

Article

Assessment of Social Responsibility in Education in Secondary Schools

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Abstract: The increase in the importance given to the social dimension of companies has led to an awareness in society of the right to require economic, social and environmental responsibility. Although several methodologies of corporate social responsibility (CSR) are being introduced in organizations, and in many others, it is already part of the corporate culture; however, it is a concept that is still being explored in the area of education, where there is no prior record of the application of a strategic assessment model in centers of learning. This study describes an innovative multicriteria model designed with the Measuring Attractiveness by a Categorical Based Evaluation Technique (MACBETH) approach to assess CSR in high schools. It is in high schools that students are old enough to internalize the different dimensions of CSR and to include it in their most personal values throughout their entire life. The model is constructed using judgements from three decision centers with a great deal of experience and an extensive professional history in the field of high school teaching. This model, built specifically for centers of learning, assigns a score to the various limits between levels of excellence, considered as actions to be determined to identify the level of centers of learning. The model can be used as a tool for the continuous improvement of CSR as it allows the strengths and weaknesses of each center in the area of educational sustainability to be recognized and action plans to be produced for those with the worst performance. Furthermore, the model can be used as a tool for benchmarking, that is, the comparison of CSR efficiency between high schools, and act as a way of attracting students. The model has been applied in three state high schools of very different types.

Keywords: corporate social responsibility; MACBETH; high schools

1. Introduction

Educational bodies have their own social responsibility, as they aim to introduce the principles of corporate (or business) social responsibility (CSR) to new generations, but it can be done more effectively and more willingly if the principles of CSR are included in its goals, in the same way as is proposed in the business world. One prioritized aim is the introduction of CSR into the area of education, i.e., life-long learning to acquire values, knowledge and skills that will help people to find new solutions to social, economic and environmental problems affecting the global long-term goal of the United Nations, and means defending a development model that can combine economic dynamism, progress and social justice, equity and a high degree of environmental protection [1].

Given the different problems that currently exist in education (which may be broadened to include other sectors), e.g., failure and dropping out, a lack of recognition of teaching professionals, a lack of agreement in financing and education law, school violence, increases in psychological change in children, increases in depression among adults, economic instability in the country, etc., it is increasingly important to be socially responsible in the broadest sense, and to develop appropriate

forms of institutional communication in centers that carry out best practice (but that need to know how to transmit and encourage ethical values) in order to serve as an attractive and influential reference [2]. Teaching and learning the concept of CSR in high schools can anchor the idea in the minds of students and express it through all the actions taken in their adult lives, contributing to the partial or complete solution of problems caused by a lack of social responsibility in society.

Thus arose educational social responsibility (EdSR) as the voluntary decision of an educational organization that, as a natural space of social possibility, favors the attention of its members to others [3]. On the other hand, Pujadas [4] considers EdSR to be a vision of the activity of an educational entity integrating respect for ethical values, people, the community and the environment in the context of its daily working (education) and in strategic decision making (management). As described by Martínez [5], it is not a sociological option requiring the transformation of the structure of these educational entities, but an existential option, requiring change to the conduct of the individual. It should be considered in the individual daily space of the educational field, and not solely in relation to social action or behavior.

The literature review carried out found some contributions related to CSR in universities, however, CSR in all its different forms has not been considered in high schools even though it is there that the students are the right age to internalize these forms and include them their most personal values. When students are at university, their personality is generally already defined. Therefore, it is in high schools that students can learn the different notions of CSR and put them into private and working practice throughout their lives because the values and beliefs can be more easily internalized. Furthermore, unlike university education, which is voluntary, compulsory education is undertaken by everybody, and thus, teaching the values of CSR in high schools would reach the whole of society.

Although several methodologies of CSR are being introduced in organizations, and in many others, it is already part of the corporate culture; however, it is a concept that is still being explored in the area of education, where there is no prior record of the application of a strategic assessment model in centers of learning. This research is, therefore, intended to analyze the essential areas of CSR that could be applied to educational centers to establish what is known as educational social responsibility so as to give weight to the main purpose of CSR in education; that is, acquiring some principles, values on which the concept of sustainability is based, knowledge and skills which give the possibility of assisting people in overcoming the social, economic and environmental hurdles that affect them, creating a better framework for shared existence. This was done by designing an innovative model via the Measuring Attractiveness by a Categorical Based Evaluation Technique (MACBETH) approach to assess EdSR in secondary education centers (high schools). This model is designed with the aim of being a tool for the continuous improvement of CSR, since the results provided by the model help to identify those aspects of CSR in which it is poorly rated, and to develop action plans for them. After a certain time, the high school can be re-assessed to analyze the performance of the improvement plans undertaken. In addition, although the model does not mainly aim for use as a tool for benchmarking, that is, to compare performance in CSR between high schools, it could be used for this purpose, and high schools with good results in the model might use it as a means of attracting students, especially in private centers, but also in state schools, especially if they offer vocational training courses.

The model will be applied in three widely differing high schools.

Novel contributions of this study are as follows:

1. Building an EdSR assessment model via the MACBETH approach.
2. Characterizing those factors which may contribute to EdSR, and defining them via indicators, so that the assessments will be objective and unambiguous.
3. Providing a tool to assess continuous improvement in CSR, as the results given by the model assist in identifying those features of CSR which have poor performance and in developing action plans for them.

4. Validating the new model through three real case studies. This involved applying the model to three state high schools.

The choice of the MACBETH approach, rather than other multicriteria decision methods, is due to the fact that it only uses qualitative judgments about the difference in performance between two elements at a time, in order to generate numerical scores for the alternatives in each criterion and to weight the criteria. It also offers the possibility of including different levels of precision in the judgements given, permitting the inclusion of uncertainty, which always exists in real decision processes, as do hesitation or disagreement between the members of the group, which can also be reflected; it has a user-friendly software called M-MACBETH which simplifies the building of models and the application of the entire multicriteria evaluation process. It requires the results generated by the judgements of the decision maker to be validated, which guarantees greater accuracy in the final results. The MACBETH approach has a complete methodology, which aids the analyst at each stage of application, thus ensuring consistency [6]. MACBETH is a very effective methodology for modeling the ideas of a group of experts exactly [7], as in the case studied here.

This article is organised as follows. Firstly, there is a review of the literature on educational social responsibility. Next is a description of the MACBETH approach. Section four sets out the multicriteria model following the MACBETH approach for assessment of educational social responsibility; this is done by describing the criteria and subcriteria, value functions and criteria weightings, following the methodology in a logical order of application. Then, three case studies are presented, with a prior description of each center, followed by the results obtained by the model for each of them and then followed by the sensitivity analysis. Finally, the discussion and conclusions, acknowledgements and references are presented.

2. Literature Review

CSR has been studied since before World War II [8] and has been the cause of great controversy in business culture [9]. There are a number of theories and definitions of CSR, which shows a great lack of consensus [10,11]. The positions of authors, such as Bowen [12], who defends the union social and economic value and the benefits they bring, and, on the other hand, Friedman [13], who considers that the sole aim of a business is to maximize its value to its shareholders, opened up a wide debate as to whether CSR policies should or should not be introduced into companies (Escamilla et al., 2016) [14]. This was when Freeman [15] set out the theory of interested groups or stakeholders, understood as any individual or group that can affect or be affected by the aims of the business. This idea of the influence of the business broadens what is relevant to social responsibility, since it is no longer limited to the shareholders themselves, but includes customers and suppliers, banks and trade unions, directors and employees, authorities, competitors, the local community, interest groups, etc. [2].

In 1999, at the World Economic Forum at Davos, a global compact was proposed between the United Nations (UN) and the business world, and in 2000 the operational stage of this agreement was started in New York. The modern concept of CSR was thus always aimed at “voluntary integration of by the company, in both its management structure and style, of social, environmental and economic concerns, and of respect for human rights stemming from the relations of the company with directly interested groups and any person affected by its economic activity” [16]. Since the global compact, work has been done to make companies, administrative bodies and organizations put into practice the fundamental values of human rights, employment and environmental standards and anti-corruption [5]. These fundamental values agreed by the UN are addressed to organizations in the form of ten principles related to human rights, employment and environmental standards and anti-corruption [17]. According to the UN, education is essential to achieving the 17 Sustainable Development Goals established for 2030 [18], and it also encourages educational institutions to implement sustainability in their programs, leading to the future production of globally responsible leaders [19].

CSR includes matters ranging from social action to the ethics of management, employment policy, transparency, relations with suppliers and sustainable development. Although there is no

single definition of CSR, there is broad agreement in understanding its scope in three areas: employment, economy and environment, and in stating that it goes beyond the altruistic [20]. CSR includes meeting current national law, and especially international standards (International Labor Organization (ILO), Universal Declaration of Human Rights, United Nations Standards on responsibilities of transnational companies and other commercial entities in the area of human rights, the Organisation for Economic Co-operation and Development (OECD) guidelines for multinational companies) [21]. According to these principles, an organization is socially responsible if it satisfies the full breadth of these ideas [3]. If it merely fulfils its legal requirements, without going any further, such as voluntarily following new demands, showing greater respect for the environment, better relations with interlocutors, greater investment in human capital, etc., it cannot be said to be socially responsible [22].

However, although there are ever more companies that design their aims through CSR, scarcely any educational organizations take it into account. This can also be seen in the literature review carried out on different databases such as Emerald, MDPI, Hindawi, Proquest, Science Direct and Scopus, using the terms “educational social responsibility” and “corporate social responsibility high school”. A few precedents have been found, aimed at the need to promote CSR in universities by providing academic services based on social diagnostics, leading to quality teaching in all areas and developing research projects, which includes forming associations with social links, developing fully inclusive policies, improving the skills of the teaching staff and giving society highly qualified and competitive professionals [23]. Likewise, Galvão et al. [24] analyzed the factors that influence the attitudes of students of higher education towards CSR through such things as personal values, gender, religion, political ideology, academic field and voluntary work; a similar study, focused on gender, is the work of Haski-Leventhal et al. [25]. Meanwhile, da Silva et al. [26] gathered the opinions of undergraduate students in management about the concepts of and corporate social responsibility. It is appreciated that for students’ notion of corporate social responsibility, the most important dimensions are the philanthropic, ethical, legal and economic. The research of Asrar-ul-Haq et al. [27] is similar but seen from the perspective of the faculty and staff of the social sciences departments of Pakistani universities. Leal et al. [28] analyzed attitudes and practices related to the integration of social responsibility and sustainability initiatives at higher education institutions. Santos et al. [29] assessed the impact of universities’ social responsibility strategies on service quality and students’ satisfaction with higher education and Medina et al. (2020) [30] assessed the educational environment in clinical practice during medical residency via a questionnaire; a similar system of assessment was used by Berniak-Woźny [31] to quantify CSR and responsible management education in non-public Polish business schools from the perspective of the students. However, according to Leal et al. [28], it is not clear that social responsibility and sustainable development are integrated into the practice of universities and, although some authors [32–34] recognize that achieving this would reduce negative environmental consequences, improve social impact and produce better governance and financial performance and better results in terms of quality, its introduction is complex due to lack of resources, wrong understandings or lack of leadership. Sánchez et al. [35] analyzed the top 200 universities according to the Shanghai Ranking and concludes that the leadership team, the size of the board of governors, committees on the board and stakeholder participation are factors determining the disclosure of information in matters of corporate social responsibility. Rehman et al. [36] assessed to what extent the MBA programs offered by top-200 European and Asian B-schools include corporate social responsibility and sustainability orientation, as per their websites, showing that European B-schools are more favorable to these concepts.

In an environment distinct from university education, Uduji et al. [37] assessed the impact that actions for corporate social responsibility of multinational oil companies are having on female education programs in the Niger Delta region of Nigeria; the results show that CSR interventions are not aimed at giving economic opportunities to women alongside education, perpetuating restrictions on women’s participation in economic, political and social development.

To sum up, as Santos et al. [29] say, a review of the relevant literature revealed little research on the application of corporate social responsibility in educational contexts, and it focuses primarily on

higher or university education. Furthermore, academic interest in studying CSR in educational establishments is very recent, and has increased since 2015, as is happening in other sectors (see [38]), and no objective model or decision support system has been found that assesses the level of CSR in learning centers of any kind.

3. The MACBETH Approach

The MACBETH approach [39] is a complete multicriteria methodology which uses judgements about the difference in attractiveness between two elements at a time in order to generate numerical scores for the options in each criterion and to weight the criteria. MACBETH has been used to solve many real-world problems, for example, in the area of finance [40], human resource management [41], in health and medicine [42,43], technology selection [44], environment and sustainable development [7,45–48], maintenance [49,50], the military [51], policy [52], tourism [53] and in education [54–56].

MACBETH uses pairwise comparisons, which give more accurate information about the preferences of the decision makers. It is also for a decision maker or group to understand and use. However, unlike other multicriteria methods, it uses two references in the decision process, which allow for more consistent comparisons, giving more objective and reliable results. It also requires the use of a non-numerical questioning procedure to attribute numerical scores, avoiding the errors typical of methods that use pairwise comparisons [57]. Therefore, MACBETH assesses the alternatives using only qualitative judgements, which remove the difficulties associated with ordinal aggregation methods (see Condorcet's paradox or Arrow's theorem) [58].

The MACBETH approach has a user-friendly software called M-MACBETH to build models; a demo version can be found at <http://m-macbeth.com/> [59].

A step-by-step description of the MACBETH approach is provided here:

- Define the problem. The decision context of the problem must be characterized, including the assumptions, aim, boundaries of the analysis and the perspective under which the decisions are taken. It might be necessary to include the perspective of different scenarios, key players or stakeholder groups, experts, users, etc., in the decision process. A further key is the choice of the type of model to be built, as there are many multicriteria analysis methods available for this purpose, and the most suitable should be chosen in each case [60]. Select criteria or areas of concern and subcriteria or fundamental points of view (FPV).
- The decision maker or decision group should determine the key aspects in which each possible solution of the problem will be evaluated. This will be done by structuring the problem into areas of concern which will bring together the different subcriteria or FPV by which the alternatives will be assessed. The FPVs must be coherent with the decision, represented on the same scale, measurable, independent of each other and not unrelated to the alternatives.
- Construct the value tree. A value tree must be built to structure the problem. The goal is placed at the higher level, followed by the criteria or areas of concern, attributes or FPVs, with the alternatives at the lowest level of the hierarchy.
- Define descriptors. A descriptor should be defined for each subcriterion. A descriptor is an ordered set of plausible impact levels [61]. Within these levels, a neutral reference level (N), for a level considered by the decision maker to be neither satisfactory nor unsatisfactory, and a good reference level (G), considered by the decision maker to be undoubtedly satisfying, must be defined [62]. This makes it easier to assign a value of the subcriterion to each alternative precisely and unambiguously. The descriptors can measure, quantitatively, qualitatively or as a mix of the two, the degree of performance of an alternative with respect to each subcriterion.
- Build value functions. The decision maker, aided by the facilitator, should order the scale levels of each descriptor from greater to lesser attractiveness. The decision maker or decision group should then verbally judge the difference in attractiveness between pairs of elements of each descriptor using one or a range of the semantic categories shown in Table 1 [61].

Table 1. Measuring Attractiveness by a Categorical Based Evaluation Technique (MACBETH) semantic scale.

Semantic Scale	Equivalent Numerical Scale	Significance
Null	0	No difference in attractiveness between the elements compared
Very Weak	1	Very weak difference in attractiveness of one element over another
Weak	2	Weak difference in attractiveness of one element over another
Moderate	3	Moderate difference in attractiveness of one element over another
Strong	4	One element is strongly attractive over another
Very Strong	5	Very strong difference in attractiveness of one element over another
Extreme	6	One element is extremely attractive over another

These semantic categories are used to fill out the MACBETH pairwise matrix. The MACBETH question procedure set out in Bana e Costa and Chagas [61] should be applied, starting with the comparison of the most attractive level with the least attractive, followed by the second most attractive with the least attractive and so on. Then the most attractive level is compared with the other options in decreasing order of attractiveness; the next step consists of filling out the diagonal border of the upper triangular portion of the matrix and finally filling out the remaining judgements on the upper diagonal.

Linear programming is used to transform ordinal scales into cardinal scales or value functions with neutral and good reference levels anchored with scores of zero and 100. However, the optimal solution from linear programming need not be unique, and so the basic MACBETH scale is mathematically guaranteed to be unique by using additional linear programming techniques (see [63]).

As there is uncertainty in real-world decision processes, MACBETH allows choices from a range of two or more consecutive semantic categories when making pairwise comparisons; additionally, the positive category (P) can be used when the information available for comparing elements is limited. This utility of MACBETH allows uncertainty to be included in the decision process without the need to use fuzzy logic techniques, which are computationally very complex.

The MACBETH judgement matrix should be consistent; otherwise, the individual or group decision maker should make changes to the judgements given to ensure their consistency [61]. The M-MACBETH software does this by assessing the consistency of the pairwise judgement matrix each time a new judgement is added and offers possible changes in the judgements to guarantee consistency.

For a set of judgements to be consistent according to the MACBETH approach, the scores obtained from them for the options should satisfy the following [64]:

- Equally attractive options receive the same score.
 - An option that is more attractive than another receives a higher score.
 - If the difference in attractiveness between two options is greater than the difference in attractiveness between another two options, the options will have scores such that the difference between the scores of the first two is greater than the difference between the scores of the other two.
- Criteria weighting. A new alternative should be created that includes all the criteria at the neutral level. The decision group should identify the MACBETH semantic categories which quantify the increase in overall attractiveness with a change from the neutral to the good level in each of the criteria. M-MACBETH orders the criteria in this way from greatest to least attractiveness. Next, there should be a comparison between the most attractive level and the second most attractive, and the most attractive with the third most attractive and so on. The process of giving judgements is repeated line by line until the matrix is complete [61].

- Select the alternatives. The possible solutions to the problem under study should be defined; these should have the following characteristics: availability, comparability, real rather than ideal, practical and feasible.
- Obtain the valuation of the alternatives in each criterion. Each alternative should be assigned one of the scale values defined by the descriptor.
- Obtain the overall values of the alternatives. MACBETH calculates the overall value score $V(A)$ of each alternative A through the simple additive value method of Equation (1) [65].

$$V(A) = \sum_{j=1}^n w_j v_j(A), \quad \text{with} \quad \begin{cases} v_j(\text{good}_j) = 100 \\ v_j(\text{neutral}_j) = 0 \end{cases}, \quad w_j > 0 \quad \text{and} \quad \sum_{j=1}^n w_j = 1 \quad (1)$$

where w_j is the weight of the criterion and $v_j(A)$ is the value score of A in criterion j .

- Sensitivity and robustness analysis. The sensitivity analysis analyzes how the logical variation of given parameters of the model, such as the weightings of the criteria and subcriteria, affects the final results. Additionally, a robustness analysis can be carried out, looking at different levels of information available, inaccuracies and uncertainties [66]. M-MACBETH has graphic tools for sensitivity and robustness analysis.

4. Multicriteria Model for the Assessment of Educational Social Responsibility

The multicriteria model is designed to assess educational social responsibility, including the process of structuring, weighting and defining alternatives.

4.1. Structuring

Building the model in MACBETH involved the participation of a decision group comprising three experts with an extensive professional history in high school teaching. In a prior analysis, the decision center analyzed the literature on the subject, especially with regard to the education, rules and standards of SR (ISO 26000, GRI, SA8000, etc.), the legal framework of CSR for the Autonomous Community of Castilla-La Mancha (Law 6/2013, dated 07/02/2013) and the Community of Navarre (Law 175E/2017, dated 2nd March 2017), which are communities whose schools were assessed in this study and by the application of the Observatory of Social Responsibility of Extremadura (ORSE) [21] from the Office of Social Responsibility of the Government of the Community of Extremadura [17], which is a self-assessment application that brings together the most important standards of SR (EFR, SGE21, IQNet SR10, GRI, Principles of the UN Global Compact, SA8000 and AA1000).

By consensus, the group considered the criteria set out below, each made up of a series of subcriteria:

- Ethics and values of the center (EAVC). This shows the ethical behaviors and transparent and responsible practices in all the activities of the center. This criterion is made up of the following subcriteria:
 - The existence of socially responsible values (ESRV) in the center. The values of the center serve as its identity, define its culture and reinforce its mission and vision within the legal framework.
 - Ethical and behavioral code (EABC). The ethical, or behavioral, code sets out the values, principles and standards of behavior of the people in the center, as well as its relations with stakeholders.
 - The intent of governors in adapting the center (IGAC) to the values of CSR. The governors define and drive responsible values in line with the educational strategy of the center, so that everyone is involved in putting the initiatives and socially responsible plans into practice.
 - The existence of mechanisms for avoiding corruption (EMAC). Centers should avoid corruptive behaviors, verify their absence and put in place specific, precise actions to address them.

- The use of social media to improve services (USMI). Social media represent an economic, easily accessible and highly effective medium for communication by the center and they also allow the public to interact.
 - The existence of annual programs of social responsibility (EAPS). CSR programs measure the economic, environmental and social impact of the center.
 - Innovation in technologies that are responsible and committed to efficiency and the prevention of pollution (ITRC). This subcriterion improves the quality of the teaching service with sustainable innovation and respect for the environment and improvements in transparency.
- Human resources and working relations (HRWR). This shows the level at which all the staff belong to the center, to increase their loyalty and commitment to the center and to create a good work environment. This criterion is made up of the following subcriteria:
 - Setting up systems to identify effects on working relations (SSIE). The center should promote the appropriate conditions for producing a good working environment, with the aim of preventing workplace and classroom bullying and social exclusion.
 - The existence of measures to balance working and personal life (EMBW). Balancing working and private life is a concept involving the harmonisation of personal, working, family and community time.
 - The existence of dialogue channels with the staff (EDCS). Via these dialogue channels, and the communication tools, the center learns the most important concerns of the staff, allowing their expectations to be managed.
 - The level of absenteeism (LEAB). Promoting healthy living habits and planning the working schedule of classroom hours and other working time to reduce stress and increase motivation are key to reducing the sick leave of teachers and students.
 - The reduction of accidents (REAC). A socially responsible center has educational projects that, beyond obeying the law, prevent accidents proactively.
 - Environment (ENVI). This shows the degree of optimization of the center's resources to promote respect for the environment and surroundings. This criterion is made up of the following subcriteria:
 - Training in good recycling practice for staff and students (TGRP). This refers to teachings and learnings aimed at sensitizing workers and students to deal properly with waste derived from their activities.
 - Energy consumption (ENCO). This shows the energy used in carrying out the activity of the center, whether the source is renewable or not.
 - Water consumption (WACO). This shows the demand involved in carrying out the activity of the center independently of where it comes from.
 - Paper consumption (PACO). The reduction in paper consumption implies an economic saving both in both removal and destruction, including use of ink and electricity.
 - The existence of means for recycling and separating waste (EMRS). Recycling avoids the inappropriate use of natural resources. In order for these policies to be effective, the center must have the means, both internal and external, to guarantee effectiveness.
 - Establishing systems for environmental analysis, management and assessment (ESEA). The environmental management of the center is the set of procedures, records, aims and indicators that lead to continuous improvement in the area of the environment, optimizing the use of energy and resources, as well as reducing its impact on society.
 - Environmental image of the center on social media (EICS). The center's social media presence gives confidence and allows interaction to build up a good educational reputation in the area of the environment.

- Social relations of the center (SRCE). This shows the acceptance of SR culture by the education community and other stakeholders. This criterion is made up of the following subcriteria:
 - Measures for the respect and tolerance of local customs, traditions and languages which represent the cultural identity of the area (MRTL). The integration of certain local circumstances, customs or cultures in certain sections of education strategy leads to a greater acceptance locally and a better working environment.
 - Coordination and collaboration with other teaching centers and with surrounding services and entities (CCTC). Mutual cooperation with other institutions may favor the supply of educational services provided by the center.
 - Responsible management practices for human resources, related to marginalized groups (RMPH). This consists of promoting social inclusion and, within its ambit, social cohesion.
 - Encouraging enterprise (ENEN). Enterprise culture is central to the creation of businesses and jobs, driving economic activity, the creation of added value to society and a guarantee of the continuation of public services.
 - The encouragement of volunteering (ENVO). The purpose is to encourage active solidarity and commitment among the workers and students with the educational community and society.
 - The satisfaction of stakeholders (SAST). The attention of certain requirements and the meeting of certain expectations, within the educational and legal framework, is an important part of education management.
- Responsible data handling and communication (RDHC). This shows the extent to which SR culture is communicated effectively and responsibly to the whole school community and the other stakeholders. This criterion comprises the following subcriteria:
 - The principles and practice of responsible advertising (PPRA). This measures the responsibility and sensitivity of the center in the information it gives out, and ensures it does not become involved in any practice that could be considered deceitful, misleading, fraudulent or unjust, including the omission of information or its deliberate misrepresentation.
 - Information about publicly subsidized activities or programs (IPSA). Intended to promote transparency, the center provides access to information about subsidized activities and the schedules and nature of these projects.
 - The production and distribution of sustainability records (PDSR). Producing sustainability records is good practice with notable effects: internally, it summarizes the management of the center from the environmental, economic and social perspective, and externally it provides information to stakeholders in order to increase transparency, confidence and commitment to sustainable development.
 - Dialogue with stakeholders and interested parties (DSIP). This refers to the specific communication system with each interested party.
 - Information about services offered to stakeholders (ISOS). The center should provide stakeholders with accessible information about the services offered, enabling them to take valid decisions which are, as far as possible, clear and free from errors.

The value tree of the model can be seen in Appendix A (see Figure A1).

MACBETH must have a descriptor associated with each subcriterion to make an operational description. A scale is defined, made up of a number of qualitative levels for each descriptor. Within these levels two reference levels are defined, neutral (N) and good (G). As examples, Tables 2–4 show the qualitative and discrete constructed descriptors associated with the subcriteria of the criteria of ethics and values of the center, environment and social relations of the center, respectively. The performance levels are ordered in decreasing order of attractiveness. It shows that in general, the

subcriteria have five scale levels (Lev1 to Lev5), and that several interrelated aspects of each criterion are combined together.

M-MACBETH, by linear programming on the judgements given by the decision group, builds a value function, such that value scores are assigned to the performance levels of a descriptor relative to the fixed scores of zero and 100 given to the reference levels neutral and good, respectively [65]. In order to give judgements, the decision group chose between the MACBETH semantic categories of the difference in attractiveness (no, very weak, weak, moderate, strong, very strong and extreme); in case of uncertainty or a lack of consensus, they chose a range of two or more of the above semantic categories (for example (see Figure A2 in Appendix A) weak–moderate when comparing Level 1 with Level 2 in the subcriterion of training in good recycling practice for staff and students). Whenever the decision group gives a qualitative judgement, the consistency of all the previously issued judgements is automatically checked by M-MACBETH software [61].

In the meetings held by the three decision groups with wide experience in schools, and specifically in high schools, they agreed by consensus the judgement matrices for the construction of value functions associated with each subcriterion. As an example, Figure A2 shows the MACBETH judgement matrices for the subcriteria within the criterion of environment. Similar matrices have been produced by the consensus of the decision group for the other subcriteria. There is no inconsistency in any of the matrices created.

The value functions obtained by linear programming in M-MACBETH from the judgements in Figure A2 are shown in Figure A3 (in Appendix A). All the subcriteria of the model use qualitative scale levels of the descriptor. Thus, the value function is a numerical scale that associates the neutral reference level of the descriptor to the value zero, and the good reference level to the value 100. For example, it can be seen in Figure A3 that the value function of the subcriterion of training in good recycling practice for staff and students, the performance level Lev2, which is assigned the good reference level and is given the value 100, whereas at the scale level Lev3, which is assigned the neutral reference level, it is given the value zero. The resulting numerical scales are therefore linear and continuous. Value functions were obtained in a similar way.

Subsequently, all the value functions obtained were checked by the decision group to ensure they properly represent the relative magnitude of the decision makers' judgements [61].

Table 2. Indicators and scale levels of the subcriteria of the criterion of ethics and values of the center.

Subcriteria	Impact Level	Description of the Impact Level
The existence of socially responsible values in the center (ESRV)	Lev1	The center has defined the values and these are aligned with the mission and vision and combine principles of responsibility and sustainability. Different levels of staff, students and families have participated in the definition, which has facilitated the introduction of the school staff into the actions. The values have been communicated to the stakeholders (G).
	Lev2	The center has defined the values and these are aligned with the mission and vision and combine principles of responsibility and sustainability. The values are formally documented and have been communicated to the stakeholders (N).
	Lev3	The center has defined the values and these are aligned with the mission and vision and combine principles of responsibility and sustainability. Furthermore, they are formally documented, but are poorly disseminated and integrated into the actions of the school staff.
	Lev4	The center has defined the values, but none of them is focused on responsibility and sustainability.
	Lev5	The center has not defined its values.
	Lev1	The center has a code of ethics or conduct documented and approved by management. This code refers to all the following elements: compliance

Ethical and behavioral code (EABC)		with legislation, work ethics, principles of personnel action, good practices in the development of work, image of the school, conflict of interest, transparency and respect for the environment, as well as rules of action with families and students, among others. This code is communicated to the stakeholders (G).
	Lev2	The center has a code of ethics or conduct documented and approved by management. This code refers to most of the following elements: compliance with legislation, work ethics, principles of staff performance, good working practice, image of the school, conflict of interests, transparency and respect for the environment. This code is communicated to the stakeholders.
	Lev3	The center has a code of ethics or conduct documented and approved by management. This code refers to some of the following factors: compliance with legislation, work ethics, principles of staff performance, good practices in the development of work, image of the school, conflict of interest, transparency and respect for the environment.
	Lev4	The center has a documented code of ethics or conduct approved by management (N).
	Lev5	The center has no code of ethics of conduct documented.
The intent of governors in adapting the school to the values of CSR (IGAC)	Lev1	The management of the center is involved and participates in the preparation, implementation and dissemination of protocols and / or manuals of managerial conduct that include respect for personal and family life, equal opportunities and the prevention of harassment and discrimination. Management includes these issues in the school's management strategy and operations.
	Lev2	The center's management is involved and participates in the preparation, implementation and dissemination of protocols and/or manuals of managerial conduct that include respect for personal and family life, equal opportunities and the prevention of harassment and discrimination (G).
	Lev3	The center's management is involved and participates in the preparation of protocols and/or management conduct manuals that include respect for personal and family life, equal opportunities and the prevention of harassment and discrimination (N).
	Lev4	The center's management participates from time to time in the preparation of a protocols and/or management conduct manuals that include respect for personal and family life, equal opportunities and the prevention of harassment and discrimination.
	Lev5	The center's management is not involved or does not participate in the preparation of protocols and/or manuals of managerial conduct.
The existence of mechanisms for avoiding corruption (EMAC)	Lev1	The center has created a set of standards, or guidelines, which reduce the possibility that corruption may occur. These standards are known to the management, and there are mechanisms to verify compliance with them at least annually. The school shares the results among its main stakeholders.
	Lev2	The center has produced a set of standards, or guidelines, that reduce the possibility of corruption. These standards are known to the management and there are mechanisms to verify compliance with them at least annually.
	Lev3	The center has produced a set of standards, or guidelines, that reduce the possibility of corruption occurring. These standards are known to the

		management (G).
	Lev4	The center has produced a set of standards, or guidelines, that reduce the possibility of corruption occurring (N).
	Lev5	The center does not understand corruption as something to be concerned about.
The use of social media to improve services (USMI)	Lev1	The center has included its profile on a social network in order to communicate with its internal and external public, based on the known needs and expectations of stakeholders. Thanks to the communication that the school carries out through social networks, adaptations and improvements have been made in its educational services/capabilities to satisfy the demands made by its stakeholders. There is a style manual that includes criteria for ethical communication, in which there is a communication that avoids misunderstandings, the loss of competence and discrimination based on sex, religion or other social conditions.
	Lev2	The center has included its profile on a social network in order to communicate with its internal and external public, based on the known the needs and expectations of stakeholders. Thanks to the communication that the school carries out through social networks, adaptations and improvements have been made in its educational services/capabilities to satisfy the demands made by its stakeholders (G).
	Lev3	The center has included its profile on a social network in order to communicate with its internal and external public, based on the known needs and expectations of stakeholders (N).
	Lev4	The center has occasionally participated in some social networks, with the sole purpose of seeking a promotion of its image.
	Lev5	The center does not participate in any social media.
The existence of annual programs of social responsibility (EAPS)	Lev1	The center has a program that it designs, implements and executes to achieve the aims and goals of CSR. This program includes the allocation of responsibilities, means and deadlines and a periodic review to ensure that it remains consistent and pertinent to the objectives and goals of social responsibility and is accessible to everyone at the school. In addition, it has designed a monitoring, measurement and evaluation process that includes CSR objectives, records and evidence, communication and awareness activities, results and worker satisfaction.
	Lev2	The center has a program that it designs, implements and executes to achieve the objectives and goals of CSR. This program includes the allocation of responsibilities, the means and deadlines and a periodic review to ensure that it remains consistent and pertinent to the objectives and goals of social responsibility, which is accessible to everyone at the school.
	Lev3	The center has a program that it designs, implements and executes to achieve the objectives and goals of CSR, which is accessible to everyone at the school (G).
	Lev4	The center designs, implements and executes CSR actions in isolation without planning.
	Lev5	The center has no documented CSR program (N).
Innovation in technologies that are responsible and committed to	Lev1	The center has established a continuous commitment to research, development and innovation (R + D + i), for the use of new technologies that favor the improvement of efficiency and pollution prevention, in the design of the teaching service. At the end of the year, it analyzes the results and identifies areas for improvement.

efficiency and the prevention of pollution (ITRC)	Lev2	The center has established a continuous commitment to research, development and innovation (R + D + i), for the use of new technologies that favor the improvement of efficiency and pollution prevention, in the design of the teaching service (G).
	Lev3	The center has established a commitment, which must be renewed with each change of management, with research, development and innovation (R + D + i), for the use of new technologies that favor the prevention of pollution, in the design of the teaching service.
	Lev4	The center occasionally promotes research, development and innovation (R + D + i), using some specific new technology that reduces pollution, in the design of the teaching service (N).
	Lev5	The center does not promote research, development and innovation (R + D + i), through the use of new technologies that favor the improvement of efficiency and pollution prevention, in the design of the teaching service.

Table 3. Indicators and scale levels of the subcriteria of the criterion of environment.

Subcriteria	Impact Level	Description of the Impact Level
Training in good recycling practice for staff and students (TGRP)	Lev1	The center trains its workers and students in good practice in recycling. This training is systematic and includes specific recycling policies, which can even be used in private life. The governors of the center take part in the training activity, and the data derived from the campaigns are made known to stakeholders (G).
	Lev2	The center trains its staff and students in good practice in recycling. This training is systematic and includes specific recycling policies, which can even be used in private life.
	Lev3	The center trains its staff and students in good practice in recycling. This training is systematic and includes specific recycling policies (N).
	Lev4	The center informs about good practice from time to time, with no record of the effect the practice has on its competitiveness by using resources more efficiently.
	Lev5	The center does not give training in good practice in recycling.
Energy consumption (ENCO)	Lev1	Energy consumption and bills vary proportionally, the center has documented policies to lower energy consumption, has trained its staff and students to introduce good practice and has alternative energy sources and/or a hybrid system.
	Lev2	Energy consumption and bills vary proportionally, the center has documented policies to lower energy consumption and has trained its staff and students to introduce good practice (G).
	Lev3	Energy consumption and bills vary proportionally, although the center has not introduced measures to optimize energy consumption (N).
	Lev4	Energy consumption is recorded with respect to the bills and there are increases in consumption when billing is lower.
	Lev5	Energy consumption is not recorded with respect to the center's bills.
	Lev1	Water consumption and bills vary proportionally, the center

Water consumption (WACO)		has documented policies to lower consumption, has trained its staff and students to introduce good practice and has internal recycling.
	Lev2	Water consumption and bills vary proportionally, the center has documented policies to lower water consumption and has trained its staff and students to introduce good practice. (G).
	Lev3	Water consumption and bills vary proportionally, although the center has no documented policies to lower water consumption (N).
	Lev4	Water consumption is recorded with respect to the bills and there are increases in consumption when billing is lower.
	Lev5	Water consumption is not recorded with respect to the center's bills.
Paper consumption (PACO)	Lev1	There are documented policies for optimizing consumption, with systems for removal and destruction and goals for consumption and the training of all staff and students in good practice in paper consumption. There is a system of reuse with positive results. The center has introduced digital signing in document management and has replaced most of its physical documents with digital ones (G).
	Lev2	There are documented policies for optimizing consumption, with systems for removal and destruction and goals for consumption and the training of all staff and students in good practice in paper consumption. There is a system of reuse with positive results. The center has introduced digital signing in document management.
	Lev3	There are documented policies for optimizing consumption, with systems for removal and destruction and goals for consumption. There are regular initiatives for the reuse of paper (N).
	Lev4	There are no policies for optimizing consumption, although there is a system for the removal and destruction of paper.
	Lev5	The center has no optimization policy for paper consumption.
The existence of means for recycling and separating waste (EMRS)	Lev1	There are means for recycling basic elements such as paper, printer cartridges, lamps, batteries and electrical devices, driven by recycling policies known to staff and students. The information is public and available to stakeholders.
	Lev2	There are means for recycling basic elements such as paper, printer cartridges, lamps, batteries and electrical devices, driven by recycling policies known to staff and students (G).
	Lev3	There are means for recycling basic elements such as paper, printer cartridges, lamps, batteries and electrical devices (N).
	Lev4	The center has no means for recycling and segregating waste.
Establishing systems for environmental analysis, management and assessment (ESEA)	Lev1	The center has set up a management program with measurable objectives and goals that are consonant with its environmental commitment and with the aim of improving the environmental impacts that have been identified. This program is reviewed each year and whenever there are changes in the center that affect its current identity.

Environmental image of the center on social media (EICS).		Furthermore, the center has identified, recorded and assessed those aspects of its activities, products and services which cause or might cause environmental impact.
	Lev2	The center has set up a management program with measurable objectives and goals that are consonant with its environmental commitment and with the aim of improving the environmental impacts that have been identified. This program is reviewed each year, and whenever there are changes in the center that affect its current identity (G).
	Lev3	The center has set up a management program with measurable objectives and goals that are consonant with its environmental commitment and with the aim of improving the environmental impacts that have been identified (N).
	Lev4	The center has set up a management program with measurable objectives and goals that are consonant with its environmental commitment.
	Lev5	The center has no system for environmental management.
	Lev1	The center has a presence on social media, and proactively drives projects for environmental improvement, using social media as a transparency tool. The work carried out on social media is professional and encourages participation in the design of specific environmental products and/or services.
	Lev2	The center has a presence on social media, and proactively drives projects for environmental improvement, using social media as a transparency tool. The work carried out on social media is professional (G).
	Lev3	The center has a presence on social media and responds reactively when the environmental impact of its activities is referred to (N).
	Lev4	The center has no presence on social media, but it does follow up on references to its environmental impact.
	Lev5	The center has no voluntary presence on social media.

Table 4. Indicators and scale levels of the subcriteria of the criterion of social relations of the center.

Subcriteria	Impact Level	Description of the Impact Level
Measures for the respect and tolerance of local customs, traditions and languages which represent the cultural identity of the area (MRTL)	Lev1	The center instils and fosters respect for others as a basic element of any action, as well as the effective equality of rights between the sexes, the rejection of all types of discrimination, respect for all cultures, local or international and the traditions of origin of the students and staff (G).
	Lev2	The center fosters respect and tolerance for other cultures based on participation, pluralism and mutual acceptance, in accordance with principles established in the constitution (N).
	Lev3	The center is oblivious to the origin and culture of origin of the students and staff, ignoring their identities.
Coordination and collaboration with other teaching centers and with	Lev1	The center is open to the possibility of the transfer, upon request, of facilities for extracurricular activities. It cooperates with the city council and, where appropriate,

surrounding services and entities (CCTC)		other institutions, through the transfer of facilities for training activities. The school participates in institutional programs of the city council or the Ministry of Education and Science or other ministries. The school participates in or transfers facilities for NGO activities, especially those related to child protection or multiculturalism (G).
	Lev2	The center cooperates with the city council and, where appropriate, other institutions, by transferring facilities for training activities. The school participates in institutional programs of the city council or the Ministry of Education and Science or other ministries. The school participates in or provides facilities for NGO activities, especially those related to child protection or multiculturalism (N).
	Lev3	The center cooperates with the city council and, where appropriate, other institutions, by transferring facilities for training activities. The school participates in institutional programs of the city council or the Ministry of Education and Science or other ministries.
	Lev4	The center cooperates with the city council and, where appropriate, other institutions, by transferring facilities for training activities.
	Lev5	The center does not cooperate with other educational or other institutions in any way.
Responsible management practices for human resources, related to marginalised groups (RMPH)	Lev1	In the cases of individuals and groups that suffer from objective situations of disadvantage and the effective absence of equal opportunities among students, the center has established mechanisms that contribute to making equal opportunities effective. The school systematically participates in programs with activities that promote the integration of disadvantaged groups, such as talks and awareness-raising sessions. The school has a reception plan for late-entry students, so that an adequate educational response can be guaranteed depending on the degree of knowledge of the language and the curriculum gap. There are documented and implemented assistance programs for teaching materials, food and transportation (G).
	Lev2	In the cases of individuals and groups that suffer from situations of objective disadvantage and the effective absence of equal opportunities among students, the center has established programs that contribute to making equal opportunities effective. The school systematically participates in programs with activities that promote the integration of disadvantaged groups, such as talks and awareness-raising sessions. There are support mechanisms for teaching materials, which are documented and put into practice (N).
	Lev3	In the cases of individuals and groups that suffer from situations of objective disadvantage and the effective absence of equal opportunities among students, the

		center has established mechanisms that contribute to making equal opportunities effective.
	Lev4	The center has occasionally carried out some activity aimed at the integration of disadvantaged groups.
	Lev5	The center does not carry out integration activities for disadvantaged groups.
Encouraging enterprise (ENEN)	Lev1	The center carries out activities to promote entrepreneurial culture for schoolchildren. The school actively participates in business networks whose objectives are the promotion of an entrepreneurial culture. The actions consist of talks or visits to the facilities.
	Lev2	The center carries out activities to promote entrepreneurial culture for schoolchildren. The actions consist of talks or visits to the facilities (G).
	Lev3	The center carries out activities to promote entrepreneurial culture for schoolchildren. Actions consist of talks (N).
	Lev4	The center does not carry out activities that promote entrepreneurship.
The encouragement of volunteering (ENVO)	Lev1	The center encourages participation in volunteer programs for both school workers and students, through actions such as talks, volunteer days, visits to various NGOs, etc. (G).
	Lev2	The center encourages participation in volunteer programs for both workers and students through talks.
	Lev3	The center occasionally participates in some volunteer action, although it occurs in a personal capacity by a teacher (N).
	Lev4	The center does not carry out activities that encourage volunteering.
The satisfaction of stakeholders (SAST)	Lev1	The center carries out evaluations of family and student satisfaction, analyzing the results and implementing the appropriate improvement measures, as far as possible (G).
	Lev2	The center carries out evaluations of family and student satisfaction (N).
	Lev3	The center does not carry out surveys to determine the degree of satisfaction of families or students.

4.2. Weighting

The weightings for the subcriteria were obtained by the procedure described in Section 2, first defining a new alternative with all the criteria at the neutral level. Once the subcriteria in the judgement matrix are ordered from the most attractive item to the least attractive, the decision group compared how much more preferable is a change from the neutral to the good level in the subcriterion of the ethical and behavioral code (EABC) with respect to the subcriterion of setting up systems to identify effects on working relations (SSIE) and they were found to be similar. Next, the comparison was repeated, this time between the ethical and behavioral code and the intent of governors in adapting the center to the values of CSR (IGAC), giving the judgement a weak rating, and so on, repeating the process row by row (from left to right), until the judgement weighting matrix was complete. It should be remembered that for the elements along the diagonal of the matrix, a

subcriterion is being compared with itself, and so they have the semantic judgement “no”, indicating that they are equally preferable. The decision group found it especially difficult to complete the matrix due to the large number of subcriteria involved, and so it was necessary to repeat the process several times until the group was satisfied with the resulting judgement matrix.

The consistency of each judgement given by the decision group was automatically checked by M-MACBETH, and so the matrix is consistent. The resulting percentage weightings are shown in the last column of Figure A4 (see Appendix A). These weightings were checked by the decision group, which was satisfied with the final results.

4.3. Alternatives

The alternatives defined in the model are the states in which the highest and lowest levels of each descriptor are found (totally excellent and totally bad) and the limits between the states of excellence that the center can achieve are studied. Therefore, the alternatives defined were:

- *Totally excellent* (EXC). The learning center achieves the highest score that can be given in all the areas studied under the criteria of educational sustainability.
- *Limit between excellent and good* (E-G). This is the score that marks the division in the center's classification between excellent and good.
- *Limit between good and neutral* (G-N). This is the score that marks the division in the center's classification between good and neutral.
- *Limit between neutral and regular* (N-R). This is the score that marks the division in the center's classification between neutral and regular.
- *Limit between regular and bad* (R-B). This is the score that marks the division in the center's classification between regular and bad.
- *Totally bad* (BAD). The learning center achieves the lowest score that can be given in all the areas studied under the criteria of educational sustainability.

To establish the above values, it is necessary first to define the influence of the alternatives considered in each subcriterion, depending on their respective thresholds, in accordance with the judgements given by the decision group. The relationship between the limits of the states of excellence that each learning center can achieve and the levels of each of the subcriteria considered are shown in Table A1 (see Appendix A). The states of totally excellence and totally bad are set at one and five, respectively, in all levels (the maximum and minimum, respectively). The values of the limits between the states are also set by the consensus of the decision group. The remaining limits are obtained from assigning a value for each of the scale levels of each indicator using the top-down methodology described by Bana e Costa et al. [62]. This methodology consists of setting an alternative with all the descriptors at the best possible scale level. Next, a descriptor that has the least influence on the system is selected, and its assignment at the scale level is lowered by one position. This process continues with the other descriptors until the decision maker considers that an additional change in another descriptor at a scale level would mean the limit between excellent and good. A similar procedure is applied to advance between the rest of the limits between states. An example of the application of this methodology can be reviewed in Bana e Costa et al. [49].

5. Case Studies

The three learning centers, to which the model was applied, are now described. Each has its own characteristics because of variables such as the social and geographical environment, the people present (workers and students), the means available to it, the applicable legal framework, etc.

5.1. Case Study 1

Learning Center 1 (LC1) is in Ciudad Real (Spain). The school opened in the academic year 1987/88 as a center for vocational training, teaching at levels I and II in electronics and healthcare. From 1994/95, the center brought in the new subjects envisaged by the Organic Law of General Organization of the Educational System of Spain (LOGSE) early, with level III of compulsory secondary education and experimental modules of specific vocational training, and began gradually to bring in the new LOGSE teaching, and cease teaching the old vocational training programs, thus becoming a secondary education center with all the levels of education. It is a state school and is therefore open to all students who meet the academic requirements set out in the law, independent of race, sex or religious belief.

The high school has four buildings and three temporary classrooms. It has the following facilities:

- 28 classrooms for normal use.
- One music room.
- One art room.
- One technology room.
- One natural science and physics/chemistry room.
- Four computer rooms.
- One gym and an outdoor sports area.
- 16 classrooms specific to stages of education.
- One library.
- One multi-purpose area.
- Other facilities, such as offices, didactic departments, two staff rooms, a visitors' room, bathrooms, a café and a house for the caretaker.

As to the students, they are mainly characterized by their range of ages, teachings, interests and social backgrounds. Over 1039 students study in the high school, from Ciudad Real, nearby towns, and even, in the case of Vocational Training (VT), from other provinces.

In the current academic year, 82 teachers are working at the center. The teaching staff have a wide variety of backgrounds, given the very broad range of courses taught at the center, which enriches the social structure and makes its functioning easier. There are many experts, which makes it possible for them to do the teaching they are responsible for and to think about the practice of education and seek resources for improvement. The center also has non-teaching staff. The center currently has three administrative staff, four bedels and four cleaners.

The center is aware of the importance to education of close cooperation with the families of students. It is understood that the presence of families in the internal dynamic of the center substantially improves the quality of teaching and education in general.

The fathers, mothers and legal guardians of students at the center participate in choosing representatives to the school council, or through the official Association of Parents (PTA). True participation through both of these paths is rather rare, and so the center has to take steps to encourage this participation.

The teaching offered by the center is as follows:

- Compulsory secondary education (CSE) and sixth form:
 - Four groups at 1st CSE.
 - Four groups at 2nd CSE.
 - Three groups at 3rd CSE.
 - Three groups at 4th CSE.
- Three groups at 1st bachillerato (lower sixth): two in the science and technology branch, and one in humanities and social sciences.

- Four groups at 2nd bachillerato (upper sixth): two in the science and technology branch, and two in humanities and social sciences.
- In vocational training, the center offers:
 - Normal level:
 1. Telecommunications installation. Two groups (1st and 2nd).
 2. Electrical and automatic installation. Two groups (1st and 2nd).
 3. Pharmacology and para-pharmacology. Two groups (1st and 2nd).
 4. Auxiliary nursing care. Two groups, one in the morning and one in the afternoon.
 - Higher level:
 1. Diagnostic imaging and nuclear medicine. Four groups in total, two from 1st and two from 2nd.
 2. Dietetics in morning and afternoon shifts. Four groups in total, two from 1st and two from 2nd.
 3. Electrical maintenance. Two groups (1st and 2nd).
 4. Telecommunications and computer systems. Two groups (1st and 2nd).

It also offers basic vocational training in first and second CSE of electricity and electronics and extracurricular activities.

5.2. Case Study 2

Learning Center 2 (LC2) is a secondary school run by the Department of Education of the Government of Navarre (Spain). Teaching began in 1995 and a new building was added in 1998. It is a state school which, from 2007–2008, has also offered a language model that includes the Basque language for those families who choose it. In the academic year 2013–2014, a bilingual program was started to include English as the language some subjects were taught in, and this was widened in 2017–2018.

With regard to facilities, they comprise classrooms, a sports hall and a playground. The classrooms are on three floors: the ground floor has two classrooms, an art room, music room, two computer rooms, technology workshop, library, laboratory, staff room, caretaker's lodge and secretaries', heads of studies' and principal's offices. The first floor has 15 classrooms, a duty room, six offices for different departments, and the second floor has a multi-purpose area and an audio-visual room. The sports hall has a multi-sport court, changing rooms, a staff office and two small general-purpose classrooms. The ground floor and the first floor are linked by a lift for the use of staff and students with temporary or permanent motor difficulties.

The staff of the center is as follows:

- A teaching staff, whose make-up depends on the number and learning needs of the pupils (approximately 35–38 teachers). The teaching staff, who mix youth with experience, are appointed by the Department of Education of the Government of Navarre.
- Non-teaching staff comprising a porter, a clerical worker and a maintenance worker shared with other centers.
- Service staff, from a company subcontracted by the Department of Education of the Government of Navarre, with three dedicated cleaning staff.

The center also, from time to time, invites other specialists (social services, experts in emotional and sexual education, etc.) to meet specific needs.

As it is a center of and for the area it serves, communication with families is swift and allows conflicts which may arise to be detected and solved. It is likewise not difficult to seek collaboration

with other local organizations (social services, city hall, local police, Civil Guard, etc.) to act together for the good of the school community.

In 1995/1996 the 1st and 2nd years of CSE were taught. In 1996/1997 this included a 3rd level of CSE. From 1997/1998 onward, the whole of the CSE (1st, 2nd, 3rd, 4th levels of CSE) has been taught. It also has two levels of the Program for Improvement of Learning and Achievement (PMAR), parallel to 2nd and 3rd level of CSE. There is a specific curricular unit with specialized teaching staff to assist pupils with special educational needs.

5.3. Case Study 3

Learning Center 3 (LC3) is a state-run center under the control of the Education and Science Department of Castilla-La Mancha. It teaches adults and is in the province of Toledo (Spain).

It has the following facilities:

- An administrative building, which has a computer room, two classrooms, one with a projector and screen and another with CD/DVD players and speakers. It also has a storeroom, staffroom-library with a photocopier, seven offices, bathrooms and boiler and cleaning rooms.
- Another building, with six classrooms, three bathrooms (one for disabled people), an office with a photocopier, a cleaning room and the boiler room for the heating system. This building has two floors and a lift. All classrooms have a projector and screen.

The students are generally from the lower-middle socio-economic class. It has 649 students and the programs are aimed at over 18s, although they can accept over 16s with a work contract or who are elite athletes.

The center has nine teachers. Other teachers, hired by nearby local authorities, deal with other activities in nearby towns and villages where there is a need for adult education. The center has classrooms with 100% occupancy during the afternoon class time, and has no porter or clerical staff; rather, it cooperates with the town council by giving over space in the mornings for any kind of activity in exchange for temporary porter services.

Since the center was opened, most of the academic activity is focused on compulsory secondary education.

Learning Center 3 has the following programs:

- On-site secondary education (1st and 3rd in the 1st semester and 2nd and 4th in the second) and distance learning (all levels in the 1st and in the 2nd semester).
- Spanish as a foreign language.
- Official English teaching.
- Preparation courses:
 - Certificate in secondary education (free presentation).
 - Entry exam to higher level courses.
 - University entry exam for over 25s.
- Informal training programs (learning and reinforcement of basic skills II).

5.4. Ranking of Learning Centers

It is necessary to include in the model a further alternative for each center studied in order to go ahead with the assessment. A performance level is assigned to each of the 30 subcriteria in each learning center. The scale levels of each descriptor assigned to each high school are set by a person who has been a teacher at the three high schools evaluated and know perfectly the behavior of each one in all the subcriteria. This teacher had contact with the director of each high school and with the head of studies, therefore his assessments are suitable and the closest scale level of each descriptor with the reality of each high schools was selected. In this way, each is placed within the limits of the

levels of excellence or the previously defined alternatives. The assessment of the educational social responsibility of each center is carried out using Equation (1), from bottom to top in the value tree shown below.

$$\begin{aligned}
 V(LC1) &= w_{ESRV} \times v(ESRV(LC1)) + w_{EABC} \times v(EABC(LC1)) + w_{IGAC} \\
 &\quad \times v(IGAC(LC1)) + w_{EMAC} \times v(EMAC(LC1)) + w_{USMI} \\
 &\quad \times v(USMI(LC1)) + w_{EAPS} \times v(EAPS(LC1)) + w_{ITRC} \\
 &\quad \times v(ITRC(LC1)) + w_{SSIE} \times v(SSIE(LC1)) + w_{EMBW} \\
 &\quad \times v(EMBW(LC1)) + \dots \\
 &= 0.0397 \times 0 + 0.0514 \times 85.71 + 0.0508 \times 100 + 0.0101 \times 200 \\
 &\quad + 0.0478 \times 100 + 0.0504 \times 250 + 0.0483 \times 60 + 0.0514 \times 100 \\
 &\quad + 0.0463 \times 100 + 0.0101 \times 0 + 0.0270 \times 150 + 0.0101 \times 100 \\
 &\quad + 0.0448 \times 100 + 0.0356 \times 166.67 + 0.0356 \times 166.67 + 0.0433 \\
 &\quad \times 100 + 0.0407 \times 100 + 0.0188 \times 100 + 0.0402 \times 100 + 0.0257 \\
 &\quad \times 100 + 0.0265 \times 100 + 0.0412 \times 0 + 0.0270 \times 200 + 0.0483 \\
 &\quad \times 100 + 0.0346 \times 100 + 0.0346 \times 100 + 0.0005 \times 100 + 0.0229 \\
 &\quad \times 100 + 0.0053 \times 100 + 0.0310 \times 100 = 103.87 \\
 V(LC2) &= 0.0397 \times 0 + 0.0514 \times 57.14 + 0.0508 \times 100 + 0.0101 \times 200 + 0.0478 \times 0 \\
 &\quad + 0.0504 \times 250 + 0.0483 \times 100 + 0.0514 \times 100 + 0.0463 \times 100 + 0.0101 \\
 &\quad \times 0 + 0.0270 \times 0 + 0.0101 \times 0 + 0.0448 \times 60 + 0.0356 \times 100 + 0.0356 \\
 &\quad \times 100 + 0.0433 \times 50 + 0.0407 \times 100 + 0.0188 \times 100 + 0.0402 \times 100 \\
 &\quad + 0.0257 \times 100 + 0.0265 \times 100 + 0.0412 \times 100 + 0.0270 \times 100 + 0.0483 \\
 &\quad \times 100 + 0.0346 \times 100 + 0.0346 \times 50 + 0.0005 \times 100 + 0.0229 \times 0 \\
 &\quad + 0.0053 \times 100 + 0.0310 \times 0 = 81.82 \\
 V(LC3) &= 0.0397 \times 0 + 0.0514 \times 57.14 + 0.0508 \times 0 + 0.0101 \times 0 + 0.0478 \times 0 + 0.0504 \\
 &\quad \times 100 + 0.0483 \times 0 + 0.0514 \times 100 + 0.0463 \times 100 + 0.0101 \times 0 + 0.0270 \\
 &\quad \times 0 + 0.0101 \times 0 + 0.0448 \times (-60) + 0.0356 \times 100 + 0.0356 \times 100 \\
 &\quad + 0.0433 \times 50 + 0.0407 \times 0 + 0.0188 \times 0 + 0.0402 \times 100 + 0.0257 \times 0 \\
 &\quad + 0.0265 \times 100 + 0.0412 \times 100 + 0.0270 \times 0 + 0.0483 \times 0 + 0.0346 \times 100 \\
 &\quad + 0.0346 \times 50 + 0.0005 \times 100 + 0.0229 \times 0 + 0.0053 \times 0 + 0.0310 \times 0 \\
 &= 40.37
 \end{aligned}$$

The valuation of the excellence levels between states has likewise been carried out previously, using values assigned by the decision group, as shown in Table A1, with the limit G-N, for example, having the value:

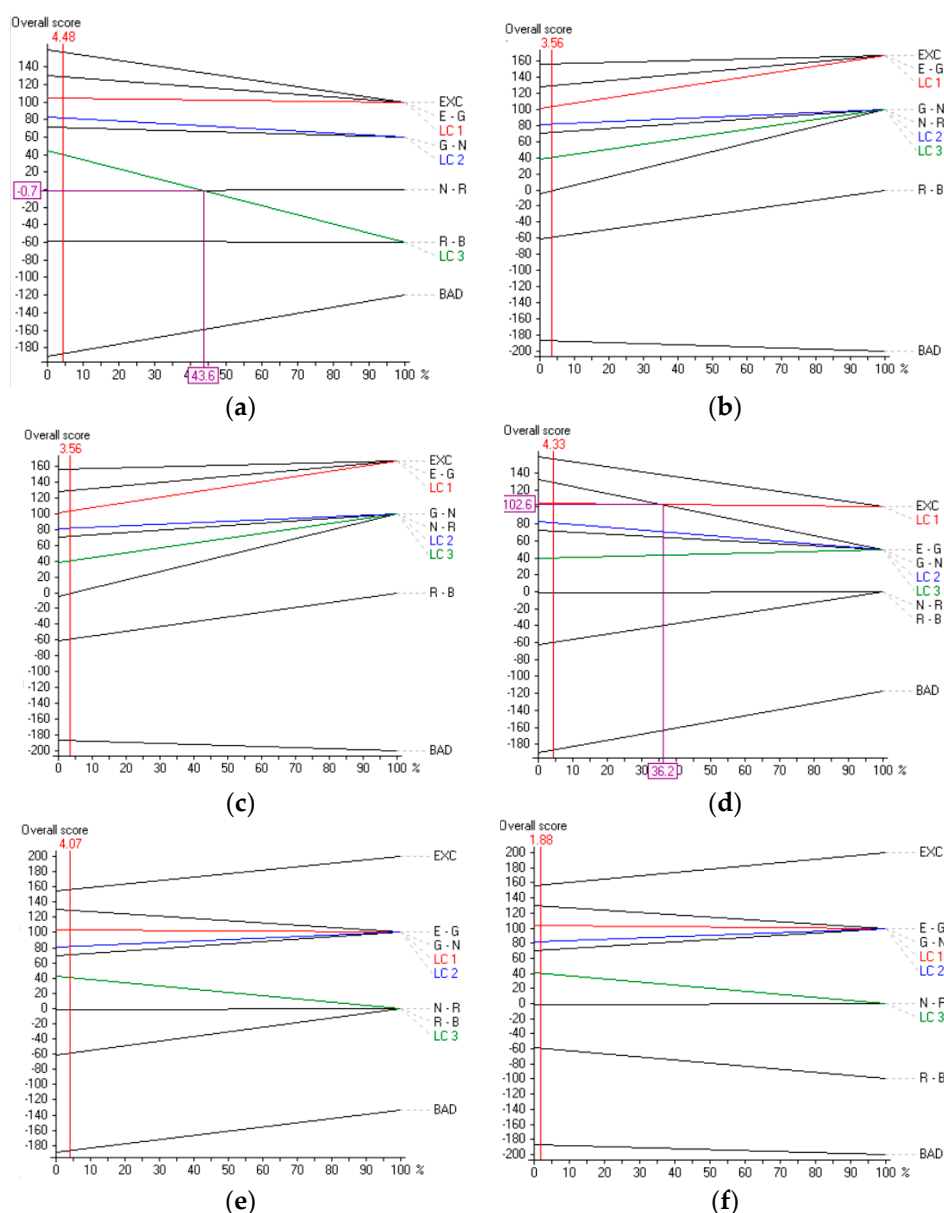
$$\begin{aligned}
 V(\text{limit G-N}) &= 0.0397 \times 0 + 0.0514 \times 57.14 + 0.0508 \times 100 + 0.0101 \times 100 \\
 &\quad + 0.0478 \times 0 + 0.0504 \times 250 + 0.0483 \times 60 + 0.0514 \times 60 \\
 &\quad + 0.0463 \times 100 + 0.0101 \times (-200) + 0.0270 \times 100 + 0.0101 \times 60 \\
 &\quad + 0.0448 \times 60 + 0.0356 \times 100 + 0.0356 \times 100 + 0.0433 \times 50 \\
 &\quad + 0.0407 \times 100 + 0.0188 \times 100 + 0.0402 \times 100 + 0.0257 \times 100 \\
 &\quad + 0.0265 \times 0 + 0.0412 \times 0 + 0.0270 \times 100 + 0.0483 \times 50 + 0.0346 \\
 &\quad \times 100 + 0.0346 \times 50 + 0.0005 \times 0 + 0.0229 \times 100 + 0.0053 \times 100 \\
 &\quad + 0.0310 \times 0 = 71.16
 \end{aligned}$$

Figure A5 in Appendix A shows the values obtained for the limits between states and for the three learning centers assessed. It can be seen that Learning Center 1 is at the good level, followed by Learning Center 2, which is also at the good level but with a lower valuation, and finally Learning Center 3, which is at the normal level.

The sensitivity analysis allows the extent to which the results of the model are changed due to changes in the relative weights of the criteria to be analyzed (keeping the proportionality relations between the other weightings).

Figure 1 shows, as an example, the sensitivity analysis when the weightings associated with the subcriteria of the criterion of environment are modified. The y-axis shows the overall score changes of each alternative when there is a variation on the horizontal axis, that is, variations in the weighting of a given criterion. The current weighting of the criterion is shown as a red vertical line. It is seen that in all cases the limits between the states of excellence are only breached if the criterion is

considered to have a weight of 100% (and so the other criteria would have a weight of 0%), which is not held to be feasible, since all the criteria included in the model are considered important by the decision group. With respect to the high schools assessed, in general, as a weighting is modified, its value changes, but usually within the levels of excellence it was at in the base level, that is, with the weightings set by the decision group. There are only a few anomalous cases; for example, in the criterion of training in good practice in recycling for workers and students (FBPR), the division is between Learning Center 3 and the N-R limit when this criterion has a weighting of 43.6% (see pink line); this weighting would mean an increase of 873.21% with respect to the given weight and is therefore not considered feasible. The same is true of the criterion of paper consumption (CDPL), where the division for Learning Center 1 is at the E-G boundary when this criterion has a weight of 36.2%, rather than the 4.33% assigned by the decision group; this could only happen with an increase in the weighting of 736.03% and, as above, this is not considered to be feasible.



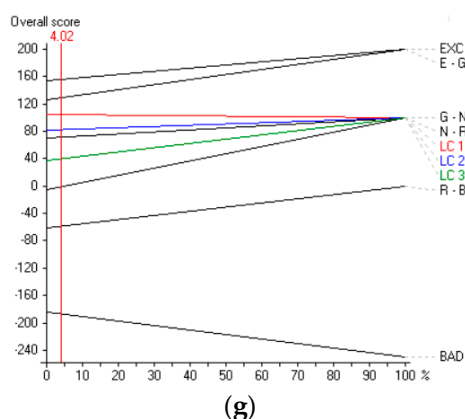
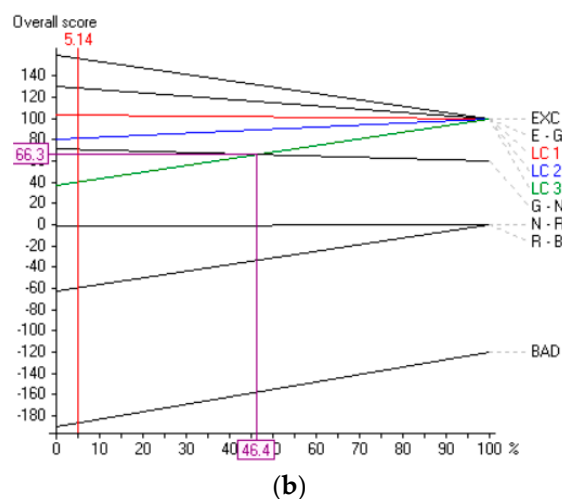
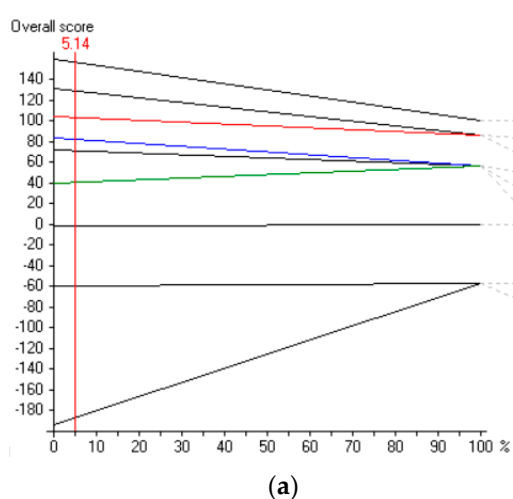


Figure 1. Sensitivity analysis: (a) training in good recycling practice for staff and students (TGRP); (b) energy consumption (ENCO); (c) water consumption (WACO); (d) paper consumption (PACO); (e) the existence of means for recycling and separating waste (EMRS); (f) establishing systems for environmental analysis, management and assessment (ESEA); (g) environmental image of the center on social media (EICS).

Figure 2 shows the sensitivity analysis carried out for the criteria with the highest weightings. It can be seen that for the criteria with the highest weightings there are no crossovers between the centers, and they also keep their level within the limits of the states of excellence; only when the criteria are given a value of 100% would the limits of the states of excellence of several alternatives coincide, which is not held to be feasible. For the criterion of setting up systems to identify effects on working relations (SSIE), if the weighting was increased by 802.72%, Learning Center 3 would switch to the good state and is therefore not considered feasible. The criterion of innovation in technologies that are responsible and committed to efficiency and the prevention of pollution (ITRC) is the only one where Learning Center 2 would overtake Center 1, although they would both remain at the good level; however, in order to make this switch, the weighting would have to increase by 699.17%. For the criterion of the encouragement of volunteering (ENVO), if the weighting was increased by 895.86%, Learning Center 3 would switch to the regular state, but, again, this increase in the weighting is not considered feasible.

Similar analyses were carried out for the remaining subcriteria, giving the same conclusions. The model is thus held to be robust.



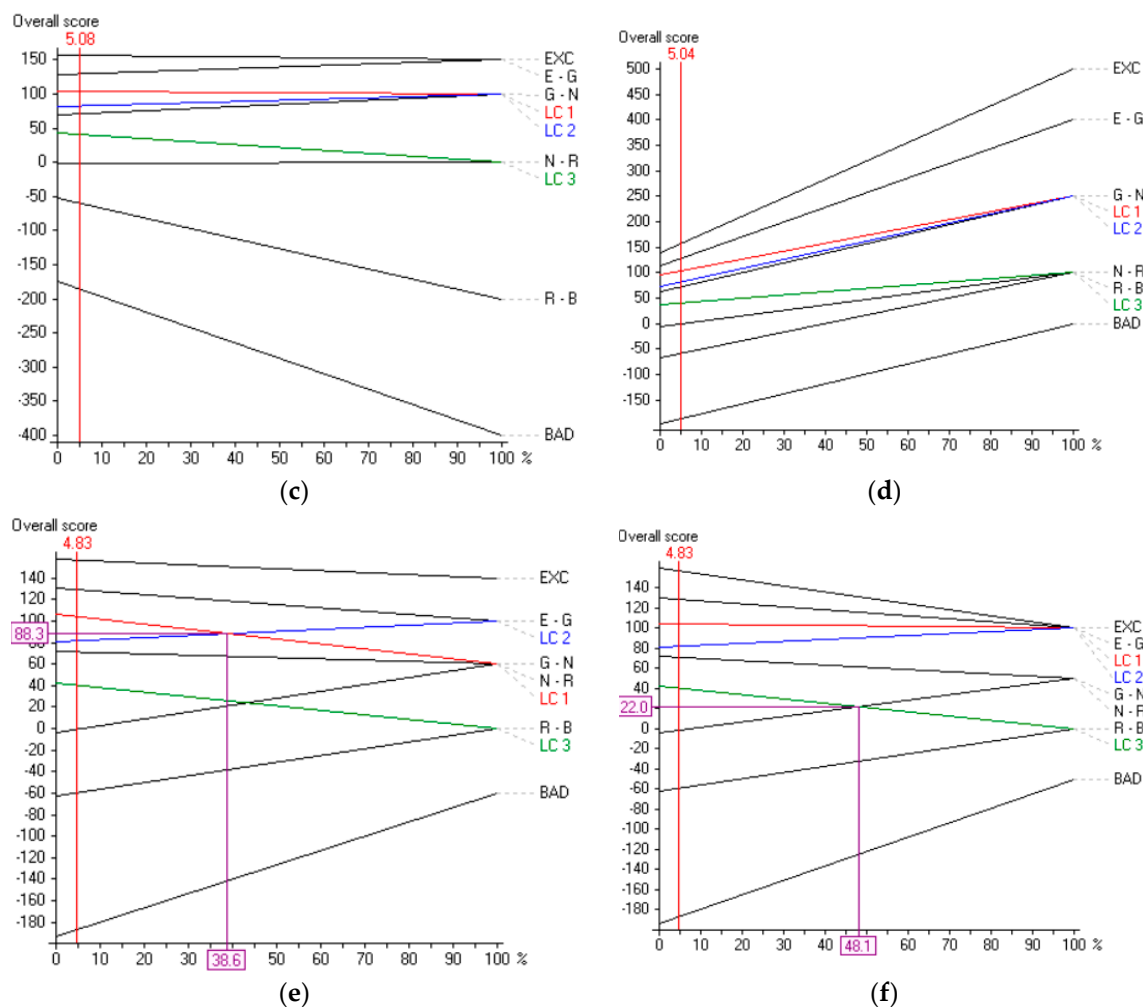


Figure 2. Sensitivity analysis: (a) ethical and behavioral code (EABC); (b) setting up systems to identify effects on working relations (SSIE); (c) the intent of governors in adapting the center to the values of CSR (IGAC); (d) the existence of annual programs of social responsibility (EAPS); (e) innovation in technologies that are responsible and committed to efficiency and the prevention of pollution (ITRC); (f) the encouragement of volunteering (ENVO).

6. Discussion and Conclusions

The model proposed is aimed at the evaluation of educational social responsibility in institutes instead of other educational stages because during this formative stage the student is at the right age to more easily internalize the different aspects of CSR and put them into practice, if it is what they see around them, in this case in their school. High school students are still being formed as people, so they can more easily assimilate the values they see as positive. A university student, for example, is considered an adult whose personality is already almost formed, so it can be more complex to internalize CSR practices. Although values related to CSR can also be taught at university, the amount to be learnt limits the time available to contemplate or implement new CSR actions. The results of the model lead to the following considerations:

- Learning Center 1 is at the good level, close to the excellent level.
- Learning Center 2 is at the good level, close to the neutral level.
- Learning Center 3 is at the neutral level.

Given the complex nature of each of the learning centers studied, the disparity between the results is quite justified.

A level close to excellence in Learning Center 1 is justified because it is one of the most prestigious in the city in the Castilla–La Mancha region (Spain), with a rating of 4.9 out of 5 on social networks (Facebook) and having received recognition from the Castilla–La Mancha Autonomous Government for their participation in the consortium of the VET: GOING ON Erasmus+ vocational training project, and has several students who have been swimming champions from Castilla–La Mancha. It has a history of 33 years of teaching and has a large number of resources that are well recognized, such as the provision of music classrooms, visual and art education classrooms, technology classrooms, natural science and physics/chemistry classrooms, four computer rooms, a library, visitors' room, a house for the custodian, etc., and with extensive participation in social networks. It is a non-denominational school and respectful of all beliefs. It is also characterized by ideological and political pluralism and by renouncing all kinds of indoctrination; on the contrary, it encourages multilingualism and multiculturalism as factors of personal and social enrichment. Its priority as a center of education is in the people who are part of it, and the efforts of the people who work in the school are directed towards them. It is intended that the school be characterized by the acceptance of the principles derived from:

- The Universal Declaration of Human Rights, mainly with regard to education and its objectives.
- The Spanish Constitution and the laws regarding the education and rights of the minor.
- Democratic coexistence based on participation, pluralism, tolerance, respect and mutual acceptance, in accordance with the principles established in the Spanish Constitution.
- The implementation of the rights and duties of students contemplated in the R.D. 732/1995 of 5th May.

The awareness of human rights is addressed in a practical way, for example, by the acts of Amnesty International carried out in the school to publicize the cases in which they work on the activities related to the Marathon of Letters for Human Rights.

It also organizes conferences on current social problems, such as eating disorders, and gift-giving activities among the students and staff of the school. Above all, the school is very oriented towards internationalism, leading Erasmus projects of higher education and vocational training for the branches of health and electricity–electronics, aimed at promoting the mobility of students and teachers, and as well as field trips to Belgium to improve in French language abilities, the students join the Cervantes Institute's projects, consisting of collaborative artistic actions and deconstructing and using the words that surround us today and cause us uneasiness to create positive and optimistic terms for the immediate future, the organization of round tables with a member of the European Parliament (MEP), Italian cultural and linguistic sessions, etc. Learning Center 1 students have homogeneous characteristics in terms of age and social and cultural level. All of the above means that teachers are satisfied with their teaching and it remains stable over time, which is why they can be involved in projects to improve the school. Furthermore, the broad educational services offered by the school means that there are experts on multiple subjects, which enriches the sociological structure of the school.

All of this means that, from the assessment of this school by the model, in 15 of the 30 descriptors it is valued at the highest level of performance (Level 1), while in another 13 descriptors it is valued at Level 2, and in the two remaining descriptors, at Level 3. By the criteria, the school shows very homogeneous behavior, thus in three of the five subcriteria of the criterion of the ethics and values of the school, it is at Level 1, in four subcriteria out of the seven in the criterion of environment it is at Level 1, in five out of six in the criterion of social relations of the school it is evaluated at Level 1, as well as in three of the five criteria for responsible data handling and communication; only in the criterion of the ethics and values of the school does it not have descriptors valued at Level 1, with five of the seven that constitute the ethics and values of the school at Level 2 and the other two at Level 3. Therefore, it would be in this criterion that the school should focus on continuous improvement actions.

The achievement of a good level by Learning Center 2 is justified by the existence of a large number of activities related to the environment, such as an organic garden, eco-friendly classes, green patrols, eco-cleaning activities in natural areas, ecological murals, limitations to the number of photocopies made per academic year of less than 1500, etc. In addition, there are educational activities, dance, theater, etc. During the 2017/18 and 2018/19 academic years, the school participated in an Erasmus+ project with the title “Students for understanding—a European media project”. The project can be tracked on social media. The school carries out student reception surveys, teacher assessments and assesses student satisfaction with the school, with 7.5 being the level of satisfaction of families with the academic training received by the students and 7.2 the level of satisfaction of the families related to human education by the school; there are actions for attention to diversity, and levels of 96% and 92% for the participation of students and families, respectively. In interviews with tutors, there is very fluid communication with families, with daily calls to absent students and communication in the middle of each term by subject, with the publication of the annual magazine “*Speaking Aloud*”. Actions related to coexistence based on collaboration and positive discipline are assessed, obtaining a satisfaction of 9.1 out of 10 for the treatment received by the staff of the school and 7.8 for the satisfaction of families with the care and respect in the treatment of the students and 7.3 for student satisfaction with the attention and respect of their treatment.

The mission of Learning Center 2, reflected in its educational project, is:

- To offer quality public education for local students, so that they can successfully pursue higher education or enter the world of work while attending to diversity.
- To promote a participatory coexistence, based on human values, involving the entire school community.
- To encourage innovation through the development of various educational projects and ongoing teacher training.

The educational principles that Learning Center 2, to encourage and empower, are the following:

- Commitment to sustainability, healthy habits and care for the environment.
- The importance of knowledge of various languages, starting with the mother tongue.
- A culture of hard work and continuous improvement.
- Solidarity and an open attitude to cooperation.
- Teamwork and internal coordination.
- The defense and integration of all the cultures present in the locality.
- The involvement and participation of the entire educational community.
- Intellectual restlessness and an appreciation for a job well done.
- Fluid and close communication.
- Creativity, personal autonomy and entrepreneurial spirit.

Learning Center 2 has students from a single population so there is homogeneity in terms of age and social and cultural level. The surveys reflect a high satisfaction of the teaching staff in the coexistence and training activities of the school in work groups, and the objective is to maintain at least five projects in the school; all this guarantees a stable teaching staff committed to the continuous improvement of the school. However, although it satisfies the criteria of sustainability, placing it at the good level, its management of policy and resources, together with its geographic and social characteristics, contribute to lowering its assessment with respect to Learning Center 1.

Therefore, the evaluation of Learning Center 2 in the model is characterized by the fact that, in eight of the 30 descriptors, it is valued at the highest level of performance (Level 1), while in 16 other descriptors it is valued at Level 2, and in the six remaining descriptors, at Level 3. By the criteria, the school shows a better performance in the social relations of the school, where in five of the six subcriteria, it is assessed at the best performance level. Very acceptable behavior can be seen in the environment, in which six of its seven subcriteria are assessed at the second-best level of performance. The criteria in which there are improvement options are those related to the ethics and values of the

school, and in particular in the subcriteria of the Ethical and behavioral code (EABC), the Use of social media to improve services (USMI) and the existence of annual programs of social responsibility (EAPS). Improvement actions can also be designed in human resources and working relations, in particular in the subcriteria of the Level of absenteeism (LEAB) and the Reduction of accidents (REAC).

The placing of Learning Center 3 at the normal level by this model is justified because it is an adult learning center, so many of the criteria applied in the other two schools, which provide compulsory education, are less important, and some are not applicable at all, since almost the entire student body are adults in distance learning. Learning Center 3 not only serves students from its own locality, but, unlike the other two learning centers, it welcomes students from 19 other nearby small towns. This, together with the fact that it is education for adults, whose age can be very varied and the fact that there is no need for classroom attendance, makes the students have a great heterogeneity regarding age and cultural and social situation (they are students who have not passed the compulsory studies at the corresponding age), from sectors with a medium–low economic level. The human and material resources available at the school are very limited, necessitating the use of classrooms in other schools in other localities for the taking of exams and it does not have a custodian or administrative staff, and has to give up space in the school during the morning so that the town council will in turn provide temporary custodians. In addition, their activity on social networks is practically non-existent, with information only regarding enrolment deadlines.

Although among the educational principles and values that guide the educational project of the school are the social integration and the education of citizens who are critical and useful to society, promoting comprehensive education and attention to differences, equal opportunities between genders and real social equality that is threatened by economic differences. In this sense, an attempt is made to attend to the most disadvantaged classes and to opt for a climate of cordial coexistence that allows the optimization of the educational response of students, however, the truth is that the climate of the school hinders the presence of permanent teachers, which minimizes the involvement of teachers, the continuous improvement and the development of improvement projects in the different forms of CSR.

Therefore, the assessment of Learning Center 3 in the model is justified, in that in five of the 30 descriptors it is evaluated at the highest level of performance (Level 1), in 11 descriptors it is valued at Level 2, 10 descriptors are valued at Level 3, and this is the only one of the three schools assessed which has descriptors at Level 4, specifically four descriptors. By the criteria, the school performs better in the social relations of the school, where four of the six subcriteria are assessed at the best performance level. Acceptable behavior is seen in the environment, in which four of the seven subcriteria are assessed at the second-best level of performance. The criteria for urgent improvement options are those related to the ethics and values of the school, and in particular in the subcriteria of the existence of annual programs of social responsibility (EAPS), the existence of mechanisms for avoiding corruption (EMAC) and innovation in technologies that are responsible and committed to efficiency and the prevention of pollution (ITRC), in which the school is at performance Level 4. Another option for urgent improvement is in the training in good recycling practice for staff and students (TGRP) subcriterion, in which the school is also at the penultimate level.

Finally, the asymmetry of these results between levels of excellence is understandable and is considered to be an expected result. This is because in state high schools it is much more feasible to achieve a completely excellent level than a poor level, such as completely bad, because of the application of current law, which means they must satisfy the minimum levels of excellence, and so the worst levels of sustainability disappear; it does, however, allow them to approach the higher levels, depending on the way it is managed and the use each high school makes of its own resources.

The CSR methodology is being introduced in many organizations, and in many others it is already part of the business culture. However, this is a term that is still being actively discussed in respect of education, where there is no prior record of the application of a strategic management model in secondary schools in the way described in this study.

The model proposed in this research is devised as a tool for a continuous improvement system of CSR in high schools. Once a school has been assessed, it is possible to identify those

criteria/subcriteria in which the worst assessment has been obtained and develop action plans to improve them; for example, by improving in one or more positions on the scale level of the descriptor that they were satisfying. This helps to see where the actions of the school should be concentrated and how to carry them out, since the scale levels of each descriptor inform about the aspects that must be satisfied in each case. In addition, the proposed model aims to help visualize, by families and students, the fulfilment of a complete training program, with contents of the multiple dimensions of CSR, which are not usually taught and which would achieve the training of upright and socially responsible people, which would result in an important benefit for society. Furthermore, although the model is not devised as a system of comparison or benchmarking between institutes, from a practical point of view, it can be affirmed that a high result in the proposed assessment system could attract student enrolment, an aspect highly valued by private schools. A high assessment makes it easier for parents and potential students to see whether the school has training that not only provides the regulated content but a series of human values that can be very positive in future personal and professional life.

This model is the result of work carried out at three teaching centers, with the cooperation of the staff, and the help of three decision groups, with extensive professional experience of teaching in state schools. The first stage involved the collection of data and the characteristics of the different centers, located in different places and with different laws and internal governance standards, adapted to its own specific circumstances.

At the second stage, an innovative multicriteria decision model was built using the MACBETH approach and M-MACBETH software, and the criteria and subcriteria, which would influence educational social responsibility, and the alternatives to be considered, were defined. These criteria are defined according to current world standards and rules in regard to CSR and current legislation in the regions where the centers are located, and which are applicable to any kind of organization, whether public or private. This multicriteria model is robust, and throughout the study no inconsistency was found.

The results reflect the strengths and weaknesses of each center in the area of educational sustainability, allowing the most suitable actions for improving aspects of each specific criterion to be identified, in the characteristic ambit of application to each center by the governing body.

The goal of future work would be to consider more closely the uncertainty of the judgements given by the decision group, using concepts of fuzzy logic, and to develop a similar model via another multicriteria technique, such as a fuzzy analytic hierarchy process and/or fuzzy technique for order of preference by similarity to ideal solution (TOPSIS) and to compare the results with each other and with those given by the model described in this paper.

One of the limitations of this research is that the model has been applied only in state secondary schools, and in future studies, therefore, it would be necessary to apply this model to private schools, both in Spain and abroad.

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

Appendix A

This appendix brings together a series of figures and a table with data on the multicriteria model built to assess educational corporate social responsibility in high schools with the MACBETH approach.



Figure A1. The MACBETH value tree.

	lev1	lev2	lev3	lev4	lev5	Current scale	extreme
lev1	no	weak-mod	mod-strg	strong	v. strong	100	v. strong
lev2		no	moderate	strong	v. strong	60	strong
lev3			no	moderate	strong	0	moderate
lev4				no	moderate	-60	weak
lev5					no	-120	very weak
							no

Consistent judgements

	lev1	lev2	lev3	lev4	lev5	Current scale	extreme
lev1	no	weak-mod	mod-strg	strong	v. strong	166.67	v. strong
lev2		no	moderate	strong	v. strong	100.00	strong
lev3			no	moderate	strong	0.00	moderate
lev4				no	moderate	-100.00	weak
lev5					no	-200.00	very weak
							no

Consistent judgements

	lev1	lev2	lev3	lev4	lev5	Current scale	extreme
lev1	no	weak-mod	mod-strg	strong	v. strong	166.67	v. strong
lev2		no	moderate	strong	v. strong	100.00	strong
lev3			no	moderate	strong	0.00	moderate
lev4				no	moderate	-100.00	weak
lev5					no	-200.00	very weak
							no

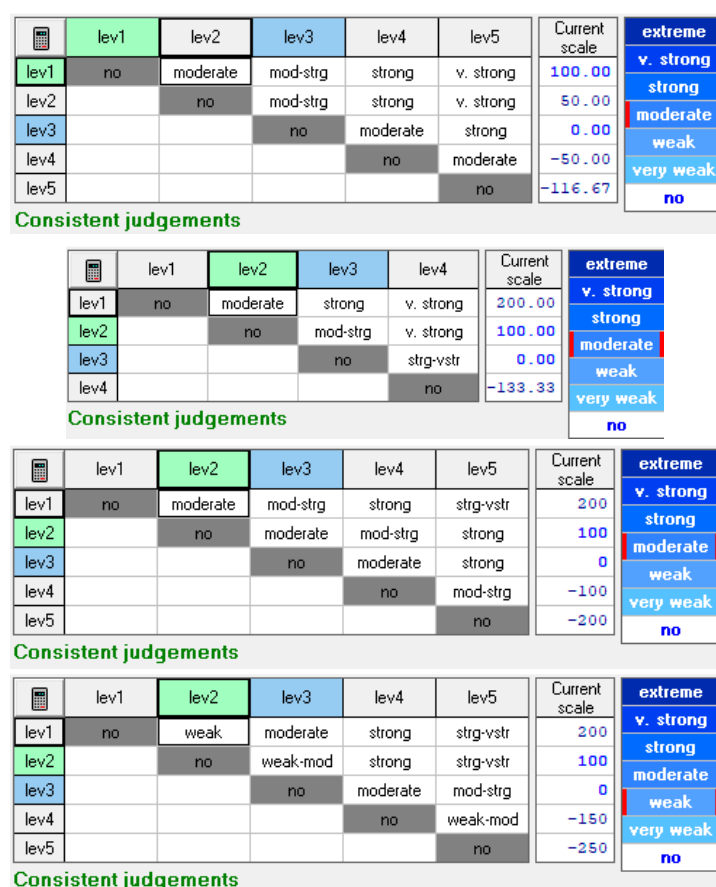


Figure A2. MACBETH judgement matrices for the subcriteria of the criterion of environment: training in good recycling practice for staff and students (TGRP), energy consumption (ENCO), water consumption (WACO), paper consumption (PACO), the existence of means for recycling and separating waste (EMRS), establishing systems for environmental analysis, management and assessment (ESEA) and environmental image of the center on social media (EICS) (from top to bottom).

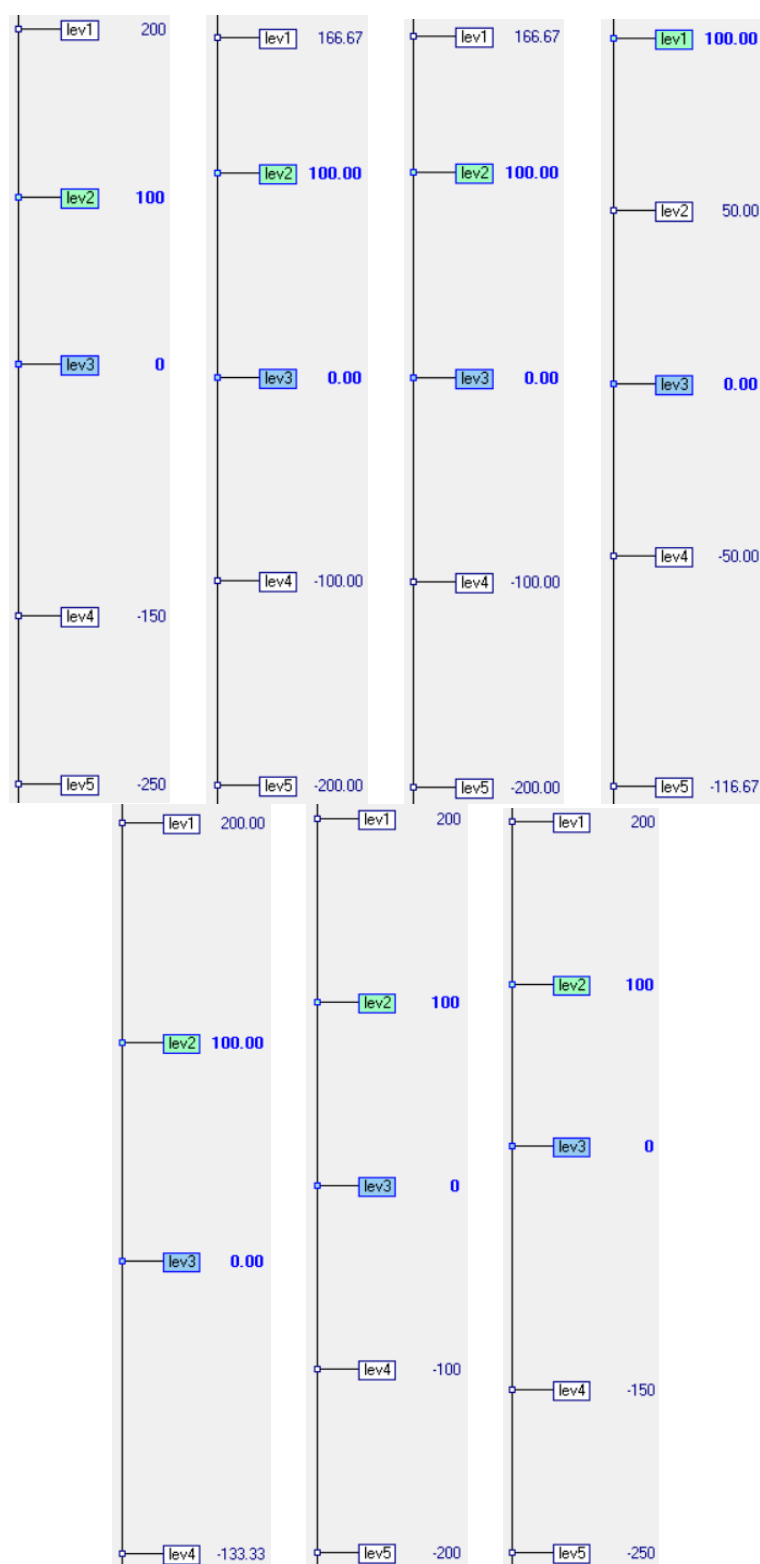


Figure A3. Value functions for the subcriteria of the criterion of environment: training in good recycling practice for staff and students (TGRP), energy consumption (ENCO), water consumption (WACO), paper consumption (PACO), the existence of means for recycling and separating waste (EMRS), establishing systems for environmental analysis, management and assessment (ESEA) and environmental image of the center on social media (EICS) (from left to right and top to bottom).

Weighing (Assessment Educational Social Responsibility)																																	Current scale		extreme
	[EABC]	[SSIE]	[IGAC]	[EAPS]	[ITRC]	[ENVO]	[USMI]	[EMBW]	[TGRP]	[PACO]	[RMPH]	[EMRS]	[EICS]	[ESRV]	[ENCO]	[WACO]	[SAST]	[PPRA]	[ISOS]	[ENEN]	[LEAB]	[CCTC]	[MRTL]	[PDSP]	[ESEA]	[REAC]	[EMAC]	[EDCS]	[DSIP]	[IPSA]	[all low]				
[EABC]	no	no	very weak	very weak	very weak	very weak	very weak	weak-weak	weak-weak	weak	weak	weak	weak	weak	weak-mod	weak-mod	weak-mod	weak-mod	weak-mod	moderate	moderate	mod-stgt	mod-stgt	mod-stgt	strong	strong	stgt-vstr	stgt-vstr	stgt-vstr	stgt-vstr	positive	8.14	v. strong		
[SSIE]	no	no	very weak	very weak	very weak	very weak	very weak	weak-weak	weak-weak	weak	weak	weak	weak	weak	weak-mod	weak-mod	weak-mod	weak-mod	weak-mod	moderate	moderate	mod-stgt	mod-stgt	mod-stgt	strong	strong	stgt-vstr	stgt-vstr	stgt-vstr	stgt-vstr	positive	5.14	strong		
[IGAC]			no				very weak	weak-weak	weak	weak	weak	weak	weak-mod	weak-mod	weak-mod	weak-mod	weak-mod	weak-mod	weak-mod	moderate	moderate	mod-stgt	mod-stgt	mod-stgt	strong	strong	stgt-vstr	stgt-vstr	stgt-vstr	stgt-vstr	positive	5.08	moderate		
[EAPS]				no	very weak	very weak	very weak	weak-weak	weak	weak	weak	weak	weak-mod	weak-mod	weak-mod	weak-mod	weak-mod	weak-mod	weak-mod	moderate	moderate	mod-stgt	mod-stgt	mod-stgt	strong	strong	strong	strong	stgt-vstr	stgt-vstr	stgt-vstr	positive	5.04	weak	
[ITRC]					no	no	very weak	very weak	very weak	weak-weak	weak	weak-weak	weak	weak	weak	weak	weak-mod	weak-mod	moderate	moderate	weak-mod	moderate	moderate	moderate	mod-stgt	mod-stgt	strong	strong	stgt-vstr	stgt-vstr	stgt-vstr	positive	4.83	very weak	
[ENVO]					no	no	very weak	very weak	very weak	weak-weak	weak	weak-weak	weak	weak	weak	weak	weak-mod	weak-mod	moderate	moderate	weak-mod	moderate	moderate	moderate	mod-stgt	mod-stgt	strong	strong	stgt-vstr	stgt-vstr	stgt-vstr	positive	4.83	no	
[USMI]							no	weak-weak	weak-weak	weak	weak	weak	weak-mod	weak-mod	weak-mod	weak-mod	weak-mod	weak-mod	moderate	moderate	moderate	mod-stgt	moderate	moderate	mod-stgt	strong	strong	stgt-vstr	stgt-vstr	stgt-vstr	positive	4.78			
[EMBW]								no	very weak	very weak	weak-weak	weak-weak	weak	weak	weak-mod	weak-mod	weak-mod	weak-mod	moderate	moderate	weak-mod	mod-stgt	moderate	moderate	mod-stgt	strong	strong	strong	stgt-vstr	stgt-vstr	stgt-vstr	positive	4.63		
[TGRP]									no	very weak	very weak	weak-weak	weak-weak	weak-weak	weak-weak	weak-weak	weak	weak	weak-mod	weak-mod	weak-mod	mod-stgt	moderate	moderate	mod-stgt	strong	strong	mod-stgt	strong	stgt-vstr	stgt-vstr	positive	4.48		
[PACO]										no	very weak	very weak	weak-weak	weak-weak	weak-weak	weak-weak	weak	weak	weak-mod	weak-mod	mod-stgt	moderate	moderate	mod-stgt	strong	strong	mod-stgt	strong	stgt-vstr	stgt-vstr	stgt-vstr	positive	4.33		
[RMPH]											no	very weak	very weak	very weak	weak-weak	weak-weak	weak	weak	weak	weak	weak-weak	weak-weak	weak-mod	moderate	mod-stgt	mod-stgt	strong	strong	stgt-vstr	stgt-vstr	stgt-vstr	positive	4.12		
[EMRS]												no	very weak	very weak	weak-weak	weak-weak	weak	weak	weak	weak-mod	weak-mod	weak-mod	weak-mod	moderate	mod-stgt	mod-stgt	strong	strong	stgt-vstr	stgt-vstr	stgt-vstr	positive	4.07		
[EICS]													no	weak-weak	weak	weak	weak	weak	weak-mod	weak-mod	weak-mod	weak-mod	weak-mod	moderate	moderate	mod-stgt	mod-stgt	strong	stgt-vstr	stgt-vstr	stgt-vstr	positive	4.02		
[ESRV]														no	weak-weak	weak	weak	weak-weak	weak-mod	weak-mod	weak-mod	weak-mod	weak-mod	moderate	mod-stgt	mod-stgt	strong	strong	stgt-vstr	stgt-vstr	stgt-vstr	positive	3.97		
[ENCO]															no	no	weak-weak	weak-weak	weak	weak	weak	weak-mod	weak	weak	weak-mod	moderate	mod-stgt	mod-stgt	strong	stgt-vstr	stgt-vstr	positive	3.56		
[WACO]																no	no	weak-weak	weak-weak	weak	weak	weak	weak-mod	weak	weak	weak-mod	moderate	mod-stgt	mod-stgt	strong	stgt-vstr	stgt-vstr	positive	3.56	
[SAST]																		no	no	weak-weak	weak	weak-weak	weak	weak	weak-mod	moderate	moderate	mod-stgt	strong	stgt-vstr	stgt-vstr	positive	3.46		
[PPRA]																		no	no	weak-weak	weak	weak-weak	weak	weak-mod	moderate	mod-stgt	mod-stgt	strong	stgt-vstr	stgt-vstr	positive	3.46			
[ISOS]																		no	no	weak-weak	weak	weak-weak	weak	weak-mod	moderate	moderate	mod-stgt	strong	stgt-vstr	stgt-vstr	positive	3.10			
[ENEN]																			no	weak	weak-weak	weak	weak-weak	weak	weak-mod	moderate	moderate	mod-stgt	strong	stgt-vstr	strong	positive	2.70		
[LEAB]																				no	no	weak-weak	weak-weak	weak	weak	weak-mod	weak-mod	moderate	mod-stgt	mod-stgt	positive	2.70			
[CCTC]																					no	no	weak-weak	weak-weak	weak	weak	weak-mod	weak-mod	moderate	mod-stgt	mod-stgt	positive	2.46		
[MRTL]																						no	weak-weak	weak-weak	weak	weak-mod	moderate	moderate	mod-stgt	mod-stgt	positive	2.87			
[PDSP]																							no	no	weak	weak-mod	weak-mod	weak-mod	moderate	mod-stgt	positive	2.29			
[ESEA]																								no	weak	weak-mod	weak-mod	weak-mod	moderate	moderate	positive	1.88			
[REAC]																									no	no	weak-weak	weak	weak-mod	positive	1.01				
[EMAC]																									no	no	no	weak	weak-mod	positive	1.01				
[EDCS]																									no	no	no	weak	weak-mod	positive	1.01				
[DSIP]																													no	weak	positive	0.53			
[IPSA]																														no	positive	0.05			
[all low]																															no	0.00			
<																															>			>	
Consistent judgements																																			

Figure A4. MACBETH judgement matrix for the subcriteria.

Table A1. Values of the subcriteria for defining the alternatives *Limit E–G*, *Limit G–N*, *Limit N–R* and *Limit R–B*.

	Subcri-terion	Limit E–G					Limit G–N					Limit N–R					Limit R–B				
		Levels					Levels					Levels					Levels				
		lev1	lev2	lev3	lev4	Lev5	lev1	lev2	lev3	lev4	Lev5	lev1	lev2	lev3	lev4	Lev5	lev1	lev2	lev3	lev4	Lev5
EAVC	ESRV		X					X						X						X	
	EABC		X					X						X							X
	IGAC	X						X						X						X	
	EMAC		X					X						X						X	
	USMI		X					X						X						X	
	EAPS		X					X						X						X	
	ITRC		X					X						X						X	
HRWR	SSIE	X						X						X					X		
	EMBW	X						X						X					X		
	EDCS		X					X						X						X	
	LEAB	X						X						X					X		
	REAC	X						X						X						X	
ENVI	TGRP	X						X						X						X	
	ENCO	X						X					X						X		
	WACO	X						X					X						X		
	PACO		X					X						X					X		
	EMRS		X					X						X					X		
	ESEA		X					X						X						X	
	EICS	X						X						X					X		
SRCE	MRTL	X					X							X					X		
	CCTC	X						X						X						X	
	RMPH	X						X						X					X		
	ENEN	X						X						X					X		
	ENVO	X						X						X					X		
	SAST	X					X							X				X			
RDHC	PPRA		X					X						X					X		
	IPSA	X						X						X					X		
	PDSR	X						X						X					X		
	DSIP	X					X							X				X			
	ISOS	X						X						X						X	

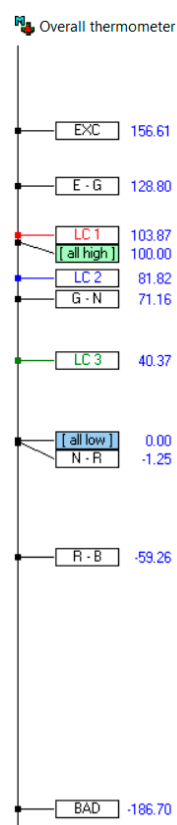


Figure A5. Ranking of the learning centers.

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