Macrothink Institute™

**Journal of Public Administration and Governance**
ISSN 2161-7104
2023, Vol. 13, No. 3

# How Sustainable is Higher Education? Assessing Environmental Sustainability in a Private Brazilian University

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Received: Sep. 20, 2023 Accepted: Oct. 24, 2023 Online published: Nov. 1, 2023

doi:10.5296/jpag.v13i3.21295 URL: https://doi.org/10.5296/jpag.v13i3.21295

**Abstract**

Over time, Higher Education has assumed the position of being one of the entities responsible for leading the population toward a society grounded on sustainable development. Based on this statement, this research aimed to analyze to what extent the teaching, research, extension, and management activities performed by a private higher education institution (HEI) are integrated with environmental sustainability criteria. For that, mixed research was conducted, using the case study strategy, with exploratory quantitative and qualitative stages, using the Sustainability Assessment Questionnaire (SAQ). The sample consisted of two groups belonging to the University Faculdade Novo Horizonte (FNH) located in Vitoria de Santo Antao, Brazil: Group 1. managers, professors, and administrators, and group 2. undergraduates of different courses. Data were collected through a survey, with closed and open questions. Results show that integration with sustainability is partially met, at a low level, given the discrepancies identified in both groups on the same topics and that only one small portion of the respondents stated being engaged with sustainability-related projects. In addition, failures in communication were evidenced, demonstrating the absence or low level of disclosure about what is promoted by the university in terms of strategic planning oriented to sustainability.

**Keywords:** higher education, university management, environmental sustainability, social impact, case study

## 1. Introduction

The historical trajectory of the discussion on 'Sustainable Development' started in the 1980s, through the debate promoted by the World Commission on Environment and Development appointed by the United Nations (UN), which highlighted the importance of the environmental issue for economic development. In later decades, the theme gained momentum, accelerated by society's search for a solution to the environmental crisis (Bergquist & David, 2023; Cavas, Ertepinar, & Teksoz, 2014). In this context, sustainable development evolved as a new ideal of progress and development.

According to the Brundtland report (WCED, 1987), and pointed out by Ramadani et al. (2022), sustainable development can be defined as one "that meets the needs of the present without compromising the ability of future generations to meet their own needs". Thus, sustainable development promotes the conscious use of natural resources, without depleting them, seeking a balance between economic growth and nature preservation. In this process, education has a "crucial role to play in helping to bring about the extensive social changes" (WCED, 1987, p. 15) indispensable for sustainable development.

In 2010, in the search for creative and innovative solutions for sustainable development, the United Nations founded the Academic Impact (UNAI) program, to share knowledge among educational institutions, as well as research, and solutions based on multidisciplinary data that dialogue with the values of the UN, aiming at democratization, inclusion and social transformation based on the objectives and themes of sustainable development (Palma, Alves, & Silva, 2013), with main topics: human rights, educational opportunity for all, poverty-fighting, promoting global citizenship and the sustainability through education.

The Rio+20 2012 conference, launched the Higher Education Sustainability Initiative through which HEIs are intended to have a key role in contributing to the achievement of sustainable development goals by educating and training future decision-makers, conducting research and innovation, and engaging with local and global communities. Main actions may include curricula and teaching methods to incorporate sustainability concepts and skills across disciplines, implementing green policies and practices on campus, and enhancing biodiversity and ecosystem services, supporting local and global sustainability efforts through partnerships, outreach, advocacy, and knowledge exchange (UN, 2023).

In 2015, the UN promoted the global pact with 193 member countries, guiding the 2030 agenda for nations to endorse sustainable development through 17 Sustainable Development Goals (SDGs), with a focus on overcoming the worldwide challenges of development. The SDGs provide countries around the world with important guidelines for the development of each nation, as long as the agenda is aligned with the reality of each location and includes the participation of the population in these revolutionary changes (Menezes & Minillo, 2017).

In this regard, there is a need to investigate the social impact of higher education on sustainability in Brazil, to identify the process of transformation of the society in which educational institutions are inserted, based on the premise that in this country there are regional disparities, reflected in public policies, result of the nation's historical heritage in the uneven process of social and economic regional development, as highlighted by Rodrigues and

Abramowicz (2013). This problem can also be identified in the last decades, in the distribution of resources destined for education, which promotes regional inequality, asymmetries, and social exclusion (da Cunha, de Britto Damasco, & de Vasconcelos, 2020; Sguissardi, 2008).

In an attempt to alleviate this situation, in 2014, significant changes were made to the Student Financing Fund program, with modifications proposed by Normative Ordinances n º21, n º22, and n º23, configuring a new higher education scenario, according to the research carried out by Castro (2017), who investigated the impacts student financing initiatives on private HEIs in the Ceara region, Brazil, evidencing differences in the degree of exposure to the program of different educational institutions. The mentioned changes had the objective of complementing the Law of Guidelines and Bases for National Education (Law No. 9.394 of December 20, 1996) that already established special conditions according to the social level – allocating more resources for the marginalized groups to reduce social exclusion –, and stimulating a linkage with education through work and social practice (Brasil, 1996; de Andrade Araújo et al., 2018).

Specifically, on the teaching of sustainability in Administration and Management courses, Rands and Starik (2009), Jacobi et al. (2011) and da Silva et al. (2022) researched the role of higher education, highlighting the importance of motivation in the education of students, as they are the future managers of an environment that should be ecologically sustainable. As for the concept of sustainability in higher education, it first emerged in the international dialogues that took place during the Earth Summit/Rio 92, but it was the International Program of Environmental Education of the UN, the first to introduce the notion of sustainability in the higher education context (Tilbury, 2004).

Thus, for changes aimed at sustainability to occur, the educational institution must commit to working to develop an institutional agenda that seeks to “learn for sustainability”, an issue highlighted by UNESCO (Vega & Boer, 2020). However, even though the need for these changes is recognized, for them to occur, institutions must face some challenges and the first of these is concerning the maturation of educational institutions about the sustainability paradigm, given that most have initiatives focused on "greening” the campus, making the theme available in a fragmented way, or including it only on a specific part of the curriculum (Rands & Starik, 2009; Raufflet, Duprés & Blanchard, 2009; Springett & Kearins, 2005).

Therefore, the importance of the debate on the theme of environmental sustainability in education is notorious, especially given the complexity identified in the insertion of sustainability in higher education, as highlighted by Jacobi et al. (2011). In this sense, there is an interest in identifying the transformations provided by HEIs in society, especially because of the role of education in improving the human being as a citizen and agent of change, especially concerning environmental sustainability, a fundamental requirement for the construction of a more egalitarian society and a more sustainable planet. Moreover, the challenge is to identify the social impacts of HEIs in the transformations of society through inclusion and environmental awareness which, for Sánchez (2005), is a process of cooperation and solidarity.

Following these arguments, this study sought to analyze to what extent the teaching, research, extension, and management activities proposed by a private HEI are integrated with environmental sustainability, using the Sustainability Assessment Questionnaire (SAQ). The

locus of this research, the Faculdade Novo Horizonte (FNH) university, is located in the city of Vitoria de Santo Antao, in the State of Pernambuco, Brazil, and has among its guidelines the development of a policy of sustainability, social impact, and reduction of social inequalities, aiming at the development of the Brazilian Northeast region. To this end, we analyzed the environmental sustainability indicators used by the HEI, clarifying how the integration of sustainability within the HEI's activities takes place.

Research on the topic of integrating sustainability into higher education courses is justified, as proposed by several researchers (Alcaraz & Thiruvattal, 2010; Jacobi et al., 2011; León-Fernández & Domínguez-Vilches, 2015; Rohrich & Takahashi, 2019; Vega & Boer, 2020), especially due to its innovative bias and the impacts that this subject could incorporate in sustainable development through education. In addition, the promotion of sustainability in higher education offers possibilities for change, requiring the review of existing courses and the development of new courses focused on sustainability, in a holistic process that incorporates its principles in educational institutions (Tilbury, 2004; Chaves et al., 2013).

## 2. Theoretical Framework

### *2.1 Management in Higher Education Institutions (HEIs)*

A University as a higher education institution has as its purpose "the permanent exercise of criticism, which is based on research, teaching and extension" (Pimenta & Anastasiou, 2010, p. 161). Universities are complex organizations, with their objectives, hierarchical systems, and structures, different from other bureaucratic organizations, since they simultaneously have the function of promoting higher education, research, and extension - bridging the gap between academia and the community -, in addition to storing and organizing the knowledge produced by humanity (de Melo, Colossi, & Silveira, 2004).

According to Kunsch (1992), universities play an essential role in the construction of modern society, preserving the memory of the past and building new professionals through new knowledge. The author also suggests that because of their diverse and cross-disciplinary nature, HEIs engage with more sectors of society than any other standalone organization. Therefore, universities today, in addition to serving as a source of theoretical knowledge and professional training, are models and instruments of social change.

On this point, Dias Sobrinho (2014) indicates that never in history has the development of society depended so much on knowledge, which has given the University greater importance, as it can "contribute to the construction processes of a democratic society of knowledge", recovering its historical mission in the civilizing process" (p. 1). Marcelino (2004) believes that the great challenge of the University is to have a perspective of results in the medium and long term, in which the institution can coordinate and evaluate teaching, research, and extension activities. In addition to this challenge, they must include training that is not only theoretical, but also practical, and overcome difficulties concerning the scarcity of financial resources by seeking alternatives that guarantee the continuity of the institution (da Silva Franco et al., 2016).

However, despite the challenges, the administration of HEIs must consider modern

management principles, that value strategic planning, setting goals, developing the annual budget and project management, prioritizing organization indicators, and aiming to achieve their strategic objectives (Rocha & Granemann, 2003). In this context, Rocha Neto (2003) emphasizes that the effective strategy that increases the power of the University is the hiring of qualified personnel, incorporating competencies, especially in the area responsible for the research activity. The author confirms the importance of the image and institutional marketing practices, which add intangible values, complementing speeches and institutional practices aligned with the organization's objectives, as a basis for authentic images.

The importance of HEIs in the advancement of innovations is highlighted by Boulton and Lucas (2011) when they state that innovation is a process that relates to business and markets, in which the university plays a very important role in creating a fertile environment that promotes innovation. Complementing this, Universities not only allow for the advancement of innovation but also of entrepreneurship, generating social and economic impacts, by transforming scientific advances into innovations ready to be implemented (European Commission, 2017). Therefore, for HEIs to carry out activities that aim at social justice, and economic viability and that are ecologically correct, it is necessary to apply an education that aims at sustainability.

*2.2 Environmental Sustainability in HEIs*

Agenda 21, the result of the Rio 1992 Conference, emphasized the importance of education and its capability to promote sustainable development, as it is through education that people are trained to deal with environmental and development issues. In this context, HEIs play a key role in teaching professionals focused on sustainability, who will make future important decisions that will have repercussions on society. That is why HEIs must be attentive to the process of education focused on sustainable development, and students need to be encouraged, through interdisciplinarity, to build critical thinking, aligned with the local life of the community around them.

Therefore, the responsibility of the HEI is closely linked to the training of people able to guarantee future sustainability. It is important to emphasize that for a university to be seen as sustainable, it needs to carry out practices that go beyond traditional teaching, seeking to insert sustainability in all activities and that they reverberate throughout society (Shriberg, 2002), including its staff. In this regard, Gotti (2015) recommends that HEIs develop different dimensions of sustainability, functioning as small urban centers. Corroborating this, Tauchen and Brandli (2006) indicate that the management of a campus is similar to that of a small city.

In summary, for a higher education institution to be sustainable, it essentially must go beyond academic priorities, encompassing the population's life, as well as encouraging and providing means of implementing sustainability practices in all areas - teaching, research, extension, administrative activities -, and carrying out its activities in a systemic way. Beringer et al. (2008) suggest that specific preparation is also necessary for students, indicating the opportunities that may arise when they get involved in sustainable actions carried out on campus, for example, in environmental centers, career counseling, and job fairs.

According to Sterling (2004) and Tilbury (2004), changes toward sustainability in higher education require more than just rethinking the content of teaching curricula and signing international declarations, demanding commitments to sustainability at a deeper level, transforming classes that address sustainability in institutions that work collaboratively towards sustainability. This implies a fundamental change not only in what is learned but also in the context and way in which it is learned. Such changes in content, context, and educational processes require a deeper commitment, and, for HEIs, a reexamination of their foundations is required, as well as the search for coherence between statements, educational paradigms, and practices (Jacobi et al., 2011).

For Tilbury and Cooke (2005) it is also necessary that the greatest number of people in the community be involved in this learning and, as a consequence of this engagement, there is an influence on the curriculum, training, financing, operations, management processes, research actions and in the performance of HEIs. Tilbury and Wortman (2008) add that there is a growing number of HEIs in several countries that are finding support to strengthen pro-sustainability education. In the case of the UK, the *Sustainable Development Education Panel and Higher Education Partnership for Sustainability* made recommendations to the government for changes to fully train all senior members of higher education in sustainability, as well as provide students with relevant learning opportunities for the UK sustainability (Tilbury, 2004). Also, data from The Australian Research Institute in Education for Sustainability (ARIES) indicate that the national governments of Australia, New Zealand, and South Africa also recognize the importance of deeper involvement of higher education in sustainability and environmental learning (ARIES, 2023).

Several challenges are identified in the organization of disciplines aimed at teaching sustainability while maintaining interdisciplinarity. According to Jacobi et al. (2011), the institutions have shown resistance to this engagement, mainly in the administrative sphere of the institutions as well as in the professors themselves, who seek the application of sustainability education through a disciplinary vision only. Another challenge is related to the organizational process within institutions, which also includes learning strategies (Sterling, 2004; Daniella Tilbury, 2004).

In addition to being responsible for debates seeking new knowledge about sustainable development as stated by Waas et al. (2010), the university is a plural and complex institution, where the complexities of the academic institution stem from four conceptions that can coexist or clash within itself: the liberal, the utilitarian, the research, and the social interest. This is why in HEIs the proposition of social impact metrics does not privilege only the utilitarian and social conceptions of the university, but also the knowledge generated by the research, which, associated with the formation of professional citizens, is critical and with a vision focused on solving problems and the social commitment of universities, results in the qualified contribution of these institutions to sustainable and socially fair development (Planeta et al., 2019). In this sense, there are three pillars of sustainability as a reference in higher education, which are social relevance, ecological prudence, and economic viability (Sachs, 2011).

The social impact that is identified in society is, according to Wood Jr. and Picarelli Filho

(2004), the benefit received by one or more segments of society, or aspects of the economy, culture, public policies, services, health, the environment or the quality of life at a regional, national or international level. In this context, Nóvoa (2018) highlights the importance of LERU (*League of European Research Universities*) in affirming universities in terms of understanding their impact on societies.

*2.3 Sustainability Assessment through Indicators*

Sustainability indicators are used as a basis for decision-making, as they help managers by pointing out different information, as well as warnings about future conditions (Uliani et al., 2011), enabling comparisons between what is being planned and what is expected to be achieved. Thus, according to Berzosa et al. (2017), different tools have been developed to assess the implementation of sustainability in HEIs, for example, the Sustainability Assessment Questionnaire (SAQ) used in this study, the Graz model for Integrative Development (GMI), the Graphical Assessment of University Sustainability (GASU), among others.

In addition to them, there are some ranking tools such as the Time Higher Education Impact Ranking System (THE), the Three-Dimensional University Ranking (TUR), and the Sustainability Tracking, Rating, and Ranking System (STARS). According to Mapar et al. (2022), systems for evaluating and classifying sustainability in HEIs still require a better definition and standardization of criteria and indicators developed to assess the progress of an HEI towards the integration of sustainability dimensions - environmental, social, economic, academic and institutional – that allow comparisons inside and outside the institution.

Thus, given the social mission of HEIs toward the society that shelters them, it is necessary to search for a form of development that allows training students based on sustainable awareness. Thus, to promote sustainability in universities, more than 350 signatories of the Declaration of Talloires were gathered and founded the Association of University Leaders for a Sustainable Future – (ULSF) with the objective of the worldwide expansion of sustainability in teaching and research through evaluations, research, and publications.

ULSF created the tool named the Sustainability Assessment Questionnaire – (SAQ) to evaluate and train its users internationally on sustainability in higher education, and it has been used effectively in several countries around the world. Among them, the study of Cavas et al. (2014), sought to identify - through the SAQ - the state of implementation of activities related to the sustainable development of higher education in seven universities in Turkey, highlighting the lack of teaching and application of sustainability concepts and the lack of inclusion of the concept in the institutional missions. In Canada, Sayed and Asmuss (2013) used 4 tools – 2 academic and 2 non-academic – including the SAQ, to benchmark and assess the sustainability of the University of Saskatchewan.

In the United States, Posey and Webster (2013) analyzed the environmental sustainability practices of the Association of Universities and Schools of the Southern USA. The most cited energy conservation practices were identified, followed by recycling and solid waste reduction. In the qualitative aspect, ways in which state policy and processes lead or restrict

academic sustainability initiatives were explored. In Spain, Berzosa et al. (2017) used the SAQ tool and 3 others to assess the sustainability of a University in the city of Madrid, concluding that HEIs can achieve improvements between 20 and 40 percent in scores in a reasonable period that will depend on the choice of the appropriate tool depending on the that the HEI understands by sustainability and in the institution's strategic planning.

Staviski (2016) used the SAQ to analyze the integration of sustainability in Brazilian university activities involving managers and professors of the Instituto Federal Catarinense's eleven campuses, focusing on the critical areas of sustainability in higher education such as curriculum; research; operations; extension; student opportunities and administration, mission, and planning. The results evidenced the integration of sustainability in teaching, research, and extension, as well as in more routine management activities, such as selective garbage collection, waste reduction, adequacy of constructions, and landscaping. The main challenges faced by institutions are sustainable transport, food, and purchasing practices.

The study by Caeiro et al. (2020) intended to critically reflect on existing tools to assess education for sustainable development and compare sustainability implementation through two case studies of universities in Portugal and Madrid. The results identified the need to define a common objective for the evaluation instruments and their limitations. The authors suggested that the tools still require improvements in their development, namely, to integrate the external impact of Higher Education Institutions on sustainability, to integrate participatory processes, and to assess non-traditional aspects of sustainability.

## 3. Method

### *3.1 Research Design*

This study adopts a mixed approach and can be classified as exploratory as it aims to analyze to what extent the teaching, research, extension, and management activities performed by a private higher education institution (HEI) are integrated with environmental sustainability. The qualitative strategy is through a case study and the quantitative, is through a survey (SAQ). Mixed methods research is based on the combined and sequential use of a quantitative followed by a qualitative research phase, or vice versa (Freitas & Jabbour, 2011). The exploratory nature, according to Sampieri et al. (2013) is evident when seeking to broaden the understanding of the proposed phenomenon. As for the procedures, the study started with a survey questionnaire application, in which information was collected from a group of people, to, through quantitative analysis, obtain conclusions corresponding to the data (Richardson, 2014) and qualitative analysis through categorical content analysis.

As for the choice of the case or HEI investigated Faculdade Novo Horizonte – FNH, it was done for convenience, given the opening of the institution for the research, as a way to improve the integration of sustainability.

### *3.2 The Case: Faculdade Novo Horizonte – FNH University*

The Faculdade Novo Horizonte (FNH), is a private higher education institution located in the city of Vitoria de Santo Antao, Pernambuco, Brazil, aiming at the socioeconomic and cultural development of the region, launched its activities in 2015 and is linked to the Ministry of

Education, as a civil society under private law, with no economic purposes, as a municipal public utility (FNH, 2023). FNH operates in more than twenty cities, having its main campus in Vitoria de Santo Antao with an annual average of 1250 undergraduate and postgraduate students, whose proposal is to offer quality courses at an affordable price, giving the student the possibility of applying to the Novo Horizonte Social Scholarship Program, under FNH Resolution No. 017 of December 7, 2020.

FNH has a permanent staff of 23 people, 18 of which are professors. To meet the proposed research objective, this research summoned the directors who worked since the foundation, as well as the professors who had already taught at the institution. The population sample was selected according to accessibility (Hair, 2010), consisting of 100 respondents (71 students and 29 employees belonging to the administrative, teaching, and/or management sectors).

### *3.3 Research Instrument and Data Collection*

We used the Sustainability Assessment Questionnaire (SAQ), based on the Global Reporting Initiative guidelines (GRI, 2023), and applied in other studies (Berzosa et al., 2017; Cavas et al., 2014; Posey & Webster, 2013; Sayed & Asmuss, 2013), adapted for the Brazilian context in previous research (Staviski, 2016). The instrument was adjusted to a format of two questionnaires, one for managers and teachers and another for students. Data collection was carried out electronically, with the questionnaire comprising 34 questions (open and closed) being sent to the sample e-mails, with 4 and 5-point Likert scale questions and open questions that facilitated the expression of the opinions of the interviewees. The main interests of the research instrument are described in Table 1.

Table 1. Axes of the Research Instrument

| Main axis | Dimensions | Questions |
|---|---|---|
| Curriculum | Sustainability at HEI; Integration; Interdisciplinarity; Inclusion in traditional disciplines | 1-5 |
| Research | Research for Sustainable Development; Research projects. | 6-8 |
| Operations | Installations; Responsible Procurement; Conscious consumption of water and energy; Sustainable economy, buildings, and reforms. | 9-21 |
| Extension | Involvement with the community; Local and international partnerships. Knowledge sharing. | 22-23 |
| School Opportunities | Environmental/sustainable center; Participation/experience; Orientation/Career. | 24-26 |
| Management, mission, and planning | Institutional documents; Institutional Mission; Institutional planning; Explicit concern with sustainability. | 27-34 |
| | Total Questions | 34 |

Source: Authors own creation, based on the model from Staviski (2016).

### *3.4 Data Analysis*

After tabulating and coding the data, the responses were submitted to descriptive analysis,

notably frequency distribution analysis. The frequencies of responses for the evaluated variables were compared using the Chi-square test ($\chi^2$) with 95% reliability. To assess the strength and direction of the association between the evaluated variables, the data were submitted to Spearman's correlation analysis, using the Statistical Analysis System (SAS®) software. After the statistical analysis, the categorical content analysis of the open questions was performed (Flick, 2009) and the results were incorporated into the analysis.

## 4. Results and Discussion

### *4.1 Sample Description*

The final sample consisted of 100 valid responses (average response rate=8%), including managers, teachers, administrative, staff, and students, as shown in Table 2, which shows the distribution of the sample for each group.

Table 2. Sample Description

| Students | | | Teachers, managers, and administrative | | |
|---|---|---|---|---|---|
| Gender | Sample | % | Gender | Sample | % |
| Female | 46 | 65% | Female | 17 | 59% |
| Male | 25 | 35% | Male | 12 | 41% |
| Total | 71 | 100% | Total | 29 | 100% |
| Academic years | Sample | % | Tenure | Sample | % |
| Less than 2 years | 29 | 41% | Less than 2 years | 1 | 3% |
| From 2 to 5 years | 42 | 59% | From 2 to 5 years | 8 | 28% |
| More than 5 years | 0 | 0% | More than 5 years | 20 | 69% |
| Total | 71 | 100% | Total | 29 | 100% |
| Student's course | Sample | % | Department | Sample | % |
| Law | 29 | 41% | Administrative | 7 | 24% |
| Pedagogy | 40 | 56% | Teaching | 19 | 66% |
| Postgraduate | two | 3% | Management | 3 | 10% |
| Total | 71 | 100% | Total | 29 | 100% |

Source: Authors own creation (2023).

Tenure and academic years become important for the present research since the more experience the respondent has within the investigated institution, the greater their knowledge, about the institution, and its didactic planning, especially on how the integration of sustainability is carried out. In the same sense, Alam (2022) points out the positive correlation between years of experience and knowledge.

### *4.2 Spearman Correlation Analysis*

Concerning the questions made to the FNH students, we identified some significant correlations, between gender and the higher education course, as well as between gender and the subjects on sustainability. On this point, Miotto et al. (2019) suggest that the sustainability issue can be a sensitive topic according to the respondent's gender because women represent half of the world's population and do not have access to the same level of education, economic

participation, financial gain, and decision-making power, policy addressed by SDG 5, which concerns gender equality, thus explaining more interest of women in sustainability issues.

Still, in the correlation analysis of the students, a significant correlation was identified between the subjects on sustainability and the time of the institution. This correlation can be explained by the fact that the more the student is involved in higher education, the more he will be transformed by environmental education, as this assumes a shared responsibility for promoting sustainable development (Jacobi et al., 2011).

Concerning professors, a significant correlation was identified between the extent to which sustainability is an integrated theme in the curriculum with time and sector at the institution and the question about which sector it operates. This correlation is closely intertwined with the fact that professors and employees who work longer at the HEI have greater contact with the sustainability initiatives at FNH.

*4.3 Descriptive Statistics*

Next, the results of the descriptive analysis are presented, and, based on them, the identification of the differences in frequencies found between the researched groups. In Table 2, the main results of agreement and disagreement (including answers: none, little and I don't know).

Table 2. Main results

| Dimension | Variables with significant interpretation | Students | | teachers, managers & administrative | |
|---|---|---|---|---|---|
| | | agree | disagree | agree | disagree |
| Curriculum | Relationship between disciplines and sustainability | 59.2% | 40.8% | 68.9% | 31.1% |
| | Integration of sustainability into the Curriculum | 49.3% | **50.7%** | **79.3%** | 20.7% |
| | Main disciplines: RSA, Environmental Law, Social Justice, lectures. | 53.7% | 46.3% | 58.6% | 41.4% |
| Research | Volume of Research, Sustainability Area. | **56.3%** | 43.7% | 31.0% | **69.0%** |
| Operations | Sustainable construction and renovations | **63.4%** | 36.6% | 41.4% | **58.6%** |
| | Energy Conservation | **54.9%** | 45.1% | 41.4% | **58.6%** |
| | waste reduction | 49.3% | 50.7% | 41.5% | 58.5% |
| | Waste recycling (paper, plastic, etc.). | **60.7%** | 39.3% | 27.6% | **72.4%** |
| | water conservation | **54.9%** | 45.1% | 20.3% | **89.7%** |
| | Sustainability audits | **52.2%** | 47.8% | 13.8% | **86.2%** |
| Extension | Involvement with the community | 64.8% | 35.2% | 62.1% | 27.9% |

| | | | | | |
|---|---|---|---|---|---|
| | Examples: selective collection, environmental conservation, sustainable education, etc. | 22.6% | 77.4% | 27.5% | 72.5% |
| | Strengths in terms of sustainability. | 23.9% | **76.1%** | **55.1%** | 44.9% |
| | Weaknesses in terms of sustainability. | 27.1% | **72.9%** | **55.2%** | 44.8% |
| School opportunities | Environmental center, mentoring programs, study groups, etc. | 69.9% | 31.0% | 58.6% | 41.4% |

Source: Authors own creation (2023). Note: Teachers' responses are listed in the right-hand columns. Bold fonts point to identified discrepancies between respondent perspectives.

The challenges faced by educational institutions due to the transformations and demands of the higher education market in a world that irreversibly needs to be sustainable are increasing. Thus, based on the students' responses described in the table above, about the extent to which the HEI investigated was able to integrate sustainability into its curriculum, most of the interviewed students agreed that disciplines related to sustainability exist, with some subjects and lectures being pointed out, such as socio-environmental responsibility, environmental law, and social justice, among others, but on the contrary, they do not perceive the integration of the curriculum with sustainability (50.7%), unlike the perspective of teachers who mostly suggest that both disciplines exist and are integrated into the curriculum (79.3%).

The discrepancy in the answers may mean that the HEI is probably not offering, in a satisfactory way, disciplines that are based on the construction of social values, knowledge, skills, attitudes, and competencies aimed at the conservation of the environment, in such a way that can be recognized by students, in harmony with what is determined by Law n. 9,795, of April 27, 1999, known as the Environmental Education Policy (Brasil, 1999). Another possibility is that there is a lack of adequate communication about integrating sustainability into the curriculum for the student's context. Proof of this is that most students reported that they did not know how to answer how this integration was promoted. For Dotto et al. (2019) the entire institution must demonstrate integration of the different actions carried out in a unified proposal for sustainable management and support for strategic planning and benefit them with a structure for managing and coordinating the flow of materials, information, and services.

It is even more important to point out that FNH needs to develop measures for the dissemination of its social, ecological, and sustainability systems, especially on conservation and reuse practices, issues that emerged in the qualitative phase of this research, because despite the existence of most of the students indicated that these practices were reasonable, without reaching a satisfactory level. This, even though career counseling focused on companies committed to social and environmental responsibility, analyzed in this study, showed a reasonable level of students with sustainable initiatives. This demonstrates the students' willingness to be part of the sustainable paradigm, consecrated by society (da Silva

Viegas & Cabral, 2015).

As for the volume of research in the area of sustainability, the students take for granted the existence of research in the area (56.3%), this being contested by the professors (69%). And, when asked if FNH has multidisciplinary and interdisciplinary structures, such as research facilities on sustainability issues, most answered that it does not. Finally, regarding practices such as sustainable construction and energy conservation, discrepancies were observed in both groups, with none of the groups of respondents having concrete initiatives to describe.

Another factor that must be rethought is the measures that are taken by FNH for the integration of sustainability in its administration, its strategic planning as well as in its projects, commitments, and disclosures, since these, despite being effective, are probably not being giving necessary subsidies so that FNH students can form an awareness about sustainable development, to the point that they do not know how to express themselves about these practices even evaluating them as being reasonable.

Therefore, it is evident that the challenges of the FNH are both in terms of sense in introducing and/or increment strategies, as well as establishing open and effective communication with its community, as it is also for several higher education institutions located in different regions of the world, as highlighted by Staviski (2016). Thus, this almost global deficit can be reduced with cooperation practices, as long as the particularities of each nationality are respected, as stated by Sachs (2011).

The discrepancy between the perspective of students and professors/managers may be related to the little knowledge that respondents have about the formal documents on the HEI's commitment to sustainability, has been identified that most student respondents are unaware or do not know, the same way who ignore or do not know about the content of campus outreach on sustainability.

As for the strengths and weaknesses of the HEI on sustainability, most students indicated that they did not know, in opposition to the professors' perspective. corroborating what was already identified in the previous questions about the absence or little disclosure about what is promoted by the HEI in terms of sustainability, at the level of the students.

Thus, no direct mentions of sustainability were identified, at first, in the institutional mission or vision, with institutional strategic planning being an unknown subject from the perspective of the interviewees, in addition to the absence of clear information about the institution that might value and publicize the theme, providing recommendations on sustainability for students, teachers, and administrative staff. This lack demonstrates the need and lack of multilevel participatory planning in the institution focused on sustainability.

As for the identification of activities and sustainability indicators attended by the HEI, this was partially met, as sustainable transport and food practices, sustainable purchases, reduction of toxic material or contaminated waste, and carrying out sustainable environmental audits have not been implemented or are unknown by the academic community, although there are some specific initiatives, but little publicized.

When comparing the results of the FNH with the study by Staviski (2016), carried out in Brazil,

it is clear that both sustainable practices and their dissemination are fragile issues for HEIs. To overcome this vulnerability, Rohrich and Takahashi (2019) point out the existence of two strands to be followed by the HEI for the teaching and practice of sustainability, the first being the need to qualify students concerning environmental practice and the second strand is the need for the HEI to implement the environmental management system on its campus and that it be fostered with practical bases and models that can be followed as a form of sustainable management that, in practice, will provide benefits to society.

## 5. Final Considerations

The objective of this study was to analyze to what extent the teaching, research, extension, and management activities proposed by the case study, FNH Faculdade Novo Horizonte in Vitoria de Santo Antao, Brazil are integrated with environmental sustainability, using for this purpose the Sustainability Assessment Questionnaire (SAQ), applied to two groups: the first including managers, professors, and administrators, and the second comprising undergraduates of different courses. In this sense, the present study showed the lack of a real understanding of the interviewees – students, teachers, and managers – of how the practical application of environmental sustainability takes place.

Regarding the integration of environmental sustainability in the various activities of the university, based on data analysis, it can be stated that it is partially met, at a low level, given the discrepancies that were identified on the same topics in both groups and that a portion small of the respondents stated to be engaged with projects connected to sustainability. Some projects were mentioned, among them the “Community in Focus” project, classes, and outdoor activities and practices, use of recycled material, lectures, among others, such as selective garbage collection, creation of a solar energy plant, courses for civil firefighters, educational internships for promoting sustainability in schools, among others.

Also, it was evidenced that the higher education institution under examination exhibits a limited degree of awareness among managers, professors, and technicians regarding sustainability-related experiences that could be further explored. These potential areas include the adoption of sustainable procurement practices, the establishment of partnerships with educational institutions for collaborative initiatives, and active participation in national and international university sustainability networks. Such engagements would facilitate the exchange of best practices and the sharing of successful initiatives and strategies to overcome common challenges and may facilitate the creation of valuable learning opportunities for students.

Initiatives like these, in addition to allowing students to be consciously educated, allow advancing strategies beyond specific actions, pointing to the organizational reform necessary for the development of sustainability in an integrated manner. Thus, the challenges of Faculdade Novo Horizonte are both in the sense of introducing and/or increasing strategies, as well as establishing open and effective communication with its internal and external community, as well as with other partner HEIs.

As for the research limitations, the first and most important is the data collection using questionnaires, related to the control of the respondent, it being possible that the individuals

selected to respond to the questionnaire are not the most representative of the study population. Although the research was carried out with the majority of senior students, the group of professors and collaborators (administrative and management) are collectives made up of people who work for a short time at the institution, as the FNH is a young institution, a factor that may imply a lack of knowledge found in the research.

A second limitation points to the use of cross-sectional data, considering that the sedimentation of sustainable practices is an evolutionary phenomenon, in which the results emerge gradually, that is, in the long term, which is difficult to determine. measure through a single-application questionnaire.

It is suggested that future studies broaden the understanding of sustainability in higher education institutions, through the participation of a greater number of HEIs located inside and outside the region. In addition, qualitative research using in-depth interviews or techniques such as participant observation, ethnography, and action research could be adequate to understand the phenomenon in its real context, which allows observing activities as they happen.

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