Received: 2 February 2023 | Revised: 3 May 2023 | Accepted: 5 June 2023

DOI: 10.1002/sd.2633

RESEARCH ARTICLE

Sustainable Development | WILEY

Perceptions of the academic community on the performance of sustainable development initiatives in higher education

Walter Leal Filho[1,2] | Claudio Ruy Portela de Vasconcelos[3,4] | Paula Ferreira[4] | M. Madalena Araújo[4] | Alessandra Berenguer[3] | Nadjacleia Almeida[5] | Bárbara Fritzen Gomes[6] | Joácio Morais Júnior[7] | Ciliana Regina Colombo[8] | Walleci Gabeu Lira[3] | Thatiana Lira Alves Agostinho[3]

[1]European School of Sustainability Science and Research, Hamburg University of Applied Sciences, Hamburg, Germany

[2]Department of Natural Sciences, Manchester Metropolitan University, Manchester, UK

[3]Laboratory of Sustainability Engineering and Consumption, Federal University of Paraíba, João Pessoa, Brazil

[4]Algoritmi Research Centre, University of Minho, Guimarães, Portugal

[5]Federal University of Paraíba, Laboratory of Cartography and Geoprocessing, Rio Tinto, Brazil

[6]Graduate Program in Civil and Environment Engineering, University of Passo Fundo, Passo Fundo, Brazil

[7]Federal University of Paraíba, Research Laboratory in Urban Environmental Systems, João Pessoa, Brazil

[8]Federal University of Rio Grande do Norte, Laboratory of Sustainability, Natal, Brazil

Correspondence
Claudio Ruy Portela de Vasconcelos, Federal University of Paraíba, Laboratory of Sustainability Engineering and Consumption, João Pessoa, PB, Brazil; Algoritmi Research Centre, School of Engineering, University of Minho, Guimarães, Portugal.
Email: crpv@academico.ufpb.br

Abstract

Since the UN Conference on the Human Environment was held in Stockholm in 1972, higher education institutions (HEIs) have been adapting to assume their social role in supporting societies in promoting sustainable lifestyles. However, HEIs are complex institutions composed of several interdependent subsystems. Sustainable improvement requires holistic assessment measures to comply with established goals. To date, few studies have focused on comparing the different perceptions of sustainability in HEIs and considering the views of the academic community in shaping the efforts and better disseminating sustainable development initiatives. To fill this gap, this work aimed to implement a methodology that compares the perceptions of sustainability and the implemented actions among members of HEIs to show the discrepancies between perceptions and facts. Many studies report either the perception of members of the academic community or the technical assessment of the sustainable performance of the institution in isolation. The novelty of this work lies in developing a tool that allows the use of a similar scale to compare the perception of users of academic services with the valuation attributed by technicians responsible for implementing sustainable development initiatives at HEIs. Analysing of these results enables the identification of dimensions with discrepancies, guiding managers as they carry out actions to promote greater community engagement in implementing sustainability initiatives that boost the consolidation of these values in the institutional culture. Additionally, it is highlighted that the proposed methodology could be adapted for use in other types of institutions, maintaining the same benefits described here.

KEYWORDS

higher education sustainability, perception of sustainability, performance assessment, sustainable development, sustainable measurement methodology

1 | INTRODUCTION

Training citizens and future decision-makers with values compatible with sustainable development is a premise that must be present at all levels of education, but above all in higher education. Since 1972 in Stockholm, the United Nations (UN) has highlighted the importance of incorporating sustainability in the development of education, science, and technology in its official documents (Chapters 31, 34 and 35 of

Agenda 21; UNCED, 1992). Recently, the UN Agenda 2030, through its 17 Sustainable Development Goals (SDGs), has highlighted education as an essential driver for sustainability (Kubiszewski et al., 2022; Shiel et al., 2016). Higher education is mentioned in one of the SDG4 targets (Kioupi & Voulvoulis, 2020). It is expected to actively engage in this sustainable development instrument since the 'green university' plays a vital role in this context. It implements sustainability in all dimensions of its activity, contributing to the global agenda through learning and teaching activities, research, organisational governance, culture and operations, external leadership (Hovmöller et al., 2019), its institutional framework, campus operations, community engagement, accountability and reporting.

The recent history of higher education institutions (HEIs) shows a change in the role of universities beyond the production of knowledge, assuming the role of the agent of change (Brugmann et al., 2019). Through disseminating research, extension practices internationalisation, teachers and students seek to incorporate sustainability practices to solve real problems inside and outside the university, thereby fostering global, national and local innovation and development (Buil-Fabregá et al., 2019).

Courses, disciplines and researches with an interdisciplinary focus are fundamental in promoting the integration of the principles of sustainable development in the administrative and operational practices of educational institutions and the activities developed by students and, consequently, society (Aktas et al., 2015). HEIs are expected to awaken sustainability perspectives in their academic staff and students, thereby affecting their decision-making and behaviour (Adomßent et al., 2014). Finnveden et al. (2020, p. 686) point out that education for sustainable development in higher education is intended to encourage young individuals to become active participants in building more sustainable societies. In this sense, students and professionals must think and act knowledgeably, critically and ethically across disciplines and sectors (Hovmöller et al., 2019).

It is evident that HEIs have a significant impact on society and must play a fundamental role in the design and development of actions aimed at sustainable development. An increasing number of 'green universities' have emerged. Most of them are signatories of commitments and declarations, such as the Talloires Declaration (1990), which in its ninth topic, commits to 'Establish a university environmental policy to engage faculty, staff, administration and students in activities such as energy and water conservation, and recycling. Encourage vendors who supply schools with products and services to act in an environmentally responsible manner when manufacturing their products and delivering their services' (ULSF, 1990). The excerpt cited shows that since the early days of the concern with integrating sustainable development principles into HEIs, the importance of engaging the entire academic community in promoting sustainable development within university campuses was already recognised.

Since then, different frameworks and tools have been developed to assess and measure sustainability in higher education, the so-called sustainability assessment tools (SATs) for HEIs (Kioupi & Voulvoulis, 2020; Lozano & Barreiro-Gen, 2019). The study of sustainability in the context of higher education remains an emerging area of research of extreme importance (Cheben et al., 2020; Leal Filho et al., 2021).

The literature reveals that only some researchers consider human factors and perspectives about the process when developing new tools to assess sustainability (Demirel & Duffy, 2013). According to Demirel and Duffy (2013), a 'sustainable approach with the human element in the centre of the development cycle is vital'. Once HEIs are complex institutions composed of several interdependent subsystems, requiring a holistic and integrated system to assess sustainability and ensure its compliance with the established goals.

In this regard, human-centred assessment tools grant the generation of knowledge about the perception of individuals to improve the understanding of how the implemented actions are perceived by their students, lecturers, employees, or society in general. Humans are the protagonists in an educational system (Demirel & Duffy, 2013) and the sustainability process. Adams et al. (2018, p. 437) conceive the integration of sustainable development in an institution as a cultural journey in which sustainability might be identified as a collection of transformative phases in which the 'behaviour and attitudes of groups of people within an organisation become increasingly aligned around and consistent with the principles embodied in and implied by sustainable development'. For that reason, developing a consistent culture helps academic members design, engage and hold shared assumptions and beliefs about their institution, at a given moment, in integrating sustainable development principles (Bertels et al., 2010). Therefore, the institutional culture acts as a pivotal element in the shift towards promoting sustainable development initiatives and adequately implementing those initiatives requires a genuine embedding of institutional culture (Bakhsh Magsi et al., 2018).

Despite the potential contribution that perceptual studies can offer, making the evaluation process more holistic, most of the existing SATs are based on objective performance indicators, disregarding the perceptional indicators in campus sustainability.

As previously stated, studies on the perception of campus sustainability still need to be made available in the literature. In the extensive literature review, we did not identify any framework that compares the perception of experts and specialists in implementing campus operations actions with the perception of academic community members not directly involved with these actions.

To fill this gap, an assessment framework developed by Vasconcelos et al. (2021), was adapted to compare the students' perceptions with the campus sustainability experts' evaluation to show discrepancies between perceptions and facts. One of the hypotheses is that the sustainability experts' evaluation translates their knowledge regarding the actions, tools, and methods systematically implemented by the diversified HEI's sustainability team.

To this end, a case study was conducted at the Federal University of Paraíba (UFPB), a Brazilian HEI that is the largest in its state. This article was structured as follows: The next section presents a theoretical background of the primary metrics and SATs employed to assess sustainability in HEIs. The following section describes the research method applied to carry out the study. The fourth section presents the results obtained, followed by a discussion regarding the obtained

data. The conclusions of the study performed in the sixth section are presented, and finally, in the last section, the references used are listed.

2 | SUSTAINABILITY ON CAMPUSES: THE NEED FOR INFORMATION

In order to take on the complete role assumed since Stockholm 1972 and evolve further in several international agreements, HEIs have been developing sustainable management and performance assessment programmes. They are also engaged in reporting procedures to follow up on the progress related to implementing actions based on sustainable development (Amaral et al., 2015). Although there is consensus in the literature on the need to adopt a holistic approach, there must be more references to assist in operationalising this perspective.

Along the same line of argument, Lozano et al. (2015), who analysed the promotion of sustainability practices and methodologies in 17 HEIs, concluded that there needed to be more integration among sustainability efforts, its metrics, and the strategies of HEIs. The authors underlined the need to perform an HEI-integrated sustainability assessment and publish reports that decision-makers could use to define strategies that consider sustainable practices as an essential component. The literature considers integrating sustainable development in HEIs a challenging task, as it usually demands substantial changes in plans and daily routines (Leal Filho et al., 2016; Sammalisto et al., 2015).

According to Shriberg (2002), cross-institutional sustainability assessment in HEIs is desirable in order to advance strong initiatives and assist lagging institutions in achieving acceptable standards of compliance and performance in the sustainable development sphere. The author also recognises that 'campuses require comparing methods to asses each other as well as to a vision of a sustainable college or university' to ensure that they are moving towards sustainable development principles (Shriberg, 2002, p. 155).

Singh et al. (2009) stated that in view of the challenge faced in implementing the principles of sustainable development, there is a broad need for metrics and tools for assessing the extent to which and how current activities are sustainable. Ajayi (2018) defines assessment as a manner of gathering valuable data that could be interpreted to support decision-making. It comprises collecting data to judge the quality of a person, object, group or event.

In HEIs, two main approaches have been developed to assess sustainability. One is based on the 'stakeholders' perceptions and the other on objective metrics. Tools assessing sustainability through the analysis of the perception of faculty and staff members are representative of the first group (Sammalisto et al., 2015; Yaakub & Mohamed, 2019) based on the perception of students (Correia et al., 2020; Jones et al., 2013; Pedro et al., 2020; Wang et al., 2020; Yuan & Zuo, 2013), as well as based on the perception of students and lectures (Saqib et al., 2020).

Besides the tools focused on perception, SATs have been created to apply objective metrics to assess, rate, or rank the performance of HEI sustainability, such as the Sustainability Tracking, Assessment and Rating System (STARS), Sustainability Assessment Questionnaire (SAQ), Graphical Assessment of Sustainability in University (GASU) and UI GreenMetric University Sustainability Ranking. Berzosa et al. (2017) considered SATs crucial in enabling institutional sustainability. However, despite its benefits, the authors state that researchers need to pay more attention to summarising what these tools conclude about HEI sustainability.

In the analysis of SATs performed by Fischer et al. (2015), the authors comparatively analysed 12 assessment tools, more than 600 indicators and criteria, as well as introductory passages in supporting documents to identify their domain and points of convergence and divergence. They set out the four fields of action universities should attend to in their engagement with sustainability: operations, research, education and community. The authors conclude that the overall distribution of indicators and criteria reveals a vast number of indicators concentred on the dimension named 'operation', which comprises 67% of all analysed indicators and criteria. This result highlights the complexity of operational aspects that took place in an ordinary HEI.

As Berzosa et al. (2017) state, the concentration of indicators in one or another dimension will depend on the assessment tool adopted. Four SATs were analysed in their work: AISHE, SAQ USAT and Sustaintool. The study demonstrated that the AISHE and SAQ tools place greater emphasis on the 'curriculum' dimension, which is similar to the coined 'education' field of action of Fischer et al. (2015), at the expense of the 'environment' dimension, which is also close to the 'operations' field of action of Fischer et al. (2015).

Fischer et al. (2015, p. 796) conclude their paper by declaring, 'Assessment and evaluation tools for higher education institutions constitute a vibrant and growing field, with new SATs emerging in different parts of the world'. The authors reflect on the need to systematise these tools and their metrics for comparative performance studies. In this sense, the authors, as mentioned earlier, consider it valuable and 'fruitful not only to have more comparative research in the dynamic field of SATs but to work towards setting standards for the analysis collaboratively'.

A selection of five of the most referred SATs are shown in Table 1, along with a brief description of each tool, the dimensions they consider, the number of indicators, the main strengths and weaknesses, the geographical coverage and examples of reported applications. The synthesis was created by compiling data available in the literature and from the web pages of the described frameworks.

The relevance of the assessment of the initiatives related to implementing sustainable development in HEIs lies in the ability to improve the deployment of SD programmes to help meet the goals established, along with the possibility of comparing sustainable performance among HEIs. According to Vasconcelos et al. (2021), in the existing literature, more attention has been given to the development of objective assessment tools rather than human-centred ones, which allow for the generation of knowledge about the perception of individuals that make up an HEI, such as students, teachers or staff. To date, no study on the SAT designed for HEIs has been identified that

TABLE 1 Main characteristics of sustainability assessment tools (SAT).

A[a]	YC[b]	Description	Dimensions	NI[c]	Strengths	Weaknesses	Coverage (countries)	Reported applications
AISHE	1.0: 2001/ 2.0: 2009	Auditing instrument for sustainability in higher education originates from the Netherlands. The current version, AISHE 2.0, was created by an international group of consultants based in the Netherlands, Sweden, Austria, and Spain. The tool comprises five dimensions, and its items are designed in a five-range Guttmann format. It is available for free use, but if the HEI chooses to use it	Identity, education, research, operations and societal outreach	30	Allows comparative analysis. Can be used for self-evaluation purposes or for an external evaluation (audit) to be certified. It is modular and process-oriented, which helps in prioritising and setting goals. Based on continuous improvement	Indicators based on narrative evaluation. Curricula oriented	Unrestricted, most used in Europe and USA	Brandli et al. (2014), Lambrechts (2015), Lambrechts and Ceulemans (2013)
STARS	2014	The sustainability tracking, assessment and rating system was created by the Association for Advancing of Sustainability in Higher Education (AASHE). It is a self-reporting framework for HEIs to measure their sustainability performance through a benchmark approach that determines a possible ranking. HEIs that submit a self-assessment using STARS may achieve a gold, silver or bronze rating	Academic, engagement, operations, planning and administration and innovation	74	Offers online application to collect and report data. Covers broad aspects of sustainability in HEIs. Offers a technical manual with a detailed explanation of the measurement process	Complex assessment procedure; accreditation costs. A complex system of scores evaluation weights. It is not quite suitable for beginners.	Unrestricted, most used in Europe and USA. It has not been used widely in developing countries	Urbanski and Leal Filho (2015)
SAQ	1999	The sustainability assessment questionnaire (SAQ) was designed by the Association of University Leaders for a Sustainable Future	Curriculum, research and scholarship, operations, faculty and staff development and rewards, outreach and service, student opportunities, and	28	Process-based tool, Its application provides a diagnosis highlighting weaknesses, supporting the definition of goals. It might be used as a pilot and strategic planning	It was not designed to be a tool for comparisons or benchmarking. It cannot be used for a rating or to compare institutions. It has	Unrestricted	Beringer et al. (2008), Fischer et al. (2015)

TABLE 1 (Continued)

A[a]	YC[b]	Description	Dimensions	NI[c]	Strengths	Weaknesses	Coverage (countries)	Reported applications
		(ULSF). It is a qualitative questionnaire designed to assess the extent to which HEIs are sustainable in seven critical areas	institutional mission, structure and planning		tool. It defines sustainability from comprehensive perspectives	inability to tackle the assessed HEIs		
GASU	2006	The Graphical Assessment of Sustainability in Universities (GASU) developed a new version in 2010 and has been designed to provide an analysis of current sustainability efforts based on the GRI G3 Sustainability Guidelines, complemented with two additional dimensions. The tool is based on comparing the SD of universities according to selected sustainability variables using a graphical tool	Profile, economic dimension, environmental dimension, social dimension, educational dimension and interlinking issues and dimensions	59	The results are shown in 12 charts to facilitate comparison between HEIs. It benchmarks universities for SD	Demand large amounts of data. Not easily applied in HEIs that do not have GRI reports on sustainability. There needs to be more coverage regarding various indicators	Unrestricted, most used in a developed country	Lozano (2006), Lozano and Young (2013)
UI GM		The Universitas Indonesia GreenMetric is a world university ranking system for HEIs to assess and compare campus efforts towards sustainability. The tool was based on a broad philosophy encompassing the three E's: environment, economics, equity and education	Setting and infrastructure, energy and climate change, waste, water, transportation, and education and research	33	It is a self-reported tool to rank HEI efforts towards sustainability. Due to its ease of application, it is widely used worldwide	For example, it focuses on environmental aspects at the expense of social aspects	Unrestricted	Atici et al. (2020), Lauder et al. (2015)

[a]A: Acronym of the SAT.
[b]YC: Year of creation.
[c]NI: Number of indicators.
Source: Alba-Hidalgo et al. (2018), Alghamdi et al. (2017), Bizerril et al. (2018), Caeiro et al. (2020), de Castro and Jabbour (2013), Hák et al. (2016), Lidstone et al. (2015), Lozano and Young (2013), and Parvez and Agrawal (2019).

would consider comparing measures based on stakeholder perceptions with those based on technical evaluations of persons responsible for implementing sustainable initiatives in HEIs.

For HEIs to successfully achieve sustainability goals, the cooperation and participation from all stakeholders—including staff, faculty, students, funding bodies, government, employers, suppliers and community—are considered critical (Green, 2013; Leal Filho, Shiel, et al., 2019; Sammalisto et al., 2015). Among them, students appear as one of the key stakeholder groups in universities. Not only for their much greater number and for being the main target of HEIs' mission but also since there is empirical evidence that they have shown a willingness to support and participate in sustainable university practices (Emanuel & Adams, 2011). Many authors note the importance of placing students engaged in the university's sustainable practices as active agents of change. However, they also recognise that there is still a dearth of previous studies about students' perceptions of sustainability in HEIs (Blanco-Portela et al., 2018).

Nejati and Nejati (2013) agree that understanding how students evaluate the sustainability practices implemented by HEIs is central, as it allows the decision-maker to become aware of the HEI's performance from the perspective of one of their major groups of stakeholders. For these authors, 'the study of students' perceptions of sustainability remains under-researched and needs further exploration' (Nejati & Nejati, 2013, p. 102).

3 | METHODOLOGY

A previously developed framework by Vasconcelos et al. (2021) was adapted to compare the students' perceptions with the campus sustainability experts' evaluation to show discrepancies between perceptions and facts.

This work aims to report the implementation of a methodology designed to measure the sustainability performance of a Brazilian HEI by comparing the perception of students with the analysis of a group of practitioners responsible for implementing campus sustainability initiatives. To address the established goal, cross-sectional descriptive research was carried out using a quantitative approach.

The adopted methodological process was designed and based on the model proposed by Malhotra, Nunan, and Birks (2018, pp. 9–12), which comprises three phases. In the first phase (a), the surveys were designed for the two samples (students and experts). In the second phase (b), surveys were administered to collect data regarding students' perceptions and the experts' experiences. In the last phase (c), the data were analysed to produce the two main results, which are the 'model of HEI sustainability' and the 'comparative analyses between the two samples to identify the discrepancies and convergences, as depicted in Figure 1.

Based on the extensive literature review, two surveys were deployed to identify and analyse the main determinants of sustainable initiatives at HEIs. The survey administered to the sample of students comprised 52 questions, of which five were demographic. The survey applied to the expert sample consisted of 50 questions, of which three regarded the characterisation of the sample. The remaining 47 variables were the same for both samples. Of these, three were dichotomous (participation in environmental sustainability practices, participation in the green prank and whether the respondent has participated in any course regarding sustainability). Forty-five variables were structured according to a Likert agreement scale of five points to measure the main sustainable development initiatives implemented at the university under analysis. One question was included to allow respondents to add general comments about the survey. The survey was piloted and pre-tested by a panel of undergraduate students and experts in incorporating sustainability in HEIs (Figure 1, phase (a)).

Both surveys were distributed through Google Forms. The first survey was directed to undergraduate students of technology courses, using the convenience sample approach. The second survey, applied to the experts, was distributed to the main sectors involved in implementing of sustainable development initiatives on the analysed university campuses (Figure 1, phase (b)).

The final step, consisting of the analysis of the data previously collected, was performed through the adoption of a set of statistical approaches. The method used to assess the adequacy and the validity of the questionnaire was the exploratory factor analysis, using principal component analysis (PCA) with varimax rotation, as recommended in the literature (Hair et al., 2014; Hatcher & O'Rourke, 2013; Malhotra et al., 2018). The results regarding the two samples were compared through descriptive statistical techniques and hypothesis testing (*t*-test). The reliability analysis for the survey was measured through Cronbach's alpha, as Field (2018) proposed.

For the sample of students, the survey was applied to 207 students of undergraduate technology courses, listed as follows: Renewable Energy Engineering (17.3%); Environmental Engineering (16.8%); Mechanical Engineering (14.9%); Mechanical Production Engineering (13.4%); Civil Engineering (9.9%); Production Engineering (9.4%); Chemical Engineering (7.4%); Electrical Engineering (6.9%); Industrial Chemistry (2.5%); Food Engineering (1.0%) and Material Engineering (0.5%). The average age of the students interviewed was 23 years, with the minimum age being 17 and the maximum being 53 years. Of the total number of students, the majority (66.7%) was male. The family income declared by the interviewed students had an average of €756,62. The minimum declared family income was €74,29, while the maximum was €3.521,54.

The 15 experts interviewed are part of the following sectors/agencies of the UFPB: Superintendence of Infrastructure—SINFRA; Environmental Management Commission; Laboratory of Sustainability Engineering and Consumption—LABESC; Pro-Rectory of Extension—PROEX; Pro-Rectory of Administration—PRA; Pro-Rectory of Undergraduate Studies—PRG and Pro-Rectory of Research—PROPESQ. Of the total number of interviewees, eight were male.

4 | RESULTS AND DISCUSSION

The results section is divided into two main parts, and a discussion follows. The first section describes the initiatives, actions, and programmes

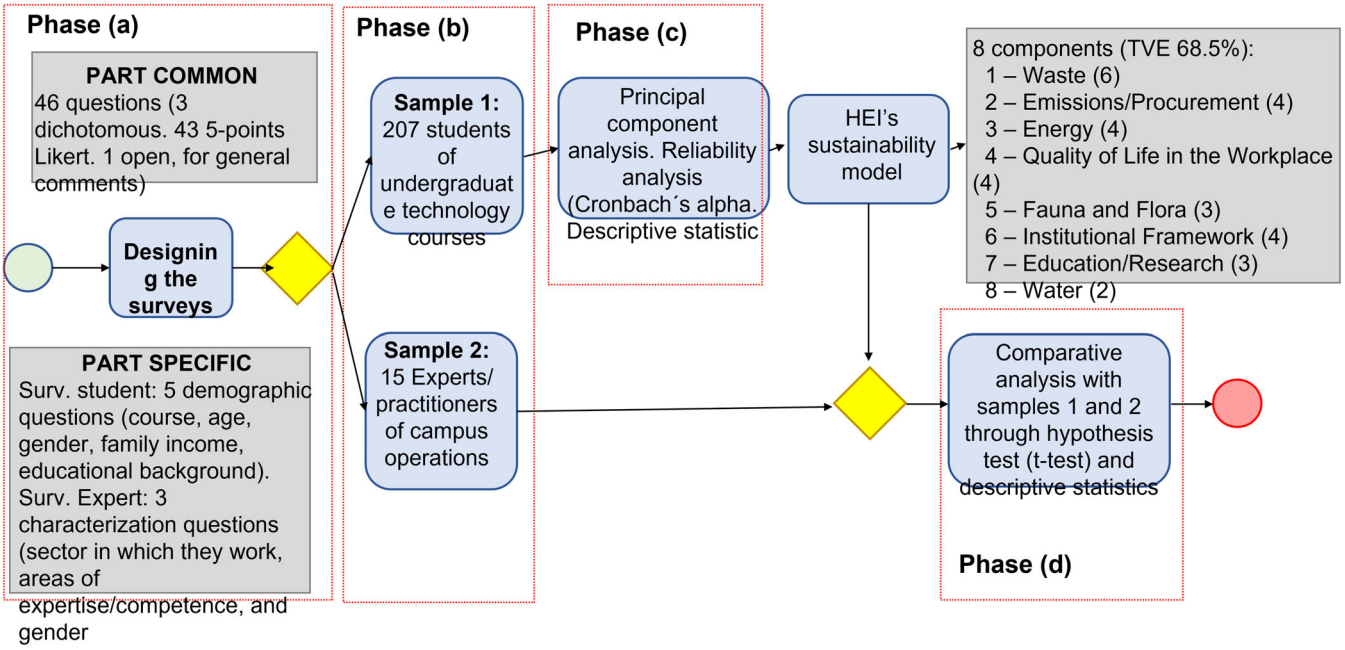

FIGURE 1 Summary of the methodological procedure adopted.

the UFPB deploy to promote campus sustainability. The subsequent section presents the results from the survey and the tool used to measure the perception of the students and experts and to compare the student perceptions in relation to the assigned score given by the expert sample.

4.1 | Campus sustainability initiatives at a Brazilian HEI: The analysed case

According to the last management report (UFPB, 2020), the UFPB, located in the Northeast of Brazil, is the largest HEI in its state, with 2831 lecturers, 4368 technical-administrative and outsourced professionals, and 37,752 students. It has been a national leader in submitting patents in various areas of knowledge. Since 2013, the institution's Environmental Management Commission, linked directly to the Rector's Office, has addressed the strategic issues related to implementing sustainable development initiatives at UFPB.

As shown in Table 2, the Environmental Commission's Annual Report (UFPB, 2000) highlights 23 action plans/programmes related to each of the eight dimensions of sustainable development in HEIs, as identified in the perception model presented in Figure 1 and further detailed in Table 4.

As can be seen in Table 2, the HEI has developed initiatives to promote sustainable development in the main dimensions of campus sustainability. Many actions have been implemented for an extended period, which positions them in a suitable stage of maturity. The institution's current major challenge is integrating sustainable development initiatives into an integrated, holistic system (Leal Filho et al., 2023). There are two main areas for improvement in achieving this goal. The first lies in the fact that the initiatives are distinct from each other, and the second is the lack of integration between the databases generated on each initiative's performance, making it challenging to establish integrated performance indicators. The need for integration in implementing sustainable development at HEIs is broadly referred to in the literature (Alghamdi et al., 2017; Leal Filho, Skanavis, et al., 2019).

4.2 | Quantitative analysis

This second section presents how both samples perceive the institutional commitment to sustainable development as an expression of formal documents and the personal commitment of the top managers. Furthermore, the designed model used to assess the students' perception of the university's commitment to sustainable development will provide details that allow for a comparison between the perception of the students and the score assigned by the experts in order to identify the main points of convergence and divergence.

The green prank (Figure 2a) is a ceremony organised by the Environmental Management Commission (CGA) to welcome new students and present the institutional commitment to sustainable development initiatives at UFPB (Table 2). Most of the experts surveyed (53.33%) reported having attended the green prank. Conversely, most students (68.60%) did not attend the event. This is justified by the fact that many of the members of the expert sample work in sectors responsible for organising or providing support during the event. As far as the proportion of students is concerned, it should be taken into account that the sample of students is larger than the experts and that participation in the event is non-mandatory. Figure 1b illustrates the massive involvement of the sample of students (90.82%) with training activities aimed at disseminating sustainable development principles. The

TABLE 2 List of the main actions, programmes and initiatives implemented at the Federal University of Paraíba.

Dimension	Actions	Description
1. Waste	Chemical waste programme	Responsible for designing a chemical waste disposal plan, implementing an action plan to reduce chemical risks, and suggesting solutions for incorrect disposal of chemical waste
	Selective collection programme	It performs the quantification and classification of solid waste and the displacement of containers and waste collectors on the campus. In addition, the programme promotes selective collection and awareness-raising campaigns to the academic community. It identifies points of inadequate solid waste disposal to be cleaned by specific personnel. Finally, it is responsible for coordinating the safe disposal of particular waste, such as lab needles, cooking oil and organic waste from the university canteens
	Composting programme	Storage and reuse of the large volume of organic waste, like leaves and branches, which are collected from pruning and sweeping on campus
	Electro-electronic waste programme	Proposal of the quantification, proper storage and disposal of toners, printer cartridges and computer components
	Civil construction waste programme	Promotes the identification and monitoring of construction sites and pruning activities, designing an action plan for the management of civil construction waste until the final destination
	Fluorescent lamps programme	The programme supports quantifying the evolution of fluorescent lamps' disposal levels and their collection, storage, and proper disposal
	SLMP—Waste	Promotes the monitoring and overview of selective collection actions and the donation of recyclable waste to an association of waste collectors, quantifying the amount of waste produced, and suggesting action plans for the reuse and recycling of different types of waste
2. Emissions/ procurement	SLMP—Displacement	Monitoring compliance with the principles of public administration in executing the displacement contract; monitoring a set of indicators of displacement, such as the evolution of the number, average age, distance travelled of the institution's vehicles and the costs of fuel, drivers' contracts and maintenance; as well as the overall fossil fuel consumption and estimation of CO_2 emissions from vehicles in the official vehicle fleet; monitoring the carbon offset strategies implemented by the University
	Rational use and maintenance of vehicles	Conducting meetings with drivers to raise awareness of more economical driving techniques and greater participation in preventive maintenance and conservation processes, carrying out preventive maintenance and periodic inspections of the vehicles
	SLMP—Procurement	Monitoring of expenditure on contracting cleaning and conservation, surveillance and telephone services
3. Energy	SLMP—Energy	Evaluation and monitoring of the performance of the electrical power contract with the supplier. Support the action plan for replacing incandescent lamps with led ones
	Consumer quality management system	It controls the performance of the electrical power distribution system, promoting the automation of real-time measurement procedures for energy consumption to keep a balance between estimation and consumption
4. Quality life in the workplace	Lectures and campaigns	Offers lectures and workshops about professional career and interpersonal relationships and campaigns for the prevention of work-related diseases
	Health care reference centre	It offers medical care in various specialities, distribution of medicines and promotion of health information campaigns to the academic community
	SLMP—QLWE	Monitoring the application and offer of different actions to boost the quality of life in the working environment
5. Fauna and flora	Green areas management programme	Restoration of forested areas, considering principles of dendometry and geoprocessing. Identification of the biodiversity of the green areas and protection of local species of fauna and flora
	'Green prank'	It is a ceremony in which the new students, along with the Rector and authorities, plant native seedlings in one of the forest fragments on the campus as a demonstration of institutional commitment to the sustainable development initiatives, presentation of the overview of main campus sustainability projects and actions, promoting the restoration of the degraded forest area within the campus (https://www.youtube.com/watch?v=g1WGeQFN7As&t=13s)
6. Institutional framework	Sustainable use and occupation programme	Spatial mapping and technical documentation of the artificial spaces of the campus. Optimising of maintenance requests for electronic devices, physical structures, water and sanitary appliances and among others

TABLE 2 (Continued)

Dimension	Actions	Description
	Institutional environmental policy	A set of principles and guidelines that aim to implement or adapt institutional actions to promote the sustainable development of UFPB and society, compatible with a healthy and ecologically balanced environment
7. Education/ research	Updating the curricula and fostering the creation of SD courses	Its aim at updating the curricula of existing courses to include contents and methodologies related to sustainable development, creation of specific teaching to train engineers in the field of renewable energies, creation of new undergraduate and postgraduate courses, such as Environmental Engineering, Renewable Energy Engineering, Environment Development Programme, to cite a few.
	Mapping research focused on SD	Mapping of research focused on sustainable development objectives and stimulation of research in sustainable development.
8. Water	Water management plan	It is responsible for mapping water supply and consumption points, monitoring water consumption, correcting wasteful points and in the campus water and sanitation facilities' quantification, location and physical conditions
	Distribution and Maintenance of the water supply network	Modelling water distribution by supply and wells. Periodic cleaning and disinfection of the wells by a specialised team. Field team fully available for distribution faults and leaks
	SLMP—Water	Monitoring of water consumption and maintenance of distribution networks and analysis of consumption indicators

Abbreviation: SLMP, sustainable logistics management plan.

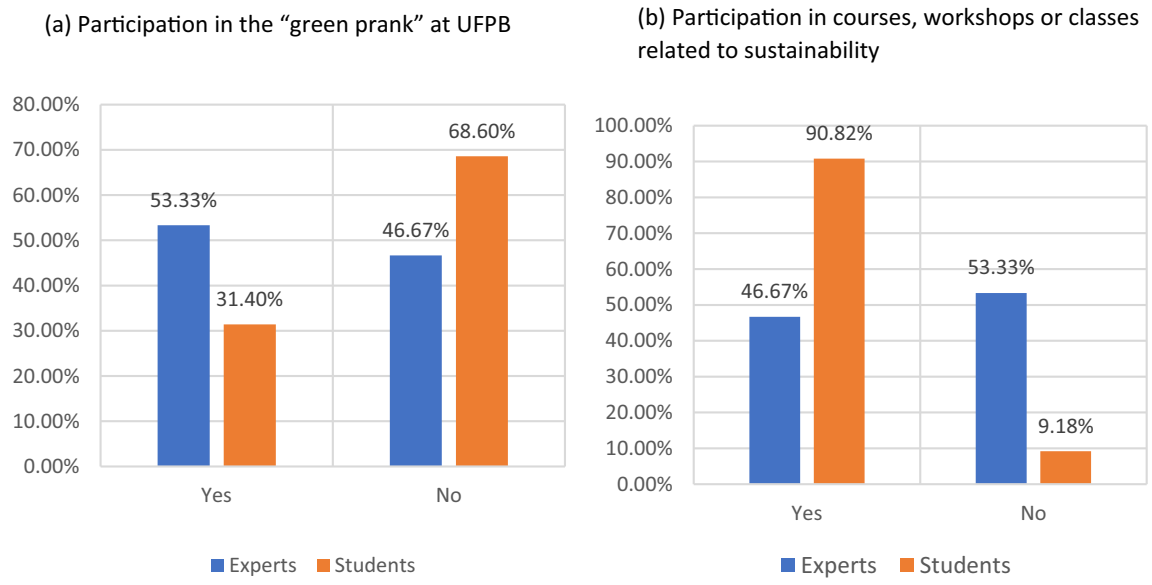

FIGURE 2 Participation of the sample in practices related to sustainability.

effort of universities to integrate content related to sustainable development in their curricula is nothing new. Thus, it is expected that the vast majority of students will participate highly in activities of this nature. Not all members of the specialist sample are lecturers and therefore are not engaged in teaching activities.

Figure 3a analyses whether the concern with sustainable management is adequately expressed in institutional documents through policies and management plans. The commitment to the principles of sustainable development is institutionalised in the HEI's strategic plan, as well as in the sectoral plan, entitled 'Sustainable Logistics Management Plan' (SLMP), and finally, in the SLMP reports that disclose the institution's performance concerning more than 50 sustainability indicators. On average, the students' perceptions (2.95) about the institutionalisation of environmental commitment are lower than that of the experts (4.00). This difference is statistically significant ($t(220) = -4.466$, $p = .000$). The gap in the perception of commitment seems to be reflected in the perceptions of the commitment of the top management to overcoming sustainability problems, as shown in Figure 3a. The average score assigned by the

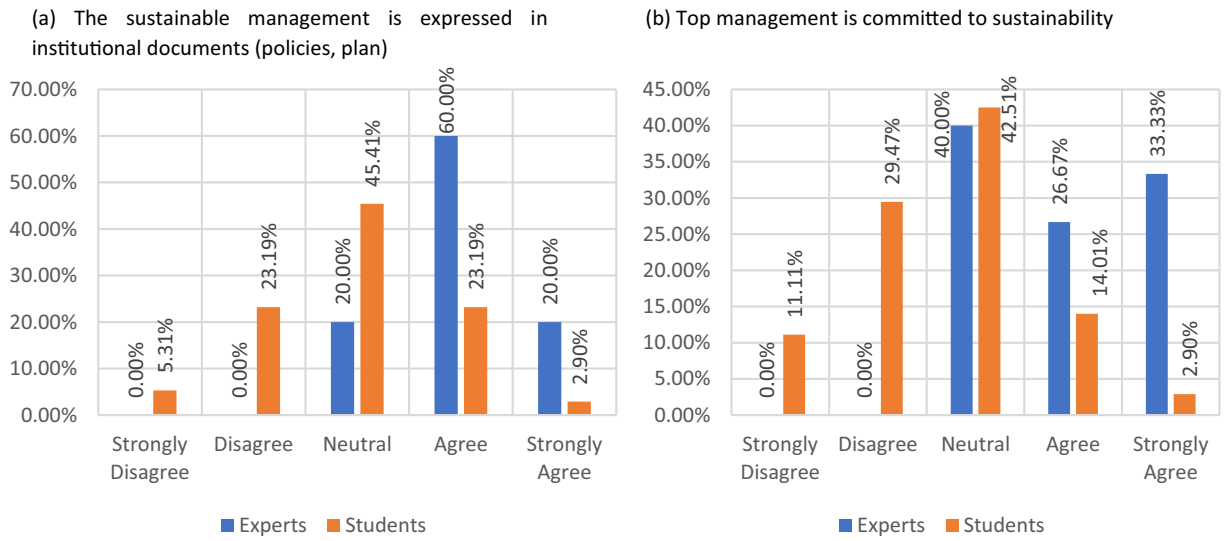

FIGURE 3 Institutional concern with sustainable development at HEI.

student sample (2.68) is also significantly lower than the score attributed by the specialist sample (3.93) ($t(220) = -4.963$, $p = .000$).

4.2.1 | Modelling the sustainability of HEIs

To cluster the items into their specific dimensions, PCA was performed on the 43 items of the five-point Likert scale on both samples ($n = 222$). PCA is a data reduction technique used to identify a smaller number of underlying components in a set of observed variables or items (Harrington, 2009). This analysis was performed to reduce the covariates and to measure single concepts using multiple items. After a series of iterations, the final solution was reached, in which 31 items remained in the model and were grouped into eight components that explain 68,586% of the total variance. The adequacy of the model was measured through the Kaiser–Meyer–Olkin (KMO) test, which is the measure of sampling adequacy, and Bartlett's test of sphericity, which tests the null hypothesis that the original correlation matrix is an identity matrix (Hair et al., 2014). The KMO was 0.876, and all KMO values for individual items ranged between 0.706 and 0.942, above the acceptable limit of 0.5 (Field, 2018). Bartlett's test of sphericity was also significant ($X^2(465) = 3586.961$, $p < .000$). For the reliability analysis, Cronbach's Alpha was used, resulting in expressed values higher than the acceptable level of 0.6 for all components, as shown in Table 3 (Field, 2018).

Considering that the model is factorable, the following table presents the model's performance on the two samples. The eight components in bold and upper case are shown in the first column, followed by their items. The means and standard deviations attributed to the samples of specialists and students are described in the second to the fourth column. The significance of the *t*-test is listed in the last column of Table 4. The *t*-test was performed to assess whether the difference between the specialist and students' sample means was statistically different. Items whose average values differed between the two samples were marked with an asterisk (*).

In Figure 4, the perception of both samples regarding each component of campus sustainability is illustrated. The numbers in bold and underlined correspond to the averages that presented a statistically significant difference. They are placed in zones of significative divergence of perception (components 1, 4, 6 and 8). On the contrary, although the remaining numbers have different values, the difference is minor, to the point of not being considered statistically significant ($p > .05$) in the *t*-test. They can, therefore, be deemed as zones of convergence (components 2, 3, 5 and 7).

4.3 | Discussion

Pereira et al. (2013, p. 36), in their study describing a case of a greening campus, cite the 'classic study' of Harris and Crane (2002), in which the authors analyse the incorporation of sustainability into the context of corporate culture, stressing the need for profound changes in the organisational culture. In the work of Harris and Crane (2002), it is stated that 'the depth of greening of the organisational culture refers to how intensely managers perceive the organisation's environmental, cultural change, as evaluated by various members and factions of the organisation. The depth will depend on the nature of symbolic events (symbolic particulars, symbolic actions or even events capable of exercising power and penetrating the depths of the organisational culture)'. The green prank, as well as the courses and workshop offered (Figure 2a,b), could be seen as symbolic events that contribute, in some way, to consolidating the concern with sustainability in the HEI's culture, nurturing the engagement of the academic community towards sustainability. Besides that, the expression—whether verbal or through actions of top management—reinforces the importance of dealing with environmental issues. Likewise, including this commitment in official documents, which are symbolic artefacts, is a valid way to promote the internalisation of this commitment in the institutional culture, as shown in the previous sections.

TABLE 3 Model adequacy and validity measure.

	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	Comp 7	Comp 8
Component average ($n = 222$)	2.571	2.28	2.30	2.910	3.06	2.87	3.30	2.34
Rotation sums of squared loadings (eigenvalues)	3.857	3.034	2.746	2.742	2.676	2.476	1.975	1.764
% Variance explained per factor	12.416	9.786	8.857	8.845	8.633	7.987	6.371	5.690
Alfa de Cronbach	0.879	0.869	0.826	0.840	0.759	0.786	0.673	0.780

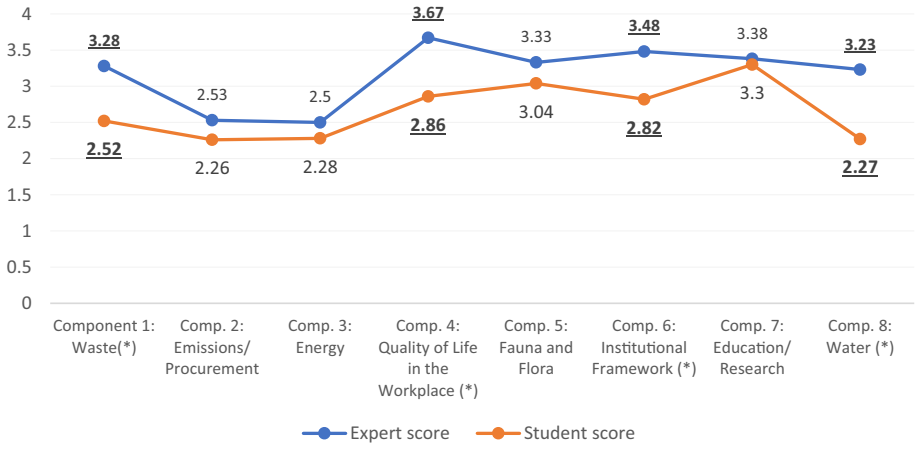

FIGURE 4 Convergence and divergence among students and experts related to each component of campus sustainability.

The first part of the research, illustrated in Figures 2 and 3, shows that the two-sample segments, although being exposed in different ways to daily experiences of sustainability on campus, such as green hazing, are influenced by the position they occupy as internal stakeholders, and this seems to affect how the two segments perceive the integration of sustainability on campus.

Ramísio et al. (2019) stated that institutionalising sustainable development policies contributes to consolidating and strengthening the commitment towards sustainability. Farinha et al. (2019) analysed the procedure most used by 15 Portuguese universities to institutionalise their commitment to sustainable development. According to the study, the three procedures used the most to consolidate the environmental commitment of HEIs to sustainable development are the publication of reports, the establishment of action plans, and strategic plans. However, these documents alone do not seem to be enough to disseminate and unify the different stakeholders' perceptions about the HEI's performance in integrating sustainability.

Table 4 and Figure 4 suggest that the ability and knowledge of each segment of the academic community concerning the implemented initiatives will influence the perception of campus sustainability. In this sense, the need becomes evident to broaden zones of convergence through developing and implementing effective communication strategies on how HEI addresses sustainability issues.

The first component, 'waste', shows a significant discrepancy between the two samples. It is the component with the largest number of initiatives developed by the analysed institution, numbering seven, as described in Table 2. This occurs due to the variety and complexity of waste discarded by a typical university institution. As seen in Table 4, waste is also the dimension with the highest number of items in the model, having six items in Table 4. Fagnani and Guimarães (2017) list the following three advantages obtained by HEIs that develop a waste management plan: (1) promotes the reduction of waste generation through the engagement of the academic community to decrease consumption. (2) supports increments in income to NGO associations involved with the recycling chain through donation and (3) it educates human resources as agents of waste management. The waste management actions reported in the literature are pretty broad. For instance, Marques and da Silva (2017) describe the experience of Portuguese universities in managing their e-waste; Ahmed et al. (2018) illustrate the potential for reducing food waste generation through student engagement at a US university; and Madrigal and Oracion (2018) evaluate the solid waste management awareness, attitude, and practices of the employees and students of a Catholic HEI in the Philippines, to cite a few cases of waste management actions undertaken by HEIs. Effective waste management at an HEI requires high levels of engagement from the academic community since it is a collaborative activity.

Given the fact that components 2 (emissions/procurement) and 3 (energy) are the ones with the lowest mean in both samples (students and experts), and considering the potential to damage the environment (emissions) and cause financial and governance losses, it is possible to suggest that they be considered as core factors in the formulation of strategies to improve sustainable development initiatives promoted by HEIs. The review of the literature acknowledges that sustainable procurement strategies deployed at HEIs have the potential to decrease negative impacts related to economic, environmental and social aspects of sustainable development, promoting gains in terms of improvement in governance, fair trade and accountability, as

TABLE 4 Summary of the PCA, reliability and *t*-test analysis.

COMPONENT/item	Expert score		Student score		Sig.
	Mean	SD	Mean	SD	
COMPONENT 1: WASTE	**3.28**	**.868**	**2.52**	**.808**	**.001***
The implemented composting system is efficient	3.47	.743	2.77	.942	.005*
UFPB encourages the correct disposal of its waste	3.27	1.163	2.39	1.117	.004*
UFPB has an efficient selective waste collection program	3.40	.910	2.26	1.043	.000*
UFPB performs proper disposal of its chemical waste	3.33	1.047	2.57	.962	.004*
UFPB promotes reverse logistics of cartridges and toners	3.47	.990	2.70	.928	.002*
Recycling bins scattered around campus motivate students to discard waste properly	2.73	1.280	2.43	1.200	.348
COMPONENT 2: EMISSIONS/PROCUREMENT	**2.53**	**.850**	**2.26**	**.805**	**.201**
UFPB prioritises the use of biofuels in its vehicle fleet	1.93	.961	2.9	.944	.314
UFPB monitors greenhouse gas emissions from its fleet	2.53	1.457	2.03	.975	.207
UFPB has procedures to optimise the use of its vehicle fleet	2.80	9.41	2.37	.946	.092
UFPB cleaning, safety, and telephone contracts take into account sustainability issues	2.87	.915	2.43	.895	.073
COMPONENT 3: ENERGY	**2.50**	**.807**	**2.28**	**.869**	**.346**
UFPB invests in renewable energy generation strategies	1.93	.799	2.25	1.059	**.256**
UFPB embraces energy efficiency by replacing LED lighting	2.73	1.163	2.23	1.049	.077
UFPB is committed to reducing non-renewable energy use	2.60	1.121	2.27	1.002	.224
UFPB promotes campaigns to rationalise the use of electricity	2.73	1.223	2.37	1.137	.238
COMPONENT 4: QUALITY OF LIFE IN THE WORKPLACE	**3.67**	**.742**	**2.86**	**,894**	**,001***
UFPB encourages respectful treatment among students	3.67	.976	2.94	1.087	.013*
UFPB inspires respectful treatment between students and lecturers	3.87	.915	2.96	1.112	.002*
The UFPB workload required for course activities is adequate	2.87	.915	2.43	.895	.000*
Student rights are respected	3.60	.910	2.86	1.070	.009*
COMPONENT 5: FAUNA AND FLORA	**3.33**	**.800**	**3.04**	**,817**	**,173**
UFPB performs proper wildlife management on its campuses	3.47	.990	3.14	1.143	.282
UFPB takes care of its forest areas	4.07	.799	3.44	1.073	.029*
UFPB deals correctly with domestic fauna on its campuses	2.47	1.356	2.43	1.205	.922
The institution complies with environmental legislation	3.33	.900	3.12	.842	.348
COMPONENT 6: INSTITUTIONAL FRAMEWORK	**3.48**	**.810**	**2.82**	**.767**	**.001***
The web and social media detail HEI's sustainability initiatives	3.27	1.100	2.77	.983	.061
UFPB has a specific sector to address the environmental issues of its campuses	4.40	.632	3.21	1.067	.000*
Overall, sustainability issues are adequately addressed at UFPB	3.27	.704	2.65	.948	.014*
Important decisions related to campus sustainability are made in a participatory manner on university councils	3.00	1.414	2.65	.958	.364
COMPONENT 7: EDUCATION/RESEARCH	**3.38**	**.434**	**3.30**	**.855**	**.527**
The course offers institutional research and extension programmes with themes related to sustainability	3.27	.799	3.51	.994	.361

TABLE 4 (Continued)

COMPONENT/item	Expert score		Student score		Sig.
	Mean	SD	Mean	SD	
The institution's postgraduate programmes related to students' fields of study offer sustainability-themed lines of research	3.93	.594	3.19	1.107	.000*
The course offers enough sustainability subjects for students' education	2.93	.458	3.19	1.161	.085
COMPONENT 8: WATER	**3.23**	**.651**	**2.27**	**.950**	**.000***
The drinking water distributed by UFPB is of high quality	3.60	.986	2.04	1.001	.000*
UFPB has a good drinking water supply	2.87	.640	2.50	1.074	.058

Abbreviations: Sig., significance (2-tailed) of *t*-test; SD, standard deviation.

well as through the supply chains involved in the HEI's market (Hughes et al., 2019; Leal Filho, Skouloudis, et al., 2019; Zaidi et al., 2019). Emission control and decarbonisation initiatives in HEIs are widely referred to in the literature as a way to contribute to fulfilling climate change-related commitments (Horan et al., 2019; Molthan-Hill et al., 2020; Versteijlen et al., 2017). Especially in the field of the efficient use of electricity to promote decarbonisation—which corresponds to 'energy', the third dimension of the designed model—the literature describes several strategies, among which are those that minimise consumption through the acquisition of more efficient electronics (Bernardo & Oliveira, 2018; Gorgulu & Kocabey, 2020) and those related to efforts to extend the commitment of the academic community to rationalise the use of electrical energy (Soares et al., 2015). Other initiatives aimed at co-generating energy through photovoltaic panels, biodigesters, and wind turbines, among other forms, are also mentioned (Bourdeau et al., 2018; Horan et al., 2019, 2020).

The fourth dimension deals with promoting quality of life in the workplace. Authors such as Ochoa et al. (2019) recognise that nourishing wellbeing in the workplace is fundamental to promoting sustainability. However, at the same time, it is also considered a huge challenge. The authors found that wellbeing is correlated with essential aspects of contemporary issues, such as gender equity, institutional performance, productivity, competitiveness and as well as sustainability. In this study, it is understandable that the actions to promote the quality of life are better perceived by the segment of experts (3.67) compared to the sample of students (2.86) since they are employees of the HEI. However, disseminating these actions to the entire community may improve the reputation of the HEI, evidencing its commitment to social aspects of sustainable development.

The main campus of the UFPB is within a native Atlantic Forest area. Therefore, the management of the 10 Atlantic Forest fragments, with their wild fauna and flora species, is considered an intangible heritage of the Institution. Therefore, the fifth component is convergent and has the second-highest average among the model components (3.06), considering both samples ($n = 222$), as described in Table 3.

Component six, Institutional Framework, has statistically divergent means between the student (2.82) and expert (3.48) samples. Pereira et al. (2013) pointed out the limited capacity to disseminate HEI environmental actions and values as a barrier to consolidating the culture of implementing sustainable development principles.

The seventh component, Education/Research, is convergent and has the highest mean (3.30, p $n = 222$) among the model components. It also corresponds to the component with the best performance in assessing the student sample (3.3). It may be the component that enables a more accurate assessment on the part of the student segment since it is totally related to their daily activities at the researched institution. Results align with the work of Abubakar et al. (2016), who evaluated students' perceptions at an HEI in Saudi Arabia, and Rampasso et al. (2019).

The last component of 'water' is the one with the higher and more significant discrepancy among the samples. The data suggests that students contend that the drinking water offered at the Institution is not of acceptable quality (2.04). On the contrary, experts rated the drinking water offered as being of moderate quality (3.60). It is explained in Table 2 that UFPB monitors the water quality. Therefore, it is necessary and possible to overcome the gap between the students' and experts' perceptions by disclosing the water analysis results on campus.

5 | CONCLUSIONS

This paper has provided an overview of the ways in which HEIs have been adapting themselves to tackle sustainable development. In particular, it has performed an assessment that compares the perceptions of sustainability and the implemented actions among members of HEIs, showing the discrepancies between perceptions and facts.

It also reports on a case study from a university in Brazil, where a tool was developed to measure the university's sustainability performance. It compares students' perceptions with the analysis of a group of practitioners responsible for implementing campus sustainability initiatives.

The framework developed in the paper shows that:

1. The comparison of the perceptions has shown that HEI stakeholders have distinct views regarding sustainability initiatives

carried out in the University, pointing out the discrepancies in topics (such as 'waste', 'quality of life in the workplace', 'institutional framework', and, 'water') and convergences ('emission/procurement', 'energy', 'fauna and flora' and 'education/research').
2. The way the integration of SD principles into institutional documents (strategic plans, policies and management reports) and top management commitment to SD are perceived (Figure 3) differs significantly between the two segments analysed. The sample comprised of specialists attributes higher scores to both factors. This is consistent with the findings from Williams (2010) and Panda (2021), who state that top management leadership skills and the organisational values expressed in strategic documents and policies define the institution's purpose and should serve as a bonding mechanism to connect internal stakeholders. Indeed, this discrepancy in perception may be affecting the perception of the two segments as a whole. The literature reinforces the role of institutional documents and top management commitment as drivers for unifying and strengthening institutional values, such as promoting sustainable development on campus (Adams et al., 2018).
3. The study shows that the perception of sustainability integration into HEIs can be affected by the position occupied by the individual in the institution, in so far as each group of stakeholders delineates their own perception of sustainability based on their experiences on campus.

The evidence gathered from the study suggests three main trends:

1. It is crucial to assess the perceptions of students and staff on matters related to sustainability since this knowledge may help in guiding future actions and implementations.
2. The specific contributions of each category of stakeholders need to be carefully defined and outlined so, that their inputs in their areas of influence may be maximised.
3. There is a need to maximise the synergies. This goal may be achieved by developing and implementing effective communication strategies on how an institution addresses sustainability issues.

The framework developed in the paper shows that the contributions of various factors (e.g., sustainability policy, the willingness of stakeholders to engage, scope of the activities undertaken to make a university more sustainable) are highly interdependent and that the actions in one area (e.g., curricular provisions) can have a significant impact on another (e.g., campus greening). Also, the framework demonstrates how institutional commitment may affect performance as far as the implementation of sustainability initiatives is concerned. This demonstrates the importance of integrated efforts in motivating and mobilising the academic community, from teaching staff to students and even administration personnel.

This paper has some limitations. Firstly, it uses a case study approach, meaning that it has a specific focus. Secondly, the fact that the examples and experiences come from a single university means that its scope cannot be regarded as comprehensive. In addition, the work was performed during the COVID-19 pandemic, a prime time for all universities. However, the evidence gathered is representative of the trends seen in universities worldwide. Moreover, the case study nature of the study means that the approach and methods used may be replicable and valuable to other universities that are interested in implementing concerted actions involving different members of the higher education community. Despite these limitations, the paper provides a welcome addition to the literature since it reports on a study which analysed the extent to which various universities perceive and implement sustainability.

The implications of this paper to the theory and practice of sustainable development are as follows. First, it demonstrates the importance of understanding the complexities of sustainable development in order to develop effective strategies within HEIs. Second, it highlights the need for an integrated approach to sustainable development, which involves the participation of different stakeholders within an organisation. Third, this paper underscores the need for collaboration between academic stakeholders to ensure that their work is practical and can be implemented in a timely manner. Finally, it emphasises the need for monitoring and evaluating tools to ensure the work yields the expected benefits.

As this paper has shown, long-term improvements in the ways that HEIs practice sustainability require a holistic and integrated system and assessment measures to ensure their compliance with the established goals. The fact that a dialogue between the key stakeholders takes place as part of this process is already a positive outcome. Furthermore, since the decisions made are a result of discussions and sometimes compromises, they are often robust and more easily implemented.

AUTHOR CONTRIBUTIONS

Conceptualisation: Walter Leal Filho and Claudio Ruy Portela de Vasconcelos; Methodology: Claudio Ruy Portela de Vasconcelos, M. Madalena Araújo and Paula Ferreira; Formal analysis and investigation: Claudio Ruy Portela de Vasconcelos and Walleci Gabeu Lira; Writing—original draft preparation: Claudio Ruy Portela de Vasconcelos, Alessandra Berenguer, Nadjacleia Almeida, Bárbara Fritzen, Joácio Morais Júnior, Ciliana Regina Colombo, Walleci Gabeu Lira and Thatiana Lira Alves Agostinho; Writing—review and editing: Claudio Ruy Portela de Vasconcelos, Paula Ferreira, M. Madalena Araújo and Walter Leal Filho.

FUNDING INFORMATION

The authors did not receive support from any organisation for the submitted work.

CONFLICT OF INTEREST STATEMENT

The authors have no competing interests to declare that are relevant to the content of this article.

ORCID

Walter Leal Filho https://orcid.org/0000-0002-1241-5225
Claudio Ruy Portela de Vasconcelos https://orcid.org/0000-0001-8353-6406

Paula Ferreira https://orcid.org/0000-0002-3712-4803
M. Madalena Araújo https://orcid.org/0000-0002-3515-0135
Alessandra Berenguer https://orcid.org/0000-0003-2673-1787
Nadjacleia Almeida https://orcid.org/0000-0003-3949-1313
Bárbara Fritzen Gomes https://orcid.org/0000-0002-0346-1270
Joácio Morais Júnior https://orcid.org/0000-0003-0293-4731
Ciliana Regina Colombo https://orcid.org/0000-0002-1473-2937
Walleci Gabeu Lira https://orcid.org/0000-0002-6755-7335

REFERENCES

Abubakar, I. R., Al-Shihri, F. S., & Ahmed, S. M. (2016). Students' assessment of campus sustainability at the University of Dammam, Saudi Arabia. *Sustainability (Switzerland)*, *8*(1), 1–14. https://doi.org/10.3390/su8010059

Adams, R., Martin, S., & Boom, K. (2018). University culture and sustainability: Designing and implementing an enabling framework. *Journal of Cleaner Production*, *171*, 434–445. https://doi.org/10.1016/j.jclepro.2017.10.032

Adomßent, M., Fischer, D., Godemann, J., Herzig, C., Otte, I., Rieckmann, M., & Timm, J. (2014). Emerging areas in research on higher education for sustainable development—Management education, sustainable consumption and perspectives from Central and Eastern Europe. *Journal of Cleaner Production*, *62*, 1–7. https://doi.org/10.1016/j.jclepro.2013.09.045

Ahmed, S., Byker Shanks, C., Lewis, M., Leitch, A., Spencer, C., Smith, E. M., & Hess, D. (2018). Meeting the food waste challenge in higher education. *International Journal of Sustainability in Higher Education*, *19*(6), 1075–1094. https://doi.org/10.1108/IJSHE-08-2017-0127

Ajayi, V. O. (2018). Difference between assessment, measurement and evaluation in science education (p. 8). Benue State University. https://www.researchgate.net/publication/322908173_Difference_between_Assessment_Measurement_and_Evaluation_in_Science_Education

Aktas, C. B., Whelan, R., Stoffer, H., Todd, E., & Kern, C. L. (2015). Developing a university-wide course on sustainability: A critical evaluation of planning and implementation. *Journal of Cleaner Production*, *106*, 216–221. https://doi.org/10.1016/j.jclepro.2014.11.037

Alba-Hidalgo, D., Benayas del Álamo, J., & Gutiérrez-Pérez, J. (2018). Towards a definition of environmental sustainability evaluation in higher education. *Higher Education Policy*, *31*(4), 447–470. https://doi.org/10.1057/s41307-018-0106-8

Alghamdi, N., den Heijer, A., & de Jonge, H. (2017). Assessment tools' indicators for sustainability in universities: An analytical overview. *International Journal of Sustainability in Higher Education*, *18*(1), 84–115. https://doi.org/10.1108/IJSHE-04-2015-0071

Amaral, L. P., Martins, N., & Gouveia, J. B. (2015). Quest for a sustainable university: A review. *International Journal of Sustainability in Higher Education*, *16*(2), 155–172. https://doi.org/10.1108/IJSHE-02-2013-0017

Atici, K. B., Yasayacak, G., Yildiz, Y., & Ulucan, A. (2020). Green University and academic performance: An empirical study on UI GreenMetric and World University Rankings. *Journal of Cleaner Production*, *129*, 125289. https://doi.org/10.1016/j.jclepro.2020.125289

Bakhsh Magsi, H., Ong, T., Ho, J., & Sheikh Hassan, A. (2018). Organizational culture and environmental performance. *Sustainability*, *10*(8), 2690. https://doi.org/10.3390/su10082690

Beringer, A., Wright, T., & Malone, L. (2008). Sustainability in higher education in Atlantic Canada. *International Journal of Sustainability in Higher Education*, *9*(1), 48–67. https://doi.org/10.1108/14676370810842184

Bernardo, H., & Oliveira, F. (2018). Estimation of energy savings potential in higher education buildings supported by energy performance benchmarking: A case study. *Environments*, *5*(8), 85. https://doi.org/10.3390/environments5080085

Bertels, S., Papania, L., & Papania, D. (2010). Embedding sustainability in organizational culture. A Systematic Review of the Body of Knowledge.

Berzosa, A., Bernaldo, M. O., & Fernández-Sánchez, G. (2017). Sustainability assessment tools for higher education: An empirical comparative analysis. *Journal of Cleaner Production*, *161*, 812–820. https://doi.org/10.1016/j.jclepro.2017.05.194

Bizerril, M., Rosa, M. J., Carvalho, T., & Pedrosa, J. (2018). Sustainability in higher education: A review of contributions from Portuguese Speaking Countries. *Journal of Cleaner Production*, *171*, 600–612. https://doi.org/10.1016/j.jclepro.2017.10.048

Blanco-Portela, N., R-Pertierra, L., Benayas, J., & Lozano, R. (2018). Sustainability leaders' perceptions on the drivers for and the barriers to the integration of sustainability in Latin American Higher Education Institutions. *Sustainability (Switzerland)*, *10*(8), 1–16. https://doi.org/10.3390/su10082954

Bourdeau, M., Guo, X., & Nefzaoui, E. (2018). Buildings energy consumption generation gap: A post-occupancy assessment in a case study of three higher education buildings. *Energy and Buildings*, *159*, 600–611. https://doi.org/10.1016/j.enbuild.2017.11.062

Brandli, L., Leite Frandoloso, M., Roorda, N., Fraga, K., & Vieira, L. (2014). Evaluation of sustainability using the AISHE instrument: Case study in a Brazilian University. *Brazilian Journal of Science and Technology*, *1*(1), 4. https://doi.org/10.1186/2196-288X-1-4

Brugmann, R., Côté, N., Postma, N., Shaw, E., Pal, D., & Robinson, J. (2019). Expanding student engagement in sustainability: Using SDG- and CEL-focused inventories to transform curriculum at the University of Toronto. *Sustainability*, *11*(2), 530. https://doi.org/10.3390/su11020530

Buil-Fabregá, M., Martínez Casanovas, M., Ruiz-Munzón, N., & Filho, W. L. (2019). Flipped classroom as an active learning methodology in sustainable development curricula. *Sustainability*, *11*(17), 4577. https://doi.org/10.3390/su11174577

Caeiro, S., Sandoval Hamón, L. A., Martins, R., & Bayas Aldaz, C. E. (2020). Sustainability assessment and benchmarking in higher education institutions—A critical reflection. *Sustainability*, *12*(2), 543. https://doi.org/10.3390/su12020543

Cheben, J., Lancaric, D., Munk, M., & Obdrzalek, P. (2020). Determinants of economic sustainability in higher education institutions. *Www.Amfiteatrueconomic.Ro*, *22*(54), 462. https://doi.org/10.24818/EA/2020/54/462

Correia, E., Conde, F., Nunes, R., & Viseu, C. (2020). Students' perceptions of HEI regarding environmental sustainability – A comparative analysis. *International Journal of Sustainability in Higher Education*, *21*(4), 629–648. https://doi.org/10.1108/IJSHE-10-2019-0320

de Castro, R., & Jabbour, C. J. C. (2013). Evaluating sustainability of an Indian university. *Journal of Cleaner Production*, *61*, 54–58. https://doi.org/10.1016/j.jclepro.2013.02.033

Demirel, H. O., & Duffy, V. G. (2013). A sustainable human centered design framework based on human factors. In *Digital Human Modeling and Applications in Health, Safety, Ergonomics, and Risk Management. Healthcare and Safety of the Environment and Transport: 4th International Conference, DHM 2013, Held as Part of HCI International 2013, Las Vegas, NV, USA, July 21–26, 2013, Proceedings, Part I 4* (pp. 307–315). Springer, Berlin, Heidelberg.

Emanuel, R., & Adams, J. N. (2011). College students' perceptions of campus sustainability. *International Journal of Sustainability in Higher Education*, *12*(1), 79–92. https://doi.org/10.1108/14676371111098320

Fagnani, E., & Guimarães, J. R. (2017). Waste management plan for higher education institutions in developing countries: The continuous improvement cycle model. *Journal of Cleaner Production*, *147*, 108–118. https://doi.org/10.1016/j.jclepro.2017.01.080

Farinha, C., Caeiro, S., & Azeiteiro, U. (2019). Sustainability strategies in Portuguese higher education institutions: Commitments and practices from internal insights. *Sustainability*, *11*(11), 3227. https://doi.org/10.3390/su11113227

Field, A. (2018). In J. Seaman (Ed.), *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications.

Finnveden, G., Friman, E., Mogren, A., Palmer, H., Sund, P., Carstedt, G., Lundberg, S., Robertsson, B., Rodhe, H., & Svärd, L. (2020). Evaluation of integration of sustainable development in higher education in Sweden. *International Journal of Sustainability in Higher Education*, *21*(4), 685–698. https://doi.org/10.1108/IJSHE-09-2019-0287

Fischer, D., Jenssen, S., & Tappeser, V. (2015). Getting an empirical hold of the sustainable university: A comparative analysis of evaluation frameworks across 12 contemporary sustainability assessment tools. *Assessment and Evaluation in Higher Education*, *40*(6), 785–800. https://doi.org/10.1080/02602938.2015.1043234

Gorgulu, S., & Kocabey, S. (2020). An energy saving potential analysis of lighting retrofit scenarios in outdoor lighting systems: A case study for a university campus. *Journal of Cleaner Production*, *260*, 121060. https://doi.org/10.1016/j.jclepro.2020.121060

Green, T. L. (2013). Teaching (un)sustainability? University sustainability commitments and student experiences of introductory economics. *Ecological Economics*, *94*, 135–142. https://doi.org/10.1016/j.ecolecon.2013.08.003

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate data analysis* (Seventh ed.). Pearson Education.

Hák, T., Janoušková, S., & Moldan, B. (2016). Sustainable development goals: A need for relevant indicators. *Ecological Indicators*, *60*, 565–573. https://doi.org/10.1016/j.ecolind.2015.08.003

Harrington, D. (2009). *Confirmatory factor analysis*. Oxford University Press.

Harris, L. C., & Crane, A. (2002). The greening of organizational culture. *Journal of Organizational Change Management*, *15*(3), 214–234. https://doi.org/10.1108/09534810210429273

Hatcher, L., & O'Rourke, N. (2013). *A step-by-step approach to using SAS for factor analysis and structural equation modeling* (2a ed.). SAS http://www.google.com.tr/books?id=dqNku94w1dIC

Horan, W., Byrne, S., Shawe, R., Moles, R., & O'Regan, B. (2020). A geospatial assessment of the rooftop decarbonisation potential of industrial and commercial zoned buildings: An example of Irish cities and regions. *Sustainable Energy Technologies and Assessments*, *38*, 100651. https://doi.org/10.1016/j.seta.2020.100651

Horan, W., Shawe, R., Moles, R., & O'Regan, B. (2019). Development and evaluation of a method to estimate the potential of decarbonisation technologies deployment at higher education campuses. *Sustainable Cities and Society*, *47*, 101464. https://doi.org/10.1016/j.scs.2019.101464

Hovmöller, E. E., Lagerlöf, D., & Aldén, S. (2019). *Rethinking higher education inspired by the Sustainable Development Goals: Conference report*. https://www.du.se/contentassets/efc0428f8de24e5cb32b19e12a3d3bfd/rethinking-higher-education-conference-proceedings-march-2019.pdf

Hughes, A., Morrison, E., & Ruwanpura, K. N. (2019). Public sector procurement and ethical trade: Governance and social responsibility in some hidden global supply chains. *Transactions of the Institute of British Geographers*, *44*(2), 242–255. https://doi.org/10.1111/tran.12274

Jones, N., Roumeliotis, S., Iosifides, T., Hatziantoniou, M., Sfakianaki, E., Tsigianni, E., Thivaiou, K., Biliraki, A., & Evaggelinos, K. (2013). Students' perceptions on environmental management of HEIs and the role of social capital. *International Journal of Sustainability in Higher Education*, *14*(3), 278–290. https://doi.org/10.1108/IJSHE-07-2011-0050

Kioupi, V., & Voulvoulis, N. (2020). Sustainable development goals (SDGs): Assessing the contribution of higher education programmes. *Sustainability*, *12*(17), 6701. https://doi.org/10.3390/su12176701

Kubiszewski, I., Mulder, K., Jarvis, D., & Costanza, R. (2022). Toward better measurement of sustainable development and wellbeing: A small number of SDG indicators reliably predict life satisfaction. *Sustainable Development*, *30*(1), 139–148. https://doi.org/10.1002/sd.2234

Lambrechts, W. (2015). The contribution of sustainability assessment to policy development in higher education. *Assessment and Evaluation in Higher Education*, *40*(6), 801–816. https://doi.org/10.1080/02602938.2015.1040719

Lambrechts, W., & Ceulemans, K. (2013). Sustainability assessment in higher education: Evaluating the use of the auditing instrument for sustainability in higher education (AISHE) in Belgium. In *Sustainability assessment tools in higher education institutions* (pp. 157–174). Springer International Publishing. https://doi.org/10.1007/978-3-319-02375-5_9

Lauder, A., Sari, R. F., Suwartha, N., & Tjahjono, G. (2015). Critical review of a global campus sustainability ranking: GreenMetric. *Journal of Cleaner Production*, *108*, 852–863. https://doi.org/10.1016/j.jclepro.2015.02.080

Leal Filho, W., Shiel, C., & Paço, A. (2016). Implementing and operationalising integrative approaches to sustainability in higher education: The role of project-oriented learning. *Journal of Cleaner Production*, *133*, 126–135. https://doi.org/10.1016/j.jclepro.2016.05.079

Leal Filho, W., Shiel, C., Paço, A., Mifsud, M., Ávila, L. V., Brandli, L. L., Molthan-Hill, P., Pace, P., Azeiteiro, U. M., Vargas, V. R., & Caeiro, S. (2019). Sustainable development goals and sustainability teaching at universities: Falling behind or getting ahead of the pack? *Journal of Cleaner Production*, *232*, 285–294. https://doi.org/10.1016/j.jclepro.2019.05.309

Leal Filho, W., Simaens, A., Paço, A., Hernandez-Diaz, P. M., Vasconcelos, C. R. P., Fritzen, B., & Mac-Lean, C. (2023). Integrating the Sustainable Development Goals into the strategy of higher education institutions. *International Journal of Sustainable Development & World Ecology*, *1–12*, 564–575. https://doi.org/10.1080/13504509.2023.2167884

Leal Filho, W., Skanavis, C., Kounani, A., Brandli, L. L., Shiel, C., do Paço, A., Pace, P., Mifsud, M., Beynaghi, A., Price, E., Salvia, A. L., Will, M., & Shula, K. (2019). The role of planning in implementing sustainable development in a higher education context. *Journal of Cleaner Production*, *235*, 678–687. https://doi.org/10.1016/j.jclepro.2019.06.322

Leal Filho, W., Skouloudis, A., Brandli, L. L., Salvia, A. L., Avila, L. V., & Rayman-Bacchus, L. (2019). Sustainability and procurement practices in higher education institutions: Barriers and drivers. *Journal of Cleaner Production*, *231*, 1267–1280. https://doi.org/10.1016/j.jclepro.2019.05.202

Leal Filho, W., Will, M., Shiel, C., Paço, A., Farinha, C. S., Orlovic Lovren, V., Avila, L. V., Platje, J. (. J.)., Sharifi, A., Vasconcelos, C. R. P., Fritzen Gomes, B. M., Lange Salvia, A., Anholon, R., Rampasso, I., Quelhas, O. L. G., & Skouloudis, A. (2021). Towards a common future: Revising the evolution of university-based sustainability research literature. *International Journal of Sustainable Development & World Ecology*, *28*(6), 503–517. https://doi.org/10.1080/13504509.2021.1881651

Lidstone, L., Wright, T., & Sherren, K. (2015). An analysis of Canadian STARS-rated higher education sustainability policies. *Environment, Development and Sustainability*, *17*(2), 259–278. https://doi.org/10.1007/s10668-014-9598-6

Lozano, R. (2006). A tool for a Graphical Assessment of Sustainability in Universities (GASU). *Journal of Cleaner Production*, *14*(9–11), 963–972. https://doi.org/10.1016/j.jclepro.2005.11.041

Lozano, R., & Barreiro-Gen, M. (2019). Analysing the factors affecting the incorporation of sustainable development into European Higher Education Institutions' curricula. *Sustainable Development*, *27*(5), 965–975. https://doi.org/10.1002/sd.1987

Lozano, R., Ceulemans, K., Alonso-Almeida, M., Huisingh, D., Lozano, F. J., Waas, T., Lambrechts, W., Lukman, R., & Hugé, J. (2015). A review of commitment and implementation of sustainable development in higher education: Results from a worldwide survey. *Journal of Cleaner Production*, *108*, 1–18. https://doi.org/10.1016/j.jclepro.2014.09.048

Lozano, R., & Young, W. (2013). Assessing sustainability in university curricula: Exploring the influence of student numbers and course credits.

Journal of Cleaner Production, *49*, 134–141. https://doi.org/10.1016/j.jclepro.2012.07.032

Madrigal, D., & Oracion, E. (2018). Solid waste management awareness, attitude, and practices in a Philippine Catholic Higher Education Institution. *Recoletos Multidisciplinary Research Journal*, *5*(2), 43–57. https://doi.org/10.32871/rmrj1705.02.04

Malhotra, N. K., Nunan, D., & Birks, D. F. (2018). *Marketing research: An applied approach* (Fifth ed.). Pearson Education Limited.

Marques, C. G., & da Silva, V. G. (2017). E-waste in Portugal — A higher education-based study. In *2017 12th Iberian conference on information systems and technologies (CISTI)* (pp. 1–6). IEEE. https://doi.org/10.23919/CISTI.2017.7975793

Molthan-Hill, P., Robinson, Z. P., Hope, A., Dharmasasmita, A., & McManus, E. (2020). Reducing carbon emissions in business through responsible management education: Influence at the micro-, meso- and macro-levels. *The International Journal of Management Education*, *18*(1), 100328. https://doi.org/10.1016/j.ijme.2019.100328

Nejati, M., & Nejati, M. (2013). Assessment of sustainable university factors from the perspective of university students. *Journal of Cleaner Production*, *48*, 101–107. https://doi.org/10.1016/j.jclepro.2012.09.006

Ochoa, P., Lepeley, M.-T., & Essens, P. (2019). *Wellbeing for sustainability in the global workplace*. Routledge.

Panda, D. K. (2021). Impact of organizational culture on strategic planning. *Management Decision*, *60*, 1368. https://doi.org/10.1108/MD-10-2020-1375

Parvez, N., & Agrawal, A. (2019). Assessment of sustainable development in technical higher education institutes of India. *Journal of Cleaner Production*, *214*, 975–994. https://doi.org/10.1016/j.jclepro.2018.12.305

de Pedro, E. M., Leitão, J., & Alves, H. (2020). Stakeholders' perceptions of sustainable development of higher education institutions: An intellectual capital approach. *International Journal of Sustainability in Higher Education*, *21*(5), 911–942. https://doi.org/10.1108/IJSHE-01-2020-0030

Pereira, G., da, S. M., Jabbour, C., de Oliveira, S. V. W. B., & Teixeira, A. A. (2013). Greening the campus of a Brazilian university: Cultural challenges. *International Journal of Sustainability in Higher Education*, *15*(1), 34–47. https://doi.org/10.1108/IJSHE-10-2011-0067

Ramísio, P. J., Pinto, L. M. C., Gouveia, N., Costa, H., & Arezes, D. (2019). Sustainability strategy in higher education institutions: Lessons learned from a nine-year case study. *Journal of Cleaner Production*, *222*, 300–309. https://doi.org/10.1016/j.jclepro.2019.02.257

Rampasso, I. S., Anholon, R., Silva, D., Cooper Ordoñez, R. E., Santa-Eulalia, L. A., Quelhas, O. L. G., Leal Filho, W., & Granada Aguirre, L. F. (2019). Analysis of the perception of engineering students regarding sustainability. *Journal of Cleaner Production*, *233*, 461–467. https://doi.org/10.1016/j.jclepro.2019.06.105

Sammalisto, K., Sundström, A., & Holm, T. (2015). Implementation of sustainability in universities as perceived by faculty and staff – A model from a Swedish university. *Journal of Cleaner Production*, *106*, 45–54. https://doi.org/10.1016/j.jclepro.2014.10.015

Saqib, Z. A., Zhang, Q., Ou, J., Saqib, K. A., Majeed, S., & Razzaq, A. (2020). Education for sustainable development in Pakistani higher education institutions: An exploratory study of students' and teachers' perceptions. *International Journal of Sustainability in Higher Education*, *21*(6), 1249–1267. https://doi.org/10.1108/IJSHE-01-2020-0036

Shiel, C., Leal Filho, W., do Paço, A., & Brandli, L. (2016). Evaluating the engagement of universities in capacity building for sustainable development in local communities. *Evaluation and Program Planning*, *54*, 123–134. https://doi.org/10.1016/j.evalprogplan.2015.07.006

Shriberg, M. (2002). Institutional assessment tools for sustainability in higher education: Strengths, weaknesses, and implications for practice and theory. *International Journal of Sustainability in Higher Education*, *3*(2), 254–270. https://doi.org/10.1016/S0952-8733(02)00006-5

Singh, R. K., Murty, H. R., Gupta, S. K., & Dikshit, A. K. (2009). An overview of sustainability assessment methodologies. *Ecological Indicators*, *9*(2), 189–212. https://doi.org/10.1016/j.ecolind.2008.05.011

Soares, N., Dias Pereira, L., Ferreira, J., Conceição, P., & Pereira da Silva, P. (2015). Energy efficiency of higher education buildings: A case study. *International Journal of Sustainability in Higher Education*, *16*(5), 669–691. https://doi.org/10.1108/IJSHE-11-2013-0147

UFPB. (2000). *Environmental Commission's Annual Report—2000*.

UFPB. (2020). *Relatório de Gestão 2019—UFPB*. https://drive.ufpb.br/s/2FXp8gyZ5zb7gRs#pdfviewer

ULSF. (1990). *Talloires Declaration* (p. 1). Association of University Leaders for a Sustainable Future. http://ulsf.org/talloires-declaration/

UNCED. (1992). *Earth summit (agenda 21)*.

Urbanski, M., & Leal Filho, W. (2015). Measuring sustainability at universities by means of the Sustainability Tracking, Assessment and Rating System (STARS): Early findings from STARS data. *Environment, Development and Sustainability*, *17*(2), 209–220. https://doi.org/10.1007/s10668-014-9564-3

Vasconcelos, C. R. P., Ferreira, P., Araújo, M., Cordeiro, D., & Dias Silva, S. M. (2021). Students' perception of campus sustainability in a Brazilian university. In *Universities, sustainability and society: Supporting the implementation of the sustainable development goals* (pp. 285–304). Springer. https://doi.org/10.1007/978-3-030-63399-8_19

Versteijlen, M., Perez Salgado, F., Janssen Groesbeek, M., & Counotte, A. (2017). Pros and cons of online education as a measure to reduce carbon emissions in higher education in The Netherlands. *Current Opinion in Environmental Sustainability*, *28*, 80–89. https://doi.org/10.1016/j.cosust.2017.09.004

Wang, J., Yang, M., & Maresova, P. (2020). Sustainable development at higher education in China: A comparative study of students' perception in public and private universities. *Sustainability (Switzerland)*, *12*(6), 1–19. https://doi.org/10.3390/su12062158

Williams, S. L. (2010). Strategic planning and organizational values: Links to alignment. *Human Resource Development International*, *5*(2), 217–233. https://doi.org/10.1080/13678860110057638

Yaakub, M. H., & Mohamed, Z. A. (2019). Measuring the performance of private higher education institutions in Malaysia. *Journal of Applied Research in Higher Education*, *12*(3), 425–443. https://doi.org/10.1108/JARHE-10-2018-0208

Yuan, X., & Zuo, J. (2013). A critical assessment of the higher education for sustainable development from students' perspectives—A Chinese study. *Journal of Cleaner Production*, *48*, 108–115. https://doi.org/10.1016/j.jclepro.2012.10.041

Zaidi, S. A. H., Mirza, F. M., Hou, F., & Ashraf, R. U. (2019). Addressing the sustainable development through sustainable procurement: What factors resist the implementation of sustainable procurement in Pakistan? *Socio-Economic Planning Sciences*, *68*, 100671. https://doi.org/10.1016/j.seps.2018.11.008

How to cite this article: Filho, W. L., de Vasconcelos, C. R. P., Ferreira, P., Araújo, M. M., Berenguer, A., Almeida, N., Fritzen Gomes, B., Júnior, J. M., Colombo, C. R., Lira, W. G., & Agostinho, T. L. A. (2023). Perceptions of the academic community on the performance of sustainable development initiatives in higher education. *Sustainable Development*, 1–17. https://doi.org/10.1002/sd.2633