. It was found that there is no specific publication for the theme. The research was carried out by 3,039 authors, with little presence of individual research, and an average of 3.1 authors per research. It was observed that the evolution of academic learning obtained by the experience of researchers has been bringing a maturity in the works, which already present a history of research, concepts and results that are being added over time, thus building knowledge in the area.

Keywords: Sustainable Education. Universities. Scientific Journals.

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INTRODUCTION

It is possible to say that the various changes that the planet is going through have considerably affected the environment, whether in physical, biological, political and social issues, compromising the quality of life for everyone and the environment in which they live. The human species, in order to ensure its survival, needs a good quality of life, adequate and healthy conditions to be able to live without health risks, starting with air without or with a low level of pollution, abundant and pure water to satisfy its thirst and personal hygiene; in addition to a beautiful, clean and wooded city. In previous years, there was the notion of three types of goods: public, for the use of the people such as streets, squares and private goods. However, in addition to the assets of the First and Second Sectors, there was the most important one, which was above public and private interests: the environmental good, the first good, the patrimony of all and the guarantee of one's own existence and a healthy life, as well provided for in the aforementioned article 225 of the CF/88.

It is a fact that the environment has been degraded over the last decades, causing a decrease in the quality of life of all humanity. Historically, in Brazil, the 1988 Constitution was the first to deal with the environment in a comprehensive way, raising it to the level of a fundamental right, addressing the defense of fauna and flora.

Before the Federal Constitution, the main Brazilian legislative charter aimed at the preservation and legal protection of forests was the Forest Code established by Law No. 4,771, of September 15, 1965, innovating in the sense of providing for legal reserve areas (RL) and Permanent Preservation Areas (APPs), and the code also underwent important changes in 2012. But, worldwide, in a historical way, there was the Club of Rome in 1972 where a group of people came together to debate issues that covered the environment, the Stockholm Conference which was the first world meeting on environmental law, reflecting on the National Environmental Policy, Rio 92, Rio +20 that took place in Brazil, focusing on the preservation and awareness of the environment.

Preserving has numerous motivations, such as the balance of ecosystems, the maintenance of fauna and flora, bringing humanity advances in areas such as pharmacy, leading to the discovery of new substances and improving learning.

According to the Michaelis dictionary (2016), the terminology sustainability means sustainable quality, that is, something that is preserved for a certain time. The report of the World Commission on *Environment and Development* (WCED) defines Sustainable Development through the concept granted by the World Commission on Environment and

Development as development that repairs current indispensabilities, without interfering with the ability of future generations to meet their needs (MILARÉ, 2011). Brazilian law, on the other hand, offers the concept of sustainable development in accordance with Law No. 6,938/81 – National Environmental Policy in its article 2.

The concern with the protection of the environment began in 1970, and with it the need to include educational institutions from elementary school to Universities and Research Institutes. However, the actions of Higher Education Institutions (HEIs) in sustainability research began in the 1990s, being consistent with the milestone of the environmental movement. In HEIs, the interest in sustainability in organizational management initially appears as a research theme that inspires researchers to investigate organizations. Subsequently, there is an amplification in the nature of the researched institutions, permeating other spheres, such as public agencies and the educational institutions themselves.

Some Higher Education Institutions (HEIs) are becoming a reference in environmentally sustainable practices, thus contributing not only to the training of their academics from a theoretical and practical point of view, but also to sustainable development, as they have sustainability as a guideline for managing the campuses of the Institutions.

Thus, the objective of this study was to investigate the correlation of research on the topic of environmental sustainability in the scientific journals of HEIs located in the state of Minas Gerais, Brazil, in the period 2016-2021. The following research hypothesis has been defined: Federal and State Public Higher Education Institutions and private in Minas Gerais are effectively related to environmental sustainability with articles published in scientific journals from 2016 to 2021.

HIGHER EDUCATION INSTITUTIONS AND ENVIRONMENTAL SUSTAINABILITY IN BRAZIL

The record of the actions of the HEIs in search of sustainability dates from the 1990s, being consistent with the milestones of the environmental movements. One of the first documents formalizing the commitment to environmental sustainability in higher education was the Talloires Declaration, an international conference in Talloires, France, which is an action plan to incorporate environmental sustainability in Colleges and

Universities, approved by more than 350 university presidents in more than 40 countries (ULSF, 1990).

The Swansea Declaration was signed in Swansea, Wales, in August 1993, when more than 400 Universities in 47 different countries came together. The Swansea meeting was inspired by the examples of Talloires, due to the significant presence of Universities at the Rio de Janeiro conference and Agenda 21 (UNESCO, 1993).

In the case of Brazil, the institutional context of academic management has pressured HEIs to adopt practices and actions aimed at sustainability (CORREA et al., 2015). In addition, society is demanding that HEIs be accountable for their actions in the economic, social and environmental dimensions. To meet these demands, whether from regulatory bodies or society, HEIs need tools to measure and disseminate their practices and actions in favor of sustainability. In Brazil, however, HEIs are not required to disclose information based on sustainability, which means that disclosure is voluntary (FERNANDEZ, 2013; ROVER et. Al; 2012).

In the institutional context, Alghamdi et al. (2017), Lozano et al. (2013), Lozano et al. (2013), discussed the issue of measuring and revealing sustainability practices and actions in HEIs. In the Brazilian academic context, some initiatives have brought the subject closer.

In this sense, there are several studies related to the subject in question, Palma et al. (2011) identified the number of disciplines related to sustainability offered in bachelor's degree courses in Administration in Brazilian Federal Universities. The process of mapping the Universities used data from the Register of Higher Education Institutions of the National Institute of Educational Studies and Research (INEPE). Only 33% of the HEIs studied offer courses related to this topic.

In this sense, Pereira et al. (2014) examined the relationship between environmental management practices developed on a *campus* of the University of São Paulo (USP) and the greening of its organizational culture. The main objective of this research is the model proposed by Harris and Crane. The authors observed that USP's environmental management program is limited by university bureaucracy and hierarchy. The general perception was that the phrase "environmental management" is almost synonymous with "solid waste management".

Following this question, Rohrich and Takahashi, (2019), examined the scientific production on the topic of environmental sustainability in HEIs in Brazil. They found that there is no specific publication for the theme nationally and that the studies are dispersed in

different journals, with group publications. It was observed that the evolution of academic learning obtained by the experience of researchers has been bringing a maturity in the works, which already present a history of research, concepts and results that are being added over time, thus building knowledge in the area.

Thus, in the state of Minas Gerais, Fernandes et al, (2019), carried out the historical rescue of the search for sustainability at PUC Minas *Betim campus*, which goes beyond legal obligations, implemented through actions of its sustainable program. In this context, the existence of the Biological Sciences Course - Emphasis on Environmental Management at the *Betim campus* had a great responsibility in the beginning of the sustainability actions that were proposed in this program. The results showed that, despite the progress in everyday activities on *campus*, we are still far from the ideal sustainable University. However, the results also clarify that we are on the right track.

METHODOLOGY

To carry out the present research, a descriptive and quantitative research was carried out (HERNANDEZ, FERNANDEZ and BATISTA, 2010), as it is a bibliometric study. Bibliometrics quantifies the production, dissemination and use of recorded information, and can include citation analysis, co-citation analysis, bibliographic groupings (CALDAS et al., 2003), to analyze scientific activity and the situation of the object of study (TOMÁS-GORRIZ and TOMÁS-CASTERÁ, 2018). On the other hand, Glänzel (2014) states that it serves to evaluate research and Romera (1992) has long recognized the value of this methodology for the study of Educational Sciences.

In this sense, the methodology was developed through the search for articles in the journals of scientific journals of Federal and State Public and Private Higher Education Institutions located in the state of Minas Gerais, Brazil.

The search was carried out based on the selection criteria, considering the investigations between the years 2016 and 2021, in the Portuguese languages, and the search through keyword research used: "Sustainability"; "Environmental management"; "Sustainability and Higher Education". The analysis was carried out according to the information selected from the articles with the greatest contribution to the research related to the study theme.

RESULTS AND DISCUSSION

In this topic, articles will be presented by journals with publications on sustainability in the State of Minas Gerais, covering public (Federal and State) Universities, as well as private ones.

Table 1. Distribution of articles by journal.

Higher Education Institutions in Minas Gerais	Number of newspapers	No. Journals with publications on sustainability	Nº publications
Federal			
Federal University of Alfenas (UNIFAL-MG)	10	3	11
Federal University of Juiz de Fora (UFJF)	38	21	57
Federal University of Lavras (UFLA)	6	3	37
Federal University of Minas Gerais (UFMG)	42	17	110
Federal University of Ouro Preto (UFOP)	20	2	8
Federal University of São João del Rei (UFSJ)	7	2	3
Federal University of Uberlândia (UFU)	46	16	304
Federal University of Viçosa (UFV)	23	18	135
Federal University of Triângulo Mineiro (UFTM)	10	6	51
Federal University of the Jequitinhonha and Mucuri Valleys (UFVJM)	4	1	11
State			
State University of Minas Gerais (UEMG)	21	14	56
State University of Montes Claros (Unimontes)	17	10	81
Private			
FUMEC University - (FUMEC) - Belo Horizonte	11	8	83
Pontifical Catholic University of Minas Gerais (PUC Minas)	31	20	108
José do Rosário Vellano University (Unifenas)	3	1	1
University of Uberaba (Uniube)	4	1	9
TOTAL	293	143	1065

According to the study, 1,065 articles were identified, distributed in 293 journals with publications on the topic of sustainability, in the 16 HEIs, with the category of University, both Federal, State and Private. There is a greater concern of Public Educational Institutions correlated to sustainability, where the institutions that had the most publications were: Federal University of Uberlândia (UFU), Federal University of Viçosa (UFV), Federal University of Minas Gerais (UFMG), Pontifical Catholic University of Minas Gerais (PUC Minas), FUMEC University - (FUMEC).

It is evident that the HEIs with the most publications are the Federal Universities, in relation to the State Universities, which may be related to environmental policies, financial aid and government incentives in relation to the theme (DE CÁSSIA BRANDÃO, 2021).

A great dispersion of publications on sustainability in HEIs was evidenced, with no specific journal on the subject. Regarding the distribution of articles by research approach,

most of the works are of a theoretical-empirical nature, reporting case studies and surveys of HEIs to learn about their environmental sustainability practices. Theoretical studies are based on secondary data published on the topic of sustainability in HEIs.

Table 3. Annual distribution of articles by HEI

Higher Education Institutions in Minas Gerais	2016	2017	2018	2019	2020	2021
Federal						
Federal University of Alfenas (UNIFAL-MG)	1	0	0	3	0	7
Federal University of Juiz de Fora (UFJF)	2	1	10	9	10	25
Federal University of Lavras (UFLA)	5	11	7	4	4	6
Federal University of Minas Gerais (UFMG)	13	13	16	22	18	28
Federal University of Ouro Preto (UFOP)	0	1	2	1	3	1
Federal University of São João del-Rei (UFSJ)	0	0	1	0	2	0
Federal University of Uberlândia (UFU)	45	31	56	40	65	67
Federal University of Viçosa (UFV)	10	18	46	17	28	16
Federal University of Triângulo Mineiro (UFTM)	7	2	8	13	7	14
Federal University of the Jequitinhonha and Mucuri Valleys (UFVJM)	4	2	1	3	0	1
State						
State University of Minas Gerais (UEMG)	1	9	4	13	15	14
State University of Montes Claros (Unimontes)	2	5	2	6	43	23
Private						
Universidade FUMEC - (FUMEC)	10	18	13	10	26	6
Pontifical Catholic University of Minas Gerais (PUC Minas)	17	11	22	28	14	16
José do Rosário Vellano University (Unifenas)	0	0	0	0	1	0
University of Uberaba (Uniube)	1	1	1	1	0	5
TOTAL	118	123	189	170	236	229

A total of 3,039 different authors were found for the 1,065 published papers, and the highest number of authors in a publication was 14 authors, totaling an average of 3.1 authors per paper. Few individual publications were verified, and most of the publications came from authors in groups, indicating that there are still no specialists who publish systematically in the area, a situation that shows how recent this area of study is, as researchers are still beginning to publish on the subject.

Looking at the data described above, it can be seen that the year 2020 was the one that most concentrated publications on the subject, followed by 2021, which also had a good publication rate. What can be observed was an increase in publications over the years, which may have occurred due to private and public financial aid, as well as promotion in relation to the theme.

Regarding the profile of scientific investigations of the journals of the HEIs of Minas Gerais and their relationship with sustainability, published in national journals in the period from 2016 to 2021, it was first possible to verify that these studies are dispersed in 143

different journals, a situation that results from the fact that there is no specific journal for the theme nationally.

The 10 journals with the most publications were *Society & Nature* (95) UFU, *Caminhos de Geografia* (47) UFU, *Revista Brasileira de Cartografia* (RBC) (46) from UFU, *Caderno de Geografia* (41) PUC Minas, *Revista PRETEXTO* (30) from FUMENC, *Revista Desenvolvimento Social* (RDS) (27) from UNIMONTES, *Revista Campo-Território* (24) from UFU, *FACES Journal of Administration* (23) of FUMEC, *The Journal of Engineering and Exact Sciences* (23) of UFV, and the journal *Trabalho & Educação* (22) of UFMG.

Likewise, the areas of knowledge of the main publications were framed in Environmental Sciences, Geography, Geosciences, Agrarian Sciences, Education, Public and Business Administration, Accounting Sciences and Tourism according to the Capes classification.

FINAL CONSIDERATIONS

Environmental conservation and the theme of sustainability are an intricate and pressing task, not only with the aim of providing sustainability, but mainly, it is a demand regarding the continuity of all species at a global level, and concerns sociocultural values and the conservation of ecological stability.

Having this notion present in Universities, perpetuated through publications focused on this area, becomes of paramount importance.

Thus, there is no doubt that there is a need for further studies, and there should be more and more influence within Universities of publications related to sustainability and environmental conservation, with a view to always raising awareness, preserving and avoiding damage to the environment.

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