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The Sustainable Development Goals: An Experience on Higher Education

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Abstract: Sustainable development is acquiring high attendance in higher education. In fact, one of the targets for the Sustainable Development Goals announced by the United Nations in September 2015 aims to ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, thorough education on sustainable development. The current study focuses on the evaluation of individual works based on the sustainable development suggested to students in a subject of the Master's of Thermal Engineering at the University of Vigo. In addition, a sustainable holistic rubric is presented, which was used to analyze the ability of the students to incorporate sustainability principles in their work. The rubric was based on the 17 Sustainable Development Goals and the associated targets of the United Nations, more specifically on the Goals 7, 8, 12, and 13. A total of 10 works were evaluated. As a general conclusion, it was found that the students generally do not consider or consider to a lower extent the economic criteria opposite to the environmental, technical, and social dimensions. The environmental sub-criterion were applied to a greater extent in the development of the works. However, the technical and social dimensions were included to a greater or lesser extent depending on the type of work developed.

Keywords: sustainable development; high education; Sustainable Development Goals; environmental criteria; technical criteria; economic criteria; social criteria; rubric

1. Introduction

The most widely accepted definition of sustainable development appeared in the report of the World Commission on Environment and Development by Brundtland, which was published in 1987 and states that sustainable development is 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' [1]. There are different interpretations of sustainable development. The most popular one describes this term based on three pillars: economy, environment, and society (sustainability Venn diagram) [2]. Although the study of sustainable development requires evaluating these three dimensions, different authors highlight the environmental dimension [3–6], while the social dimension is often overrated [7]. Other dimensions can be also found in the literature such as the cultural [8], institutional [9], or temporary dimensions [10].

Recently, on 25–27 September 2015, in the 2030 Agenda for the Sustainable Development of the United Nations, a total of 17 Sustainable Development Goals and 169 associated targets were announced, which demonstrate the ambition to reach sustainable development. Action over the next fifteen years will be stimulated with these goals and targets [11].

According to the UNECE Strategy for Education for Sustainable Development, education is a requirement for achieving sustainable development. Thus, education for sustainable development helps to make judgments and choices in favor of sustainable development [12,13].

Education for sustainable development means including key sustainable development issues into teaching and learning. UNESCO (Resolution 57/254 United Nations General Assembly) seeks to mobilize educational resources to develop a sustainable future [14]. Thus, teaching and learning of sustainable development must be implemented to reach that goal. In fact, Sustainable Development Goal 4 is focused on education in which one of the targets specifically aims to 'ensure that all learners acquire the knowledge and skills needed to promote sustainable development' [11].

Technological advances, with all their advantages, have led to unsustainable practices, which make it necessary to implement sustainable development strategies. At this point, sustainable development will be systematically embedded into the curriculum across universities' offerings.

In the university field, the importance of sustainable development and its inclusion in different activities at colleges and universities became an official stance and a commitment recognized by many universities all around the world since the Tallories Declaration (campus of Talloires, France) in 1990. This document has been signed by over 250 universities worldwide, which constitute the group named the University Leaders for a Sustainable Future. In Europe, the European University Association has created the COPERNICUS program (Cooperation Program in Europe for Research on Nature and Industry through Coordinated University Studies), which in 1994 published the University Charter for Sustainable Development that was endorsed by 520 European universities: 'universities train the coming generations of citizens and have expertise in all fields of research, both in technology as well as in the natural, human and social sciences. It is consequently their duty to propagate environmental literacy and to promote the practice of environmental ethics in society'.

Despite the evidence and the good intentions, the notion of global sustainable development was not incorporated in higher education until recently, and there are still several challenges that need to be overcome [15]. Ramos et al. gathered a total of 33 studies that show some of the efforts taken to contribute to sustainable development in higher education [16]. Many other studies that can be found in the current literature are based on the application of sustainable development concepts in universities [17–20].

In Spain, the Conference of Rectors of Spanish Universities (CRUE) created in 2002 a working group focused on Environmental Quality and Sustainable Development with the purpose of introducing sustainable development in university activities at all academic and management levels. However, the concept of curricular sustainable development must guide the new curriculum. According to the Conference of Rectors of Spanish Universities, this guidance does not mean adding another layer to the academic aspects of education; rather, the approach must address the teaching and learning process in a holistic manner, contemplating how students will interact with others throughout their professional career, directly or indirectly [21].

Currently, the curricula in higher education have been criticized for their tendency towards specialization [22,23], leading to many graduates attempting to solve problems from a very narrow and isolated point of view [23]. The following have been widely discussed in the literature: the tools used to examine the teachings of sustainable development that appear in the curriculum and the quality of the knowledge that is acquired by the students [24,25].

Therefore, significant changes are required to integrate the content of sustainable development into the curriculum of university engineering programs to enable students to be prepared to face complex global dilemmas.

Consequently, universities, especially engineering schools, must establish the mechanisms required so that the future graduates will think in terms of sustainable development. These mechanisms involve not only teaching subjects that stress the technical, social and economic aspects of sustainable development, but also designing the curricula from the point of view of sustainable development.

The current article aims to report a higher education study carried out in a subject of the Master's in Thermal Engineering at the University of Vigo based on teaching and promoting sustainable development. It mainly consists of individual cases solved by the students in which the different criteria of sustainable development should be addressed. Two different types of works were suggested. The results were evaluated by a sustainable rubric developed based on the 17 Sustainable Development Goals recently announced by the United Nations. Finally, a discussion of the outcomes is given, which is related to sustainable development in higher education.

2. Materials and Methods

2.1. Structure of the Master's in Thermal Engineering

The School of Engineering at the University of Vigo confers a total of six Bachelor's degrees (i.e., Mechanic Engineering, Electric Engineering, Electronic and Automatic Engineering, Chemical Engineering, Industrial Organization Engineering, and Industrial Technologies Engineering). The academic offering of the School of Engineering also includes six Master's degrees (i.e., Industrial Pollution, Energy and Sustainability, Construction, Mechatronics, Occupational Risk Prevention, Design and Mechanical Production, and Thermal Engineering).

The main objective of the Thermal Engineering Master's degree program is to provide the future professionals who will work in the Energy Engineering field with high-level training to gain the knowledge and skills that range from the field's sources to its applications in the industry and society in general. The purpose is to teach them the capacities and the abilities needed for the use of calculation methodologies, simulation, design, analysis, and auditing in the manufacturing, transformation, storage, transport, and energy use sectors, with a particular emphasis on the sustainable development, efficiency, and environmental impact aspects of the different management forms, applications, and techniques of the energy resources. Within this overall objective, the training to gain the knowledge and skills needed to perform the investigation and develop and innovate new technologies and cutting-edge systems in the energy sector is also included.

This Master's degree gives access to the doctoral program of Energy Efficiency and Sustainability in Engineering and Architecture.

The curriculum of this Master's degree has been structured as fourteen subjects, including Energy Audit, Thermoeconomics, and Criteria of Sustainable Development and Life Cycle Analysis, which are highly linked to sustainable development. At the last stage of the Thermal Engineering Master's program and after finishing all the subjects aforementioned, the student must complete a dissertation project, the purpose of which is to conduct an individual study that applies and incorporates the knowledge acquired in the degree, thereby performing a comprehensive assessment of the students' professional capacity and level of scientific and technological training as a requirement for obtaining the Master's degree in Thermal Engineering. The master's dissertation project focuses on the assessment of a series of competences associated with the master's degree.

2.2. Description of the Subject Criteria for Sustainable Development and Life Cycle Analysis

The optative subject Criteria for Sustainable Development and Life Cycle Analysis taught in the Master's degree consists of both conventional and computer lessons, and part of these are face-to-face while other part is not on-site.

The main competences pursued with this subject are as follows:

- To know how to apply the criteria of energy efficiency and sustainable development applicable to processes and/or activities.
- To be able to calculate the energy efficiency and the exergetic efficiency of systems and to propose solutions of improvement.
- To know how to apply the different energy policies and sustainable development in systems and projects of reduced scope.

- To be able to implement life cycle analysis to projects, activities, etc.
- To be able to select and apply improvement solutions in projects, systems, etc.

The training activities for this subject are divided into 100% face-to-face lectures and practical case solving, in which only the 10% is face-to-face, allowing the students to implement the knowledge they acquire in the most autonomous possible way. The evaluation systems used consist of a written exam, which is weighed between 30% and 40% of the final grade, and of the resolution of the practical cases that is weighted between 60% and 70% of the final grade. As observed, in this subject, a high weight is given to the resolution of practical cases. It allows the students to apply theory to real situations. In this way, curiosity is inculcated through active learning.

The syllabus of the subject consists of the following topics:

- Sustainable development criteria: the carbon footprint, the global evolution of sustainable development parameters, energy efficiency and equivalent CO_2, and exergetic efficiency.
- Analysis of life cycle: inventory analysis, allocation procedures, impact methodology, databases and data quality, and criteria for improvement.

Concretely, this paper is focused on the resolution of the practical cases related to the topics involved in the subject in which the students had to focus on sustainable development competencies. Each student was asked to carry out an individual work. Two options were available based on:

(1) The development of a work based on sustainable development factors from a title given.
(2) The analysis of the involvement in sustainable development issues by different companies.

In this way, it was suggested that each student choose one of the two possibilities. In the first case, some titles were proposed. The students who selected this option had to choose a title from the given list and develop the topic based on sustainable development. In the second case, the student had to choose a certain company and evaluate its involvement in and contribution to sustainable development related to the different aforementioned dimensions.

2.3. Description of the Sustainable Rubric

A sustainable rubric was used in order to evaluate the ability of the student to incorporate sustainable development principles in Thermal Engineering topics so that both the student and the teacher had a document that included all the verifiable evaluation parameters. The rubric helps students assess their own work and provides the instructor with a tool for grading the assignment and providing feedback [26].

The main purpose of the design of the rubric was to create a tool that allows teachers to have a set of unique and common standards that facilitate and standardize the evaluation process. Therefore, the rubric should provide accurate information regarding the strong and weak points and the areas of the work to improve. Another important point is that the rubric, although it was confined to the area of sustainable development, is related to the other elements of the Master's of Thermal Engineering curriculum, including objectives, content, and activities.

The rubric construction was performed in three stages:

2.3.1. Task Description: Identification of Competencies and Performance Standards

Different standards were consulted, including the so-called Nine Principles of Green Engineering [27,28], the 12 Principles of Green Chemistry [29], and the 12 Principles of Green Engineering [29]. Finally, the competencies were evaluated based on the 17 Sustainable Development Goals of the 2030 Agenda of the United Nations for sustainable development approved by world leaders in September 2015. These objectives and targets are integrated and indivisible, global in nature and universally applicable. The different realities, capacities, and levels of development of each country are taken into account, and national policies and priorities are respected. The importance of

recognizing the link between sustainable development and other relevant ongoing processes in the economic, social, and environmental fields is noted [11]. The list of the 17 Sustainable Development Goals is shown in Table 1.

Table 1. The 17 Sustainable Development Goals [11].

Order	Goals
1	End poverty in all its forms everywhere
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
3	Ensure healthy lives and promote well-being for all at all ages
4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5	Achieve gender equality and empower all women and girls
6	Ensure availability and sustainable management of water and sanitation for all
7	Ensure access to affordable, reliable, sustainable, and modern energy for all
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all
9	Build resilient infrastructure, promote inclusive, and sustainable industrialization and foster innovation
10	Reduce inequality within and among countries
11	Make cities and human settlements inclusive, safe, resilient, and sustainable
12	Ensure sustainable consumption and production patterns
13	Take urgent action to combat climate change and its impacts
14	Conserve and sustainably use the oceans, seas, and marine resources for sustainable development
15	Protect, restore, and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation, and halt biodiversity loss
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels
17	Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

Each goal is divided into a series of targets. The development of this rubric was focused more concretely on four of the 17 the Sustainable Development Goals, which can be observed in Figure 1.

Figure 1. Sustainable development goals used for the development of the rubric [11].

Tables A1–A4 in the Appendix A show the targets related to Goals 7, 8, 12, and 13, on which the current rubric is concentrated. Although, several targets were considered, the rubric was focused more concretely on the following targets:

- 'By 2030, increase substantially the share of renewable energy in the global energy mix', from Sustainable Development Goal 7.
- 'By 2030, double the global rate of improvement in energy efficiency', from Sustainable Development Goal 7.
- 'By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency, and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology', from Sustainable Development Goal 7.
- 'By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries in accordance with their respective programs of support', from Sustainable Development Goal 7.
- 'Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programs on sustainable consumption and production, with developed countries taking the lead', from Sustainable Development Goal 8.
- 'Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment', from Sustainable Development Goal 8.
- 'By 2030, achieve the sustainable management and efficient use of natural resources', from Development Goal 12.
- 'By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water, and soil in order to minimize their adverse impacts on human health and the environment', from Sustainable Development Goal 12.
- 'By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse', from Sustainable Development Goal 12.
- 'Integrate climate change measures into national policies, strategies, and planning', from Sustainable Development Goal 13.

From the 17 Sustainable Development Goals and targets, it was determined that the rubric should integrate four basic criteria including environmental, technical, social, and economic competencies.

2.3.2. Proposal Development

A holistic rubric model was chosen as the goal was to make a sustainable rubric that allows for the evaluation of any work for the Master's of Thermal Engineering degree and, moreover, could be used as an extrapolated instrument for other related studies. In this case, it was used specially for evaluating the individual works developed by the students for the subject Criteria for Sustainable Development and Life Cycle Analysis. The evaluation scale (score) of the criteria does not define specific concepts in detail.

The preliminary evaluation matrix was developed with reference to the structure proposed by Stevens and Levi [30]. A set of four criteria with 12 sub-criterion (Table 2) was generated.

Table 2. Criteria and sub-criterion of the sustainable rubric.

Design Criteria	Points
Environmental Criteria	
Sustainable management and efficient use of natural resources	0–4
Prevents waste and gas emissions/global warming reduction	0–4
Incorporates climate change measures	0–4
No incorporation of dangerous or toxic materials	0–4
Technical Criteria	
Uses renewable energy sources	0–4
Incorporates life cycle analysis	0–4
Designed for energy efficiency	0–4
Incorporates innovative technologies or systems analysis to achieve sustainable development	0–4
Social Criteria	
Benefits for the community	0–4
Considers local circumstances and cultures	0–4
Economic Criteria	
Consider sustainable consumption and production programs to decouple economic growth from environmental degradation	0–4
Conduct a cost and/or cost-benefit analysis	0–4

The scale was divided into five levels (0–4), thus allowing markers to have a neutral opinion. Moreover, it was divided into potential and assigned scores. The first one, the potential score, was used to indicate whether a sub-criterion is applicable to a work (0 means not applicable, the criterion is not linked to the work; 1 means valid, although the design of the work does not require the application of this criterion, it could be applicable; 2 means adequate, it is advisable to apply the criterion; 3 means required, the criterion applicable is required; 4 means critical, the criterion is considered critical in the work development). On the other hand, the scale of the assigned points shows the level of inclusion of the sub-criterion in the work (0 means fail, the criterion is not included in the work; 1 means deficient, the criterion is mentioned, but it is not applied; 2 means adequate, the criterion is not mentioned and applied but in a general, unclear, or incorrect manner; 3 means good, the criterion is applied adequately; 4 means excellent, there is evidence that the criterion is widely applied in the work).

2.3.3. Validation: Submit the Rubric to an Expert Trial

The effectiveness of the rubric was verified by having different teachers evaluate some projects from previous years. A total of five projects were evaluated. The results showed that the rubric could be applied and the goals could be reached.

3. Results

In this section, both the actual results of the developed works as well as the potential results obtained from evaluating the individual works using the sustainable rubric are presented.

3.1. From the Development of Individual Works

Figure 2 shows a diagram of the process of the selection and development of individual works. Both the roles of the students and teacher are exposed. In the first phase, the teacher proposed the two types of possible works. The students selected the work to develop and gathered the data from different sources. During the development of the works by the students, the teacher helped them by supervising and advising when any problem or doubt arose. Finally, the works were evaluated using the sustainable rubric presented before.

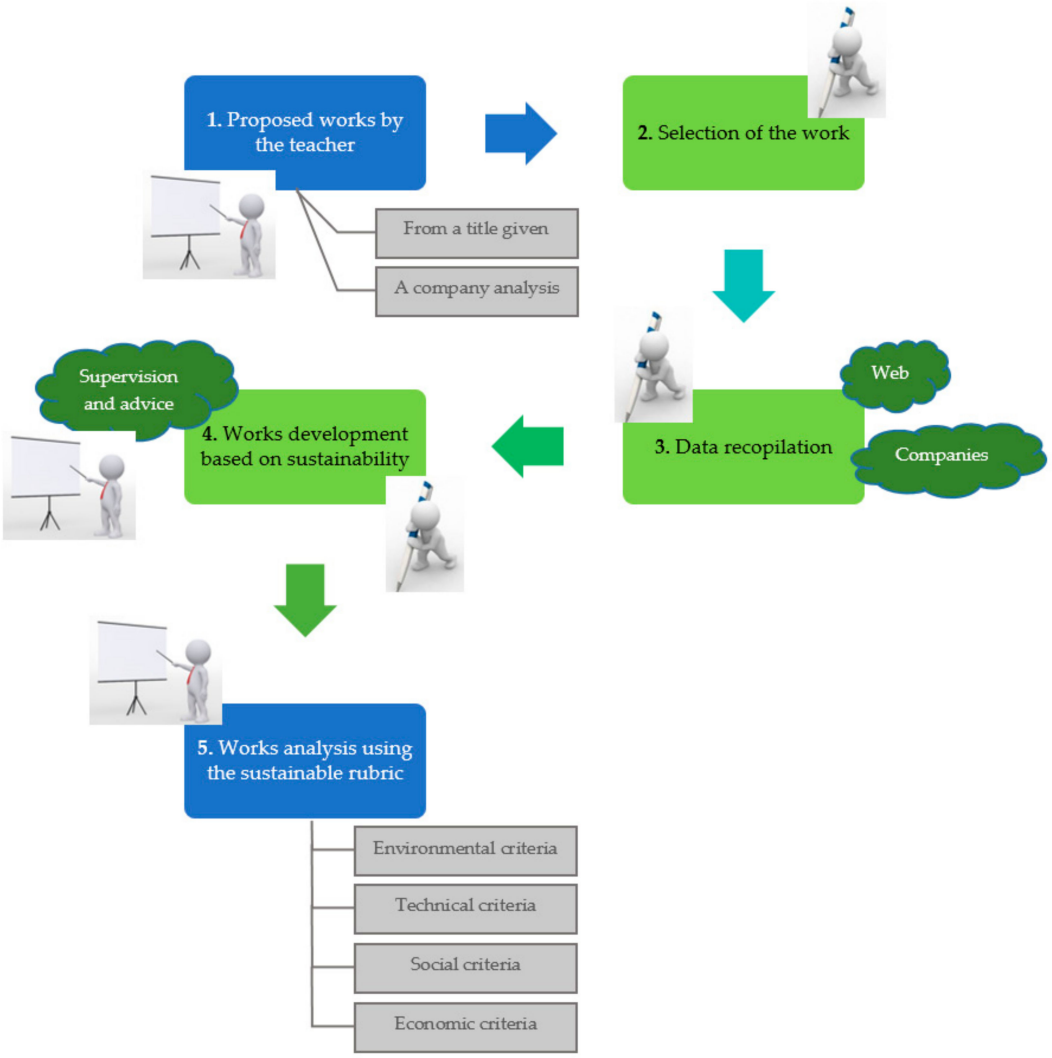

Figure 2. Diagram of the process of the selection and development of the individual works.

Part of the students chose to develop a topic from a given title (a total of five works among the ten works analyzed). The topics selected by the students are shown in Table 3. It was suggested that the students develop the topic based on sustainable development criteria.

Table 3. Titles of the individual works developed by the students based on sustainable development.

Works	Titles
1	Sector analysis of the energetic optimization potential in public buildings in Galicia
2	Strategies in the study of the composition of fouling in biomass boilers
3	Energetic systems for marinas
4	Study of the design of heating and domestic hot water boilers up to 1000 kW of thermal power.
5	Comfort and thermal facilities in a hospital building

On the other hand, the rest of the students (half of the evaluated works) chose a company in order to evaluate its involvement in sustainable development issues. In this case, the students mainly got the information from the general reports of the companies, as well as from the reports of Corporate Social Responsibility (CSR).

Some of the topics most developed by the students in these works (from company analysis) were the environmental impacts on the life cycle of the different products or services depending on the

company evaluated in terms of energy, emissions, waste, and water. Environmental accidents occurring during the productive activity of the companies were included. The importance and evaluation of climate change was also addressed, as well as agreements with the stakeholders. However, the social and economic contributions were mentioned in a lower extent. Many of the students also referred to the 17 sustainable development objectives of the United Nations as they appear in many of the corporate social responsibility reports of the companies analyzed.

3.2. From Applying the Sustainable Rubric

Table 4 shows how the criteria described in the sustainable rubric were applied by the students in their individual works. A total of 10 works were evaluated; five of them were developed from the titles proposed (see previous section) and the other five were based on the analysis of companies' sustainable development criteria and CSR information. The table shows the mean score and standard deviation for both the potential and assigned score for each of the sub-criterion. That is, this analysis tests the potential scores versus the actual scores for each criterion. Student's *t*-test and its probability were also added.

Table 4. Results of the works evaluated using the sustainable rubric.

Item	Potential Score		Assigned Score		*t*-Test	
	Mean	Standard Deviation	Mean	Standard Deviation	*t* (9)	*p*
Environmental Criteria						
Sustainable management and efficient use of natural resources	2.900	0.876	2.200	0.632	−2.689	0.025 *
Prevents waste and gas emissions/global warming reduction	3.200	1.135	3.300	0.675	0.429	0.678
Incorporates climate change measures	3.200	0.919	2.600	0.699	−1.964	0.081
No incorporation of dangerous or toxic materials	3.200	0.919	1.300	0.483	−5.460	0.000 ***
Technical Criteria						
Uses renewable energy	3.200	1.135	2.300	1.160	−1.964	0.081
Incorporates life cycle analysis	2.900	0.876	0.200	0.422	−10.371	0.000 ***
Design for energy efficiency	3.800	0.422	3.500	0.707	−1.406	0.193
Incorporates innovative technologies or systems analysis to achieve sustainable development	3.300	0.823	2.900	0.994	−1.500	0.168
Social Criteria						
Benefits for the community	2.700	0.949	2.100	1.101	−1.964	0.081
Considers local circumstances and cultures	2.700	0.949	1.700	0.675	−3.873	0.004 **
Economic Criteria						
Consider sustainable consumption and production programs to decouple economic growth from environmental degradation	3.500	0.972	1.000	0.667	−7.319	0.000 ***
Conduct a cost and/or cost-benefit analysis	3.600	0.516	1.500	0.850	−9.000	0.000 ***
Mean Score						
	3.183	0.917	2.050	1.194	−2.837	0.019 *

* $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$.

Figure 3 represents the mean scores, potential and assigned, for the four sustainable development criteria related to each of the ten individual works evaluated.

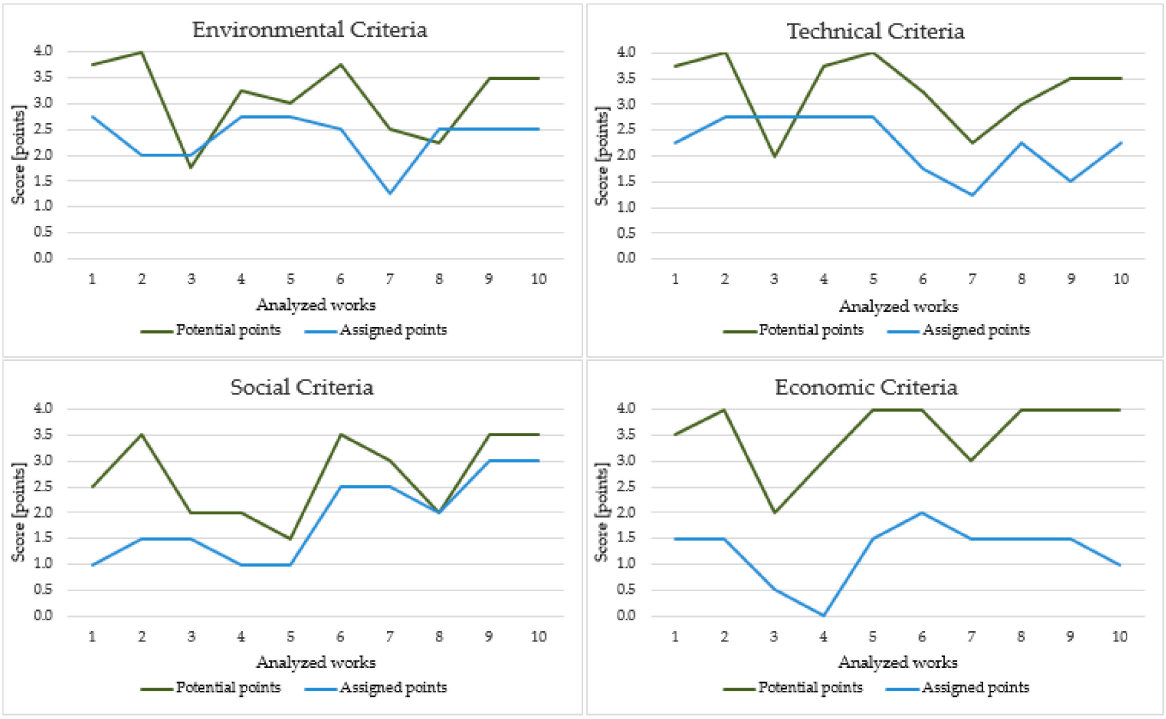

Figure 3. Potential and assigned points for each of the ten individual works evaluated for the four sustainable development criteria.

Finally, Figure 4 exposes the mean potential and assigned scores and the standard deviation for the four sustainable development criteria.

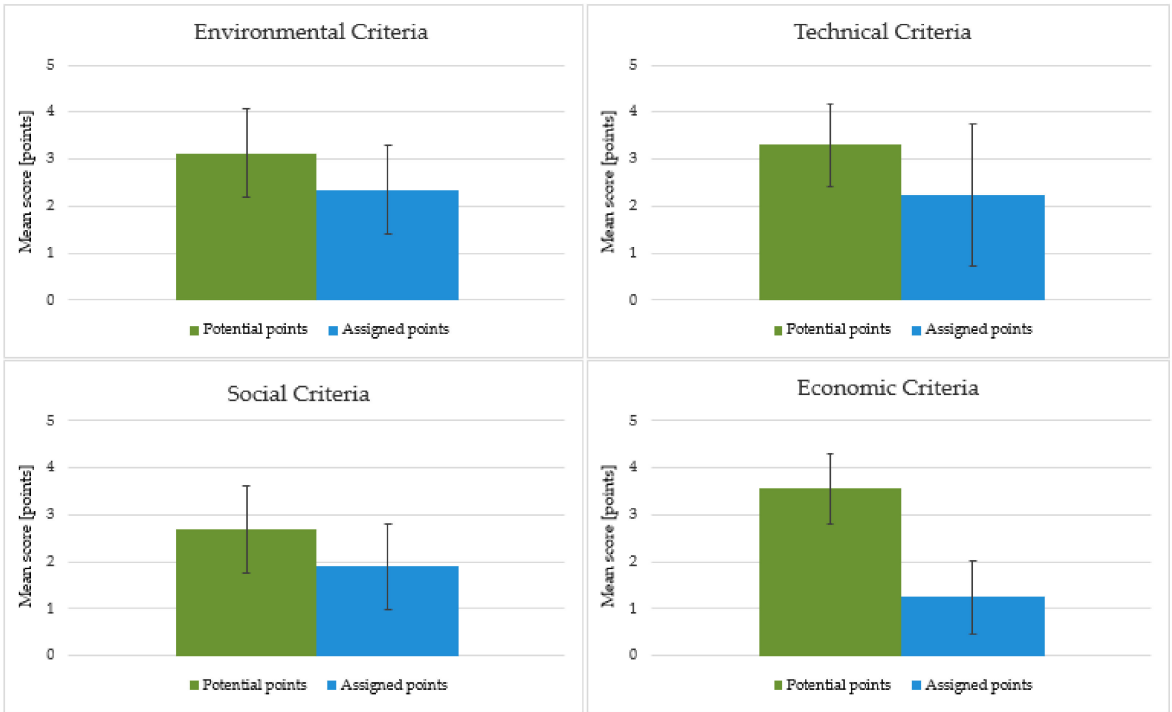

Figure 4. Mean score and standard deviation for the potential and assigned scores for the four sustainable development criteria.

4. Discussion

The individual case solving rubric developed for the students of the Master's of Thermal Engineering proposed during the subject Criteria of Sustainable Development and Life Cycle Analysis tries to inform and raise awareness among the students of the importance of sustainable development. In addition to the theoretical lessons taught in the classroom, it was proposed to carry out this work in order to fix and transfer to real life the theoretical concepts and promote the students' search for information on sustainable development autonomously.

In this way, it was pursued one of the targets of Sustainable d = Development Goal 4, related to ensuring inclusive and equitable quality education and promote lifelong learning opportunities for all: 'By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, thorough education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development' [11].

From analyzing the individual works, a common conclusion was found. The students generally do not consider or consider to a lower extent the economic criteria. The environmental dimension is considered to a great extent regardless the type of work selected. The technical and social dimensions depend on the type of work chosen. The social criteria have been much more considered by those students who focused their work on the analysis of a certain company (works 6 to 10), while the technical dimension was less recognized. The opposite occurs with respect to the consideration of these two criteria in the case of the works developed from a given title (works 1 to 5), in which the technical part was considered more, leaving aside the social criteria. Thus, the necessity of reinforcing and emphasizing the importance of all the criteria during the teaching of sustainable development is shown.

The results from applying the rubric show this tendency. In general terms, as it can be observed in Table 4, the assigned scores are lower than the possible potential scores. This fact indicates that the works should address the sustainable development criteria in greater depth. In fact, for the mean score, the potential points average was nearly twice the assigned average point value. This can be also observed in Figure 3, where each of the ten selected works were individually evaluated. Only according to some sub-criterion of the environmental and technical dimensions, the assigned points exceed the potential score in two of the works evaluated (analyzed works number 3 and 8). Computing the mean scores for each criteria, represented in Figure 4, the greater mean values of the potential scores can also be observed with respect to the assigned values.

The environmental sub-criteria were applied to a greater extent in the development of the works. This can be observed with the naked eye in Figure 4 since there is a small difference between the mean assigned and potential scores or individually for each of the analyzed works in Figure 3. In this dimension, the work expectations and the results are close. Table 4 shows that the sub-criterion of 'Prevents waste and gas emissions/global warming reduction' was implemented to a greater extent than the evaluation commission required for the project (p = 0.678). That is, the mean potential score in this case is lower than the mean assigned score. This result indicates that the works not only met the standards set by the tutors of the Master's students, but also surpassed them. Overall, the environmental criteria achieved a great fit between expectations and the final works; however, there are sub-criteria that, despite their importance, have not been included. This lack of inclusion is noted for the sub-criterion 'No incorporation of dangerous or toxic materials' ($p < 0.001$).

The technical sub-criterion was also applied to a large extent in the development of the works (Figures 3 and 4). That is, in the technical dimension, there is a good agreement between the work expectations and the final results. However, it was noted that this dimension was taken into account to a greater extent in those works developed from a given title compared to those that were based on the analysis of companies. Table 4 indicates that the sub-criterion 'Design for Energy Efficiency' was highly applied by the students in their works. On the other hand, the sub-criterion 'Incorporates life

cycle analysis' was not considered ($p < 0.001$). However, as it can be observed in Figure 4 although not at the same high level as for the environmental criterion, there is a generally good involvement of the technical dimension in the works regarding the expectations.

The social dimension was highly considered by the students in the case of works based on companies, whereas it was hardly taken into account in the rest of the works.

In contrast to the previous criteria, the economic dimension was considered to a much smaller extent despite its importance and its inclusion in the companies' reports. In fact, the corresponding sub-criteria were hardly considered in the works. As observed in Figure 3, none of the assigned scores of the ten works evaluated reached the potential scores. Thus, the mean potential score for this dimension is much higher than the mean assigned score (Figure 4).

5. Conclusions

The current study focuses on the implementation of sustainable development in higher education. In this way, an experience developed in the subject Criteria of Sustainable development and Life Cycle Analyses taught in the Master's of Thermal Engineering at the University of Vigo is presented.

In addition, a sustainable holistic rubric is presented and described. As conclusion after analyzing the individual works, it was found that the students generally do not consider or consider to a lesser extent the economic criteria opposite to the environmental, technical, and social dimensions. The environmental dimension was considered to a great extent regardless the type of work selected. In this way, the results showed very similar values between potential and actual scores, meeting the expectations.The technical and social dimensions depend on the type of work chosen. The social criteria have been much more considered by those students who focused their work on the analysis of a certain company, while the technical dimension was less recognized. The opposite occurs with respect to the consideration of these two criteria in the case of the works developed from a given title, in which the technical part was considered more, leaving aside the social criteria.

This should be considered an important finding in order to know how to focus learning on sustainable development in higher education, taking into account the dimensions that should be emphasized. In fact, one of the targets of Sustainable Development Goal 4 refers to ensuring that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, thorough education for sustainable development.

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Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Targets of Goal 7. Affordable and clean energy [11].

Order	Targets
1	By 2030, ensure universal access to affordable, reliable, and modern energy services
2	By 2030, increase substantially the share of renewable energy in the global energy mix
3	By 2030, double the global rate of improvement in energy efficiency
4	By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency, and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
5	By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular the least developed countries, small island developing states, and landlocked developing countries, in accordance with their respective programmes of support

Table A2. Targets of Goal 8. Decent work and economic growth [11].

Order	Targets
1	Sustain per capita economic growth in accordance with national circumstances and, in particular, at least seven percent gross domestic product growth per annum in the least developed countries
2	Achieve higher levels of economic productivity through diversification, technological upgrading, and innovation, including through a focus on high-value added and labour-intensive sectors
3	Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services
4	Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead
5	By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value
6	By 2020, substantially reduce the proportion of youth not in employment, education, or training
7	Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking, and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms
8	Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment
9	By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products
10	Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance, and financial services for all
11	Increase Aid for Trade support for developing countries, in particular least developed countries, including through the Enhanced Integrated Framework for Trade-Related Technical Assistance to Least Developed Countries
12	By 2020, develop and operationalize a global strategy for youth employment and implement the Global Jobs Pact of the International Labour Organization

Table A3. Targets of Goal 12. Responsible consumption and production [11].

Order	Targets
1	Implement the 10-year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries
2	By 2030, achieve the sustainable management and efficient use of natural resources
3	By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses
4	By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water, and soil in order to minimize their adverse impacts on human health and the environment
5	By 2030, substantially reduce waste generation through prevention, reduction, recycling, and reuse
6	Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainable development information into their reporting cycle
7	Promote public procurement practices that are sustainable, in accordance with national policies and priorities
8	By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature
9	Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production
10	Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products
11	Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation, and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities

Table A4. Targets of Goal 13. Climate action [11].

Order	Targets
1	Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
2	Integrate climate change measures into national policies, strategies, and planning
3	Improve education, awareness-raising, and human and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning
4	Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible
5	Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing states, including focusing on women, youth, and local and marginalized communities

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