

Integration of sustainability in the curricula of public higher education institutions in Portugal: do strategic plans and self-report align?

Strategic plans
and self-report

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Marina Duarte, Sandra Sofia Caeiro, Carla Sofia Farinha,
Ana Moreira, Margarida Santos-Reis, Constança Rigueiro and
João Simão
(*Author affiliations can be found at the end of the article*)

Abstract

Purpose – This study aims to explore the alignment between strategic plans of the Portuguese public higher education institutions (HEIs) and their perception of the integration of sustainability in education and curricula.

Design/methodology/approach – The strategic plans from 15 institutions were selected for content analysis; data about the integration of sustainability in education and curricula, from these HEI, were collected with an online questionnaire (self-report survey). Qualitative and quantitative analyses were performed.

Findings – Strategic plans of the Portuguese public HEIs seem to not be sufficiently aligned with self-assessment integration of sustainability in education and curricula.

Research limitations/implications – The classifications used in the content analysis were constructed and revised by the authors to reduce coder interpretation issues and subsequent bias in the results. However, some subjectivity could remain. The analysis of strategic plans and self-report surveys answered by top management, or a technician, does not assess the practices and sustainability implementation in education and curricula.

Practical implications – This study allows the self-report of already-implemented practices to be compared to the planned strategy of HEI governance in Portugal as stated in their strategic plans.

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Originality/value – An analysis and respective insights on the lack of connection between strategic planning and self-report practices about sustainability implementation, using Portugal as a case study.

Keywords Portugal, Higher education institutions, Polytechnics, Universities, Sustainability, Curricula

Paper type Research paper

1. Introduction

Higher education institutions (HEI) have a critical responsibility in education for sustainable development (ESD), by providing the knowledge and skills for students to devote to a more sustainable future (Lozano *et al.*, 2015). While many HEI are contributing positively toward sustainable development (SD), much deeper and far-reaching transformation is indispensable (Caeiro *et al.*, 2020). Recognizing HEIs' fundamental role in the sustainability agenda is not enough; it is essential to identify what is preventing them from contributing significantly to the Sustainable Development Goals (SDG) (Parr *et al.*, 2022).

European HEIs have been ahead in implementing sustainability, namely, in education and curricula (E&C) (Lozano *et al.*, 2015, 2019). Despite the lack of national policies in southern European countries, HEIs are working toward ESD implementation by developing plans and specific actions (Farinha *et al.*, 2020). According to Klein *et al.* (2022), HEIs in Portugal show positive relationships between lean management and sustainable practices, demonstrating relevance for leadership and the role of students as building blocks of HEIs' success in promoting sustainability practices. Nevertheless, the number of degrees addressing SDGs is still low (Aleixo *et al.*, 2020). One of the singularities in Portugal is the creation of the Sustainable Campus Network (SCN) [1] in 2018. This network – primarily built upon academics, researchers and civil society (and not institutions) – has been an important driver to trigger cooperation between HEI for the implementation of sustainable principles and practices. This is an excellent example of a bottom-up approach (Farinha *et al.*, 2020) that has created several sustainability initiatives, in particular concerning E&C. Despite the importance of this and other similar projects, an effective incorporation of sustainability into policies, curriculum and practices needs to be supported by the HEI governance (Franco *et al.*, 2019). Also, there is a dearth of international research about how strategic plans (SP) in HEIs are aligned with the practical integration of sustainability in E&C (Fantauzzi *et al.*, 2021).

This paper contributes to ESD strategic planning and implementation, by comparing the planned strategy of HEI governance, expressed in their SP, with the self-report of practices already in place, using Portugal as a case study. To do so, the following research question was formulated:

RQ1. To what extent are the SP of the Portuguese public HEIs, namely, universities and polytechnics, aligned with their perception of the integration of sustainability in E&C?

To answer this question, the following research objectives were formulated:

RQ2. To quantify the HEI incorporation of sustainability into their SP, considering the context (research, education and extension) and sustainability dimensions (environmental, social and economic).

RQ3. To describe the perception of HEIs about the integration of sustainability in E&C.

RQ4. To analyze the relationship between the incorporation of sustainability in SP and the perception of its integration in E&C.

This paper is organized as follows: Section 2 summarizes a literature review about the implementation of sustainability in E&C in HEIs and how it is integrated into SP; Section 3

describes the methodology (participants, instruments and procedures for data collection and analysis); Section 4 explains the results and findings in light of the research question and objectives; Section 5 presents a discussion of the findings and their limitations; finally, Section 6 highlights the conclusions and proposes recommendations for future work.

2. Literature review

Integrating sustainability into education is one of the key areas of UN guidelines for HEIs (SDSN, 2020). HEIs have been incorporating sustainability into E&C, from modules to courses, or at the program level, and recent research focuses on sustainability competencies, pedagogical approaches and how to connect them (Lozano *et al.*, 2021). Despite this, job opportunities and wealth accumulation have become the priorities of most students and their families. Consequently, HEIs aligned degree programs and course offerings more closely with perceived employability and economic opportunities, usually stressed in the strategy of these institutions.

Sustainability incorporation in E&C is still not thoroughly implemented in the SP of many HEIs (Parr *et al.*, 2022). Strategic planning is an important tool for implementing SD in HEIs, as it:

- reflects an institutional commitment;
- specifies institutional objectives;
- identifies concrete actions to achieve the objectives over time;
- associates goals with responsible persons;
- is the object of strategic performance evaluation; and
- recognizes shortages in terms of the resources needed to implement the strategy (Fantauzzi *et al.*, 2021; Filho *et al.*, 2019).

Organizational strategies must therefore align with the SDGs (Fleacă *et al.*, 2018; Avelar *et al.*, 2019; Paletta and Bonoli, 2019; Caputo *et al.*, 2021), which are currently the main international benchmark for governance and implementation of sustainability. As SD should be the guiding thread of all HEI systems, areas and activities in an interconnected way (Ceulemans *et al.*, 2015; Yáñez *et al.*, 2019), the planning of actions to carry out the mission is of added importance. In the SP, HEIs must include concrete actions related to sustainability in at least some of the following areas: curriculum, campus operations, research, extension and concrete projects (Filho, 2011); for actions to be effective, they must be strategically supported by coordinated and integrated governance approaches (Franco *et al.*, 2019). SP are textual documents that convey an organization's strategy. However, there are notable differences between the strategic "praxis" and the SP, as the strategy effectively implemented is a mix of planned strategy (expressed in the SP), emergent strategy (which emerges with time) and planned but not implemented strategy (Mintzberg and Waters, 1985). In other words, SP are documents that may not effectively translate an organization's activities for the period to which it refers, but that reflect its purpose at the time of their preparation. In this sense, analyzing SP does not consist in studying actions, but what some consider to be an organizational communication discourse (Spee and Jarzabkowski, 2011), essential in the relationship with stakeholders (Ferrero-Ferrero *et al.*, 2018; Aversano *et al.*, 2020).

Despite strategic planning being a useful tool, some works have shown that it does not solve other types of organizational constraints for the implementation of sustainability. Absence of leadership and institutional policies, resistance to change (Larrán Jorge *et al.*, 2015), lack of financial resources, staff and experienced officers (Farinha *et al.*, 2020) are some of the problems that HEIs face in implementing sustainability even when the intention arises in the SP.

While SP are forward-looking documents (expressing a path for the future), sustainability reports (SR) are documents that describe what happened in each period. When

analyzed together, a very approximate idea of the importance of sustainability for the organization is obtained, as the plans express the actions planned, and the reports allow detection of the actions that emerged in that period and that were not planned. Following the footsteps of what is happening in the business sector, HEIs have also started to report their SD activities, although still at a very embryonic stage, both in terms of the number of institutions that report and the quality of reporting (Ceulemans *et al.*, 2020). Despite the growing concern about SD among the younger generation and other stakeholders, and even considering that the interest of these actors is the main element of pressure for disclosure (Sassen and Azizi, 2018), it is not expected that shortly, there will be a massive dissemination of sustainability reporting in HEIs (Alonso-Almeida *et al.*, 2015).

The question arises about what is highlighted in the SP on the implementation of sustainability in E&C and what is being applied. Sustainable assessment tools are being used to measure sustainability performance in different dimensions (Parr *et al.*, 2022) and provide a basis for organizational planning and strategy development (Findler *et al.*, 2019). These tools are being largely used by HEIs, and most of them are mainly based on self-report surveys (Findler *et al.*, 2019; Caeiro *et al.*, 2020). So, the link and alignment between SP and self-report assessment can give a better profile of what is really being implemented in HEIs.

Earlier studies conducted in Portugal suggested differences between the implementation of SD practices in universities and polytechnics (Aleixo *et al.*, 2018 and Fonseca *et al.*, 2018). As in other countries (e.g. Finland), these two higher education sub-sectors are fundamentally different (Pinheiro and Pillay, 2016). The polytechnics are seen as institutions that prepare their students for practical work, while the mission of universities is more academic with a theoretical/research orientation. The universities have a three-cycle degree structure as per Bologna, whereas the polytechnics, at the time of this study, could not offer doctoral-level education [2] (Pinheiro and Pillay, 2016).

3. Methods

3.1 Participants

The population are the 34 Portuguese public HEIs, of which 14 are universities (41%) and 20 polytechnics (59%). In Portugal, higher education is organized in a binary system, with universities being geared toward the provision of solid scientific training, and polytechnics focusing on vocational and professionally oriented training. In 2020/2021, public HEIs were responsible for 3,947 degrees (78% of the total), in which 335,139 students (81% of the total) were enrolled. These students were mainly female (53%) and 62% studied in universities. Further, 62% of the teaching staff were in the universities, and the remaining in the polytechnics (DGES, 2023).

To identify the participants for gathering information on SP, the criteria were it being available (online or by requesting it to the HEI) and including the year 2020. Twenty-eight HEIs were selected (82% of the population). As for the online questionnaire, it was answered by 15 of these 28 institutions (44% of the population). Each HEI was attributed a code (U_HEI, for universities or P_HEI, for polytechnics, followed by a numeric identifier). In 2020/2021, these 15 HEI were responsible for 32% of the public degrees (DGES, n.d.) and accounted for 12% of the students in public HEIs, the majority of which were female (53%) and studied in universities (60%) (DGEEC, 2023a). The teaching staff of these HEI represented 43% of the total. The majority (68%) were employed by the universities (DGEEC, 2023b).

3.2 Instruments

To compare the alignment between strategic planning and implementation, regarding the integration of sustainability in E&C, the SP and the SR could be used. Because Portuguese

HEIs are still in a very embryonic stage of sustainability reporting (like in other countries), and only a few HEIs have their SR published, it was necessary to resort to an online questionnaire to collect data on the implementation.

Because the online questionnaire (SUSHEQ) was elaborated for a larger study (Madeira *et al.*, 2022), only two sections (A and C) of SUSHEQ were considered for this research. Section A was used to characterize the participants. Section C asked about the integration of sustainability in the review and improvement of courses, the development of sustainability skills in the courses, the existence of courses dedicated to sustainability, the support to teachers to promote sustainability competencies in their curricular units (CU), the promotion of specific pedagogical practices for the teaching of sustainability and spaces and facilities, in addition to classrooms, dedicated to activities promoting sustainability.

3.3 Data collection, treatment and analysis

The collection of SP was made online, when available, or by email, from December 2020 to February 2021. For the data collection with SUSHEQ, the HEI's rectors/presidents were invited by email to participate, receiving a link to the questionnaire, which was available from January to December 2021.

Regarding the data from the SP, and to find the excerpts related to sustainability, the keywords “sustain*,” “SDG” and “2030 Agenda” were used. The identified excerpts were transcribed and used as analyses units for content analysis (Bardin, 2011). The analysis categories were the following: three related to the context – research, education and extension (following SDSN, 2020, about HEI contributions to the SDG); three for sustainability dimensions – environmental, social or economic; one for “Sustainable Development Goals” or “SDG” and “2030 Agenda.” Frequencies of occurrence (FO) were computed for:

- finding the keywords in the selected excerpts (FO-Sustain); and
- classifying the excerpts in the categories (FO-Research, FO-Education, FO-Extension, FO-Environmental, FO-Social, FO-Economic and FO-SDG).

To analyze the representation of each of the analysis categories in the overall FO, Spearman's rank-order (r_s) correlation (Pestana and Gageiro, 2014) was computed between FO-Sustain and other FO variables.

As for Section C of SUSHEQ, the answers were converted into a numeric scale: “1” to “yes,” and “0” to “no.” To analyze the pattern of association between variables, Spearman's r_s correlation (Pestana and Gageiro, 2014) between the FO values and the binomial values from SUSHEQ was used.

Correlations were considered moderate with an r_s value from 0.40 to 0.69 and strong from 0.70 to 0.89. As for the evidence for rejecting the null hypothesis, a probability value (p -value) between 0.05 and 0.01 was used. The data complied with Spearman's correlation required assumptions:

- the two variables result from independent observations;
- are ordinal;
- represent paired observations; and
- a monotonic relationship was assumed.

Analytical steps included the calculation of the t -statistics and a p -value of 0.05 as the threshold of significance.

4. Results and findings

4.1 Incorporation of sustainability in strategic planning

In the content analysis of SP, 155 excerpts related to sustainability were identified, and FO-Sustain in these excerpts was 196. The references to sustainability dimensions (environmental, social or economic) represent 65% of the FO-Sustain, and to the context (research, education and extension), 25%. The remaining 10% are explicit references to SDG and the 2030 Agenda. The higher FO corresponds to the environmental dimension (26%), followed by the social dimension (24%). The lowest FO is in research (6%). Universities have almost the same occurrences as polytechnics (53% vs 47%), but they have higher FO in the context (67%) than polytechnics (33%). This difference is much smaller in sustainability dimensions (53% in universities and 47% in polytechnics) and in the references to SDG and the 2030 Agenda (52% in universities and 48% in polytechnics).

Regarding the context, Figure 1 shows no uniformity in neither polytechnics nor universities. Polytechnics seem to have a prominent concern with extension actions (43%), with education actions (35%) being present in half of them, and research being the least frequent (22%). The same tendency exists within universities, where extension actions are the most frequent (41%), followed by education (36%) and research (23%). Overall, there are three institutions (20%) where context actions were not found. Only six institutions (40%) have actions simultaneously in research, education and extension.

As for sustainability dimensions, the FO in universities is slightly the same as in polytechnics (only 1.13 higher). Figure 1 shows that FO values are similar in universities and polytechnics, with more uniformity in the polytechnics. These HEIs seem to have a prominent concern with the environmental dimension (42%), followed by the social (35%) and the economic dimension (23%). Nonetheless, and confirming the mentioned uniformity, 88% of polytechnics mention all sustainability dimensions. In universities, the dimensions are more evenly distributed, being 37% in the environmental, 37% in the social and 26% in economics. All polytechnics and all universities mentioned at least one dimension. There is one HEI (7%) where the environmental dimension was not mentioned, three (20%) for the social and two (14%) for the economic. Eleven HEIs (73%) mentioned all sustainability dimensions.

The low occurrence of the economic dimension in SP may be justified by:

- authors' decision of excluding occurrences referring to the institutions' management of their (scarce) budget, what was considered not related with sustainability; and
- their less detailed discussion on economic dimension compared to the other dimensions.

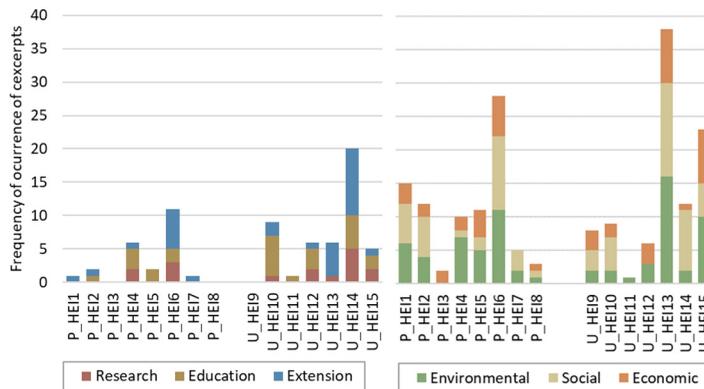


Figure 1. Polytechnics and universities' FO of context and dimension-related categories in the excerpts

Source: Authors' own creation/work

Therefore, many institutions depending on the state budget are limited to developing and implementing standard education/training activities for their students, rewarding professional merit, investing in research and modernizing infrastructures.

The correlations between FO-Sustain and the dimensions variables (FO-Environmental, FO-Social, FO-Economic) were all statistically significant (p -value < 0.05), being moderate for the economic dimension and strong for the environmental and social ($r_s = 0.651$, $r_s = 0.734$ and $r_s = 0.826$, respectively). The correlation with FO-SDG was also statistically significant and strong ($r_s = 0.754$). As for the context variables, only extension had a statistically significant correlation with FO-Sustain, which was moderate ($r_s = 0.674$). No statistically significant correlation was found with education or research.

4.2 Self-report of sustainability integration in education and curricula

Considering SUSHEQ answers, a great number of HEIs integrate sustainability in the review and improvement of courses, no matter the form, except for higher recommendations. Nevertheless, 30% do not seem to integrate sustainability at all. Only two universities promote two distinct forms of revision or improvement of courses regarding the integration of sustainability. Four universities mentioned the promotion of revision or improvement of curricula regarding the programs, integrating sustainability through the “modification and creation of Curricular Units.” Five HEIs (30%) integrate sustainability through “SDG,” two being polytechnics and three universities. Initiatives of environmental and social responsibility are also a form of promoting revision or improvement of curricula, despite their lesser importance, both in universities and polytechnics.

Concerning the development of sustainability skills in the course, HEIs responded positively, either through the inclusion of the theme in multiple CU (87%) or through the implementation of extracurricular initiatives such as seminars or conferences (93%). All universities plainly expressed the development of sustainability skills in the courses, no matter the process. These results were not so clear in the polytechnics, even though there is a positive implementation. The majority (62%) of polytechnics considered the inclusion of the theme in multiple CU, and the implementation of extracurricular initiatives such as seminars or conferences was followed by 75%.

On the question in which the HEIs were asked whether they had courses dedicated to the theme of sustainability and which was the approach followed, 11 HEIs (73%) responded positively to the first, this being more expressive in the universities (100% vs 50% in Polytechnics); of these, the majority (47%) reported that the approach followed is integrated (meaning focusing the different dimensions of sustainability), while others mention the focus in one of the dimensions, the environmental being the one most referenced (40%), followed by the social (33%) and the economic (27%). When asked about what kind of sustainability-related courses they taught, the answer varied from technical courses to doctoral programs, these last only awarded by universities by legal imposition.

Regarding the support teachers in the promotion of sustainability competencies in their CU, again 11 HEIs (73%) responded affirmatively, referring both to formal and informal actions, with no significant difference being detected between polytechnics (75%) and universities (71%). However, the way support is provided is more frequent and diverse in polytechnics than in the universities (see [Figure 2](#)). The most referred support was informal (47%), including, among others, support in obtaining new skills, by allocating funds for self-training or through participation in the Eco-Schools Program. Formal support ranged from resorting to an office/committee/dedicated advisory group (13%) to organizing training actions (40%) and providing supporting documentation (33%).

On the question about having specific pedagogical practices promoted for the teaching of sustainability, 67% answered positively, namely, 50% of the polytechnics and 86% of the universities. Almost half (47%) reported doing it with transdisciplinary studies and with the resolution of problems, while 40% mentioned study cases and experimental practices. Some HEIs (33%) used participative teaching and games (13%). As shown in Figure 3, universities have a more diversified (or even more complete) approach than polytechnics.

On the question in which the HEIs were asked if, in addition to the classrooms, they had other spaces/facilities where teaching or extracurricular activities on sustainability took place, 13 HEIs (87%) responded positively, this being more expressive in polytechnics (100% vs 71% in universities); of these, the majority (53%) reported the canteen, 47% reported vegetable gardens and circulation areas and 33% mentioned green areas. It should not be forgotten that these institutions include agricultural schools with vast cultivable fields to support the classes.

4.3 Relationship between the incorporation of sustainability in strategic plans and its self-reported integration in education and curricula

The correlation between the integration of sustainability in the review and improvement of courses through “SDG” and FO-Environmental and FO-Social is moderate and statistically

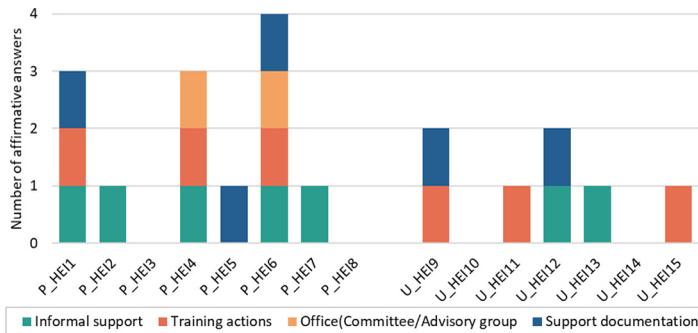


Figure 2.
Supporting actions to HEI staff to promote sustainability training/teaching

Source: Authors’ own creation/work

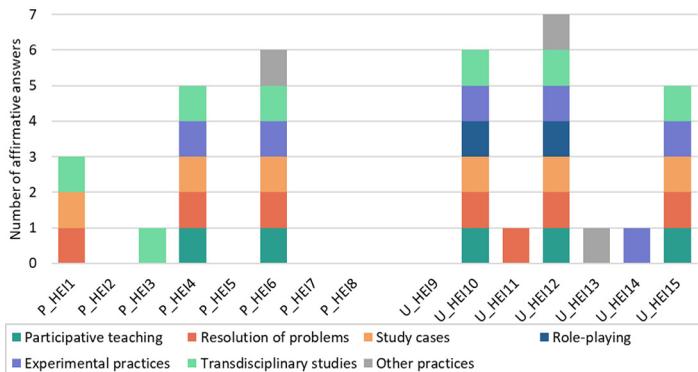


Figure 3.
Specific pedagogical practices promoted for the teaching of sustainability by each HEI

Source: Authors’ own creation/work

significant ($r_s = 0.574$; p -value = 0.025). Despite these overall results, no statistically significant result was found when analyzing universities and polytechnics (p -values > 0.05). As for the other variables, no significant correlations were found (see Appendix, [Table A1](#)).

Regarding the development of sustainability skills in the course and the existence of courses addressing sustainability, no significant correlations were found with FO variables (see Appendix, [Table A1](#)).

When analyzing the correlation between FO-Sustain variables and the existence of formal actions to support teachers in the promotion of sustainability competencies in their CU, or other types of actions, and the existence of specific pedagogical practices promoted for the teaching of sustainability, no statistically significant correlations were found. The same results were obtained when analyzing the correlation between FO-Sustain variables and the existence, in addition to the classrooms, of other spaces/facilities where teaching or extracurricular activities on sustainability took place (see Appendix, [Table A1](#)).

5. Discussion

As stressed by [Fantauzzi et al. \(2021\)](#), HEIs struggle for competitiveness and international visibility, which makes strategic planning crucial, with the mission statement that represents the starting point in this process, summarizing HEI identity and the objectives that these institutions want to achieve. Given the importance of sustainability implementation in HEIs as leaders and in accordance with UNESCO's guidelines for the fulfillment of the 2030 Agenda, the reference to sustainability is prioritized in that statement ([Parr et al., 2022](#); [Sanchez et al., 2022](#)).

No consistent integration of sustainability in E&C. In all the SP analyzed, there are references to sustainability, but there is a great disparity between HEIs, both in the quantity and in the diversity of these references. Also, dimensions of sustainability are mentioned 2.6 times more than the context of HEI activities as research, education and extension. Half of the references to sustainability found in the SP are distributed almost equally between the environmental dimension and the social dimension, with both dimensions having a strong correlation with the excerpts related to sustainability. In fact, according to SP's main purpose, external leadership is a mission, along with teaching and research, that summarizes a new and wider role for HEIs ([Fantauzzi et al., 2021](#)). Nevertheless, these results show that in Portugal, HEIs are not yet considering sustainability in an integrated fashion within their main activities and core business, namely, E&C. According to [Sanchez et al. \(2022\)](#), HEIs must modify themselves and incorporate sustainability into their strategy holistically, instead of specific actions or parallel processes.

Focus on environmental and social dimensions. While polytechnics prioritize the environmental dimension, followed by the social dimension, universities focus their efforts equally on both dimensions. These results may indicate an evolution in HEIs, since in earlier studies ([Aleixo et al., 2018](#)), they were mainly engaged in the social *dimension*, and polytechnics had a less developed environmental dimension. Another driver could be the increased number of polytechnics that have recently enrolled in the eco-campus initiative, where actions are mainly focused on the environmental dimension. In 2021/2022, nine Polytechnics earned the green flag of eco-campus compared to just one university ([Associação Bandeira Azul da Europa, 2022](#)).

Extension and education and research. As for the context, extension actions are the most frequent, followed by education and research, both in universities and polytechnics. Polytechnics seem to have a more prominent concern with extension actions, compared with universities. These results could show that polytechnics are more concerned with the connection with outside communities, in particular local stakeholders and cross-sectoral

dialogue and action [according to the extension meaning for SDG implementation in HEI (SDSN, 2020)] due to their more practical missions and scope.

Formal and lifelong learning courses dedicated to sustainability. Although education for sustainability is not particularly highlighted in the SP, according to the self-reported survey, most institutions run formal and lifelong learning courses exclusively dedicated to sustainability issues. Moreover, the approach to sustainability is carried out differently, being better represented in the universities than in polytechnics. According to [Fonseca et al. \(2018\)](#), Portuguese universities have more CU addressing the topic, while [Aleixo et al. \(2018\)](#) report that polytechnics give less importance to formal training and research. Concerning the use of specific pedagogical practices promoted for the teaching of sustainability, the majority of HEIs answered positively and do it with transdisciplinary studies and experimental practices. Also, most of them had other spaces/facilities where they teach or extracurricular activities on sustainability take place. In this regard, it looks like polytechnics can take advantage of their green spaces. These results are in accordance with the presentations on E&C practices and examples featured at the conferences organized by the SCN since 2019. Following the Italian example, this type of network has been a driver for the integration of sustainability in E&C in Portugal ([Fantauzzi et al., 2021](#); [Sonetti et al., 2020](#)).

Lack of higher-level recommendations. There seemed to be no higher recommendation for the integration of sustainability in the HEI courses, which is in accordance with the lack of national policy recommendations in Portugal ([Farinha et al., 2020](#)). In most of the cases, the revision or improvement of curricula was made by modifying or creating CU, followed by “SDG.” It is noteworthy that only two universities out of 15 HEI promoted two distinct forms of revision or improvement of courses to integrate sustainability.

Bottom-up initiatives toward ESD. In general, the results show a slight alignment between SP contents and self-reported integration of sustainability in E&C, between environmental and social dimensions found in SP analysis and integration of sustainability in the review and improvement of courses through “SDG.” The HEI responded positively concerning the development of sustainability skills in the courses, either through the inclusion of the theme in multiple CU or through the implementation of extracurricular initiatives. These results were not so clear in the polytechnics, even though there was a positive trend. Nevertheless, there seems to be no correlation between the development of these skills and SP contents (in the education context). These seem to demonstrate that the HEI top-level government is not aware of the several initiatives that are being carried out by their teachers and students. This fact, together with the aforementioned emergence of initiatives created by professors and researchers (e.g. sustainable network campus) and the absence of recommendations in national policies, points to the possibility that ESD initiatives in Portuguese HEI are closer to grassroots movements, where syllabus, materials, courses and well-structured actions are emerging, despite the reduced involvement at the organizational and national level. This phenomenon has been reported by several authors in various geographic contexts ([Murphy et al., 2009](#); [Sonetti et al., 2020](#)). Nevertheless, those initiatives are still compartmentalized, requiring greater integration throughout the institutions.

Following UN Recommendations (SDSN, 2020), there is a need for an intermediate structure that operates as a connecting tissue, accelerating the change processes that come from both the “top” (formal and institutional initiatives, where the integration of sustainability in E&C are committed in the SP), and the “bottom” (spontaneous impulse of the academic community, through their different initiatives).

Raise awareness across society and integrate sustainability knowledge in E&C. This study shows that an increasing number of HEIs recognize the need to integrate sustainability into their curricula and policies, which is challenging (Fiselier and Longhurst, 2018). It is fundamental to raise awareness for sustainability across society. Curricula should include basic knowledge of sustainability, soft skills in several areas (e.g. leadership, social psychology), values and ethics, lean management practices and technical knowledge about how to measure the impact of sustainability initiatives in a business or organization, for example. Besides, also following Klein *et al.* (2023), focus should be given on the student and or their more active role as a basic principle of HEI success and better overall sustainable practices. In addition, the absence of governmental and, in many cases, organizational commitment, corroborates the impression that in Portugal, as well in other countries, HEIs seem to forget their role as agents of change (Klein *et al.*, 2022).

Threats to validity. There is no direct comparison between the two different modes of data collection. On the one hand, SP data collection was made online, or by email to the HEI when the SP was not publicly available. This task was performed by the authors of this article. Even though data classification followed a double check process, major doubts were discussed among all the authors. The strategy described in each SP might or might not be executed by the HEI. It is a document of intentions. Only the SR would confirm its execution. On the other hand, the participants answering the online questionnaire on behalf of the HEI identified themselves and provided their email. Therefore, the data collected corresponds to the respondents' knowledge in the HEI. Ultimately, this is an auto-assessment exercise that depends on the respondent either on top management or a technician with no formal responsibility in the HEI. Given this, a comparison among HEI's results is not possible.

There is also a difference regarding time of data collection. While SP data was collected between December 2020 and February 2021, the online questionnaire began in January and finished in December 2021 (including request reinforcements).

6. Conclusions

This article explored the alignment between SP of the Portuguese public HEI, namely, universities and polytechnics, and their perception of the integration of sustainability in E&C. Further, 82% of these HEIs SP were analyzed, and 44% answered a self-assessment survey.

Both universities and polytechnics, despite no apparent strategy from top governance, are increasing their engagement and evolution toward implementing E&C, from developing courses exclusively dedicated to sustainability, using different pedagogical practices, developing sustainability skills in the students and conducting extracurricular activities. Universities appear to be slightly ahead, but polytechnics seem to take advantage of their green spaces, focusing more on the environmental dimension. As the main conclusion, SP seem poorly aligned with self-assessment integration of sustainability in E&C, where several practices are being reported. The network of collaborations between HEIs and multiple academic initiatives and research work about implementing sustainability are working as important drivers to unlock and change the behavior of HEI in Portugal and could be a good example for other countries to follow.

Even though the classifications used in the content analysis were defined and revised several times by the authors of this research to reduce coder interpretation and subsequent bias in the results, some subjectivity might remain. Also, the analysis of SP or self-report surveys answered by top management or a technician does not assess the practices and sustainability implementation in E&C themselves. So, further studies should consider the analysis of programs and courses syllabus, as well as interviews with students and teachers to confirm these results and deepen the research.

Notes

1. www.redcampussustentavel.pt
2. The law changed on February 24, 2023, and these institutions can now offer their own doctoral programs.

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Further reading

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N. Question	VARIABLES	rs	t-statistics	p-value
General data	FO-Sustain and FO-Education	0.485	2.000	0.067
	FO-Sustain and FO-Extension	0.674	3.285	0.006*
	FO-Sustain and FO-Research	0.593	2.652	0.020
	FO-Sustain and FO-Environmental	0.734	3.894	0.002*
	FO-Sustain and FO-Social	0.826	5.282	0.000**
	FO-Sustain and FO-Economic	0.651	3.089	0.009*
	FO-Sustain and FO-SDG	0.754	4.141	0.001*
	FO-Sustain and SUSHEQ (Q2)	Integration of sustainability in the review and improvement of courses through... ... "change or creation of courses (CU)" and FO-Sustain ... "SDG" and FO-Sustain ... "social and environmental responsibility initiatives" and FO-Sustain ... "sustainability principles" and FO-Sustain ... "change or creation of courses (CU)" and FO-Education ... "change or creation of courses (CU)" and FO-Extension ... "SDG" and FO-Extension ... "social and environmental responsibility initiatives" and FO-Extension ... "sustainability principles" and FO-Extension ... "social and environmental responsibility initiatives" and FO-Environmental and FO-Social ... "SDG" and FO-Environmental and FO-Social ... "change or creation of courses (CU)" and FO-SDG ... "SDG" and FO-SDG ... "social and environmental responsibility initiatives" and FO-SDG ... "sustainability principles" and FO-SDG ... "sustainability principles" and FO-SDG	0.485 0.674 0.593 0.734 0.826 0.651 0.754 -0.052 0.427 -0.137 0.093 0.435 0.110 0.241 0.110 0.033 -0.205 0.574 -0.111 -0.170 -0.168 0.163	2.000 3.285 2.652 3.894 5.282 3.089 4.141 0.189 1.701 0.497 0.337 1.742 0.400 0.896 0.400 0.117 0.754 2.526 0.401 0.062 0.614 0.598
FO-Sustain and SUSHEQ (Q3)	Development of sustainability skills in the courses through the... ... "inclusion of the theme in multiple CU" and FO-Sustain ... "extracurriculars initiatives (e.g. seminars, conferences)" and FO-Sustain ... "inclusion of the theme in multiple CU" and FO-Education ... "extracurriculars initiatives (e.g. seminars, conferences)" and FO-Education	0.4010 0.279 0.424 0.345	1.619 1.048 1.690 1.326	0.129 0.304 0.115 0.208
FO-Sustain and SUSHEQ (Q4)	Existence of courses dedicated to sustainability... ... "using an integrated approach" and FO-Sustain ... "addressing only the environmental dimension" and FO-Environmental ... "addressing only the social dimension" and FO-Social	0.372 0.016 0.330	1.446 0.056 1.259	0.172 0.956 0.230

(continued)

Table A1. Correlations between variables (from questions 2 to 7) whose data sources are SP and online questionnaire (SUSHEQ)

Table A1.

N. Question	VARIABLES	rs	t-statistics	p-value
FO-Sustain and SUSHEQ (Q5)	... "addressing only the economic dimension" and FO-Economic and FO-Education	0.478	1.946	0.071
	Existence of support to the teaching staff and FO-Education	0.215	0.794	0.442
FO-Sustain and SUSHEQ (Q6)	Existence of specific pedagogical practices to promote the teaching of sustainability and FO-Sustain.	0.073	0.264	0.796
	and FO-Extension and FO-Education	0.263	0.982	0.344
FO-Sustain and SUSHEQ (Q7)	... "throughout transdisciplinary studies" and FO-Education	0.299	1.129	0.279
	Other spaces/facilities where teaching or extracurricular activities on sustainability take place, in addition to the classrooms and FO-Sustain	0.361	1.395	0.186
FO-Sustain and SUSHEQ (Q7)	and FO-Extension	-0.409	1.612	0.132
	and FO-Social	-0.444	1.785	0.098
	and FO-Education	-0.485	1.999	0.067
	and FO-Environmental	0.023	0.083	0.935
		-0.069	0.248	0.808

Source: SUSHEQ – online questionnaire (SUSHEQ); strategic plans (SP); rs = Spearman correlation; N (number of HEIs) = 15; DF (degree of freedom) = 13; Small effect (< = 0.05); ** Large effect when rs is quite close to 1, and p-value is quite smaller compared to significance level (0.05)

Source: Authors' own creation/work

Author affiliations

Marina Duarte, ISEP – School of Engineering, Polytechnic of Porto, Porto, Portugal and Center for Research and Intervention in Education (CIIE), Faculty of Psychology and Education Sciences, University of Porto, Porto, Portugal

Sandra Sofia Caeiro, Centro de Estudos Globais, Universidade Aberta, Lisbon, Portugal and Center for Environmental and Sustainability Research (CENSE), School of Science and Technology, NOVA University of Lisbon, Caparica, Portugal

Carla Sofia Farinha, Center for Environmental and Sustainability Research (CENSE), School of Science and Technology, NOVA University of Lisbon, Caparica, Portugal

Ana Moreira, NOVA-LINCS, Departamento de Informática, School of Science and Technology, NOVA University of Lisbon, Caparica, Portugal

Margarida Santos-Reis, Centre for Ecology, Evolution and Environmental Changes (cE3c), Faculdade de Ciências, Universidade de Lisboa, Lisbon, Portugal

Constança Rigueiro, ISISE, Instituto Politécnico de Castelo Branco, Castelo Branco, Portugal

João Simão, Centro de Estudos Globais, Universidade Aberta, Lisbon, Portugal and CAPP – Center for Public Administration and Public Policies, Universidade de Lisboa, Lisbon, Portugal

About the authors

Marina Duarte is an Assistant Professor in the Department of Mechanical Engineering of the School of Engineering of Polytechnic of Porto (ISEP-P.Porto), where she has been teaching since 1993. She is an integrated member of the Center for Educational Research and Intervention of the Faculty of Psychology and Educational Sciences of the University of Porto (CIIE-FPCEUP) and a collaborating member at the Center for Research and Development in Mechanical Engineering of the School of Engineering of Polytechnic of Porto (CIDEM-ISEP-P.Porto). She holds a PhD in Educational Sciences from the Faculty of Psychology and Educational Sciences of the University of Porto, a Master's degree in Educational Sciences, with a major in University Pedagogy from the Faculty of Psychology and Educational Sciences of the University of Coimbra, a Master's degree in Mechanical Engineering, with a major in Thermal Engineering, from the Faculty of Engineering of the University of Porto, and a degree in Mechanical Engineering, with a major in fluids and heat. Marina Duarte is the corresponding author and can be contacted at: mic@isep.ipp.pt

Sandra Sofia Caeiro holds an undergraduate degree in Environmental Engineering from NOVA School of Science and Technology, FCT (1992), a Master's in Science of Coastal Zones from University of Aveiro (1997) and a Doctorate on Environmental Engineering from FCT (2004), Portugal. She is currently a Full Professor in the Department of Science and Technology at Universidade Aberta (UAb). Her main research and teaching areas include environmental and sustainability management and assessment and education for sustainable development. She is an Associate Editor at the *Journal of Cleaner Production*, Elsevier and on the editorial board of the international journals of *Ocean and Coastal Management*, Elsevier, *Latin American Journal of Management for Sustainable Development*, *Inderscience* and *International Journal of Sustainability in Higher Education*, Emerald and reviewer of several international scientific journals and books. She has mentored several post-graduate students and postdoctoral researchers, published papers in peer-review ISI journals, chapter books and international conference proceedings and coordinated and participated in several national and international research projects.

Carla Sofia Farinha graduated from the Technical University of Lisbon in 1992 with a bachelor's degree in agronomics engineering, followed by a master's degree in agronomics engineering in 1997 and an MBA from Portuguese Catholic University in 2000. She has a PhD from Universidade Aberta (2020) and works as a Research Associate at the NOVA University of Lisbon, Portugal's Center for Sustainability and Environmental Research (CENSE). She also has a postgraduate degree in "Public Finances in Public Administration" from the University Institute of Lisbon, ISCTE (2022). As a Senior Expert on Statistics, she works for Statistics

Portugal in Lisbon. Her main areas of research are education for sustainable development and sustainable development goals as well as global burden of diseases, injuries and risk factors (GBD). And so, she is a GBD Collaborator who is a member of the Institute of Health and Metrics Evaluation (IHME), which is based in the University of Washington, that manages the GBD health financing collaborator network. She published papers in peer-review ISI journals, chapter books and international conference proceedings, including one for the General Directorate of Health where she oversaw the Portuguese team's work with IHME on the organization's first policy report on Portuguese health, titled *Portugal: The Nation's Health 1990-2016: An overview of the Global Burden of Disease Study 2016 Results*. In addition, she is guest editor at *Sustainability and Frontiers* and a reviewer of several international scientific journals and books.

Ana Moreira is an Associate Professor with Habilitation at NOVA University of Lisbon where she leads the Software Engineering team at the NOVALINCS research laboratory. Her main research topics are requirements engineering, software architecture design, model-driven development, software quality and sustainability engineering. She is the co-founder of the international movements pUML, Early Aspects and Model-Driven Requirements Engineering; she is or was an editorial board member of the journals *IEEE Transactions on Software Engineering*, *Software and Systems Modeling* and *Transactions on Aspect-Oriented Software Development*. She is an elected Council Board member of IREB e.V. for the international professional certification for requirements engineering. She is a member of the Steering Committee of the conferences ACM/IEEE MODELS, IEEE RE, RESFQ and ACM AOSD/Modularity. She has been an organizer, and a Program Board and Program Committee member of numerous international top-ranked conferences and workshops, Conference Chair for UML'04 and RE'17 and Program Committee Chair for AOSD'09, MODELS'13, ICT4S'20, RE'21 and REFSQ'24. She publishes regularly in major scientific conferences and journals and has been awarded with several best paper awards and two most influential paper awards.

Margarida Santos-Reis holds an undergraduate degree in Biology from the Faculdade de Ciências da Universidade de Lisboa (1979) and a PhD on Biosystematics and Ecology (1990) from the same university, in Portugal. She is currently a Full Professor in the Department of Animal Biology and Vice-Dean for Research at FCUL (also termed as CIÊNCIAS). Her main research and teaching areas include ecological assessment and environmental sustainability. She has mentored several post-graduate students and postdoctoral researchers, published approximately 150 papers in peer-review ISI journals, chapter books and books and coordinated and participated in several national and international research projects. Since 2019, she is one of the coordination members of the Sustainability Living Lab @Ciências ULisboa that aims to give coherence and visibility to a diverse set of activities already going on, and to enhance the involvement of the school's community, and the surrounding reality, in the challenge of sustainable development in all its dimensions.

Constança Rigueiro. PhD in Civil Engineering in the area of Mechanics of Structures and Materials in 2009 from the University of Coimbra, MSc in Civil Engineering in 1998 from the University of Coimbra and degree in Civil Engineering in 1992 from the University of Coimbra. She is a Coordinator Professor at the Polytechnic Institute of Castelo Branco. Effective member of the Research Center Institute for Sustainability and Innovation in Structural Engineering (ISISE) assessed in 2020 by Fundação para a Ciência e a Tecnologia (FCT) with the overall quality grade of Excellent. She integrates the research team of Steel and Mixed Construction Technology (SMCT). In this context, she has been developing research in: behavior of structures subject to accidental actions, numerical and experimental characterization; analysis of the sustainability of structures; analysis of the dynamic behavior of railway viaducts and pedestrian bridges. She participates in the Technical Committee for Standardization of the Portuguese Institute for Quality, namely, member of CT 171 – Sustainability in buildings. She is a member of WG 5 – Social Performance Assessment of Building and WG 8 – Sustainable Refurbishment of CEN/TC 350 – Sustainability of construction works. She is a member of the technical committee 14 (TC 14) – Sustainability and Eco-Efficiency of Steel of the European

Convention for Construction Steelwork. In her curriculum vitae, the most frequent terms in the contextualization of scientific, technological and artistic-cultural production are: structural dynamics; bridges; extreme actions; design; sustainability; sustainable construction; sustainability assessment.

João Simão holds a PhD on Management from Universidade Aberta, Portugal. He is currently a Professor in the Department of Social Sciences and Management at Universidade Aberta (UAb) and a researcher at CAPP – Center for Public Administration and Public Policies and CEG – Center for Global Studies. His main research and teaching areas include sustainable development and corporate social responsibility.