# The EDINSOST project: Improving Sustainability Education in Spanish Higher Education

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## Abstract

The EDINSOST R+D+i "Society Challenges" Project, funded by the Spanish Ministry of Economy and Competitiveness and the Spanish Ministry of Science, Innovation and Universities under the research challenge in the field of social change and innovation, aims to contribute to the improvement of social challenges across the (1) Spanish Strategy for Science, Technology and Innovation, (2) the State Plan of Scientific and Technical Research and Innovation, and (3) the European 2020 Strategy. The research is both highly multidisciplinary and contextualized and is applied in Ten Spanish Universities working together in the "Curriculum sustainability" group of the CRUE Sectorial Commission of Sustainability. The goal of this group is to create synergies and action frameworks agreed at a national level. This is an area of research action whose lack of common criteria for integrating sustainability competencies, learning processes and assessment hinders their achievement. To meet this challenge, frameworks and processes have been designed to facilitate the integration of sustainability into the university curriculum holistically through mapping and validation of pedagogical practices and the diagnosis of the state of Spanish universities, for which building materials for teaching and learning sustainability competencies have been developed. The project objectives and results are focused on: 1) Defining the map of sustainability competencies of the university degrees involved in the project, and establishing the framework to facilitate their integration in a holistic manner; 2) validating teaching strategies for the acquisition of sustainability competencies from a constructivist and community-oriented pedagogical approach; 3) diagnosing the state of faculty sustainability training needs and developing and pilot training proposals; and 4) diagnosing the state of learning of sustainability competencies in university students as well as preparing and piloting training proposals. The research methodology has an interpretive focus and uses quantitative and qualitative techniques to cover a population with three impact levels. Firstly, Bachelor and Master Degrees that integrate the three pillars of sustainability (environmental, social and economic). Secondly, and taking into account their long-term multiplier effect, special emphasis is made on five Bachelor and Master degrees in Education, since these graduates are the future teachers of the next generation of citizens. Finally, seven technological Bachelor Degrees are studied for their great impact on societal challenges.

**Keywords:** Sustainability education, Teacher training, Competency map, Sustainability map, Pedagogical strategies, EDINSOST project

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## 1. Introduction

As an institution dedicated to the creation and transmission of knowledge through research and teaching, the University plays a leading role in the dissemination and application of possible solutions and alternatives to the socio-environmental problems facing today's society (UNESCO, 2005; United Nations, 2012). The experiences and learning of the university community are of great importance for driving the change towards a culture of sustainability. In this sense, the integration of Education for Sustainable Development (ESD) into Higher Education helps to develop competencies concerning sustainability of university graduates, such as critical and creative thinking, problem solving, ability for action, collaboration, and systemic thinking, thereby forming potential agents of change capable of configuring more sustainable societies.

Numerous universities have signed international declarations committing them to introducing Sustainable Development in their educational policies, including the curriculum, research and social projection (Wright, 2010). However, recent studies show the lack of social commitment of graduates, and even how this commitment decreases as students advance in their careers (Segalàs, et al., 2010; Cehc and Sheric, 2015). Curricular sustainability implies the empowerment of the university community, the creation of spaces for collective interdisciplinary reflection and collaboration that foster learning, critical reflection on existing practices, together with worldviews as well as creative and innovative action. It is therefore essential to consider the joint and coordinated work between different research teams and institutions within the Spanish University System.

The general objective of the EDINSOST project is to boost educational innovation in ESD in Spanish universities in order to provide future graduates with the necessary skills to catalyze the change towards a more sustainable society. The integration of sustainability into the curriculum, the design of teaching and learning strategies for its implementation in the Spanish university context, and the evaluation of the level of sustainability competencies of current graduates are the main features of the EDINSOST project. This is a contextualized research applied in ten specific university institutions: the Autonomous University of Madrid (UAM), the University of Cádiz (UCA), the Camilo José Cela University (UCJC), the University of Córdoba (UCO), the University of Girona (UdG), the International University of Catalonia (UIC), the Universitat Politècnica de Catalunya (UPC-BarcelonaTech), the Universidad Politécnica de Madrid (UPM), the University of Seville (US) and the University of Salamanca (USAL). These universities work jointly through the CRUE Sector Commission on Sustainability (CADEP- CRUE, 2012) with other universities framed within the Working Group of the Sustainability Competency.

The research sample comprises three levels of incidence. First, to cover the specific areas, the EDINSOST project works with degrees that integrate the three pillars of sustainability (environmental, social and economic). Secondly, due to its multiplier and long-term effect, the project aims to make a special impact on the Bachelor and Master degrees in education sciences, since these graduates will be the future teachers of the new generations of citizens. Finally, as regards the short-term effect, the project works in six technological degrees due to their great impact on the challenges facing society. The sample degrees will be analyzed in several of the participating universities where they are taught. Specifically, the degrees studied are as follows:

1.1. Bachelor Degrees in Early Childhood Education (BDECE), Primary Education (BDPE), Pedagogy (BDP), Social Education (BDSE), Environmental Sciences (BDES), Business Administration (BDBA), Mechanical Engineering (BDME), Design Engineering (BDDE), Electrical Engineering (BDEE), Informatics Engineering (BDIE), and Chemical Engineering (BDCHE).

1.2. Master Degree in Secondary-School Teacher Training (MDSSTT), and Interuniversity Master in Environmental Educator (MIEE).

The EDINSOST project is structured around 4 objectives:

9.1. Objective 1: Define the Sustainability Map of the degrees involved in the project
9.2. Objective 2: Validate teaching strategies for the acquisition of sustainability competencies
9.3. Objective 3: Diagnose the status of ESD in teachers and develop a proposal for the professional training of teachers
9.4. Objective 4: Diagnose the learning status of the students' sustainability competencies and prepare a training proposal

The methodology applied in each of the four objectives and the results obtained to date are presented in the sections below:

## 2. Methods

### 2.1. Objective 1. Sustainability Map

Objective 1 has two sub-objectives: (1) design the sustainability maps of the degrees involved in the project as an instrument for guiding the other objectives, and (2) analyze the current status of the curricula of different degrees to determine how they meet the learning outcomes identified in the sustainability map of each degree.

A Competency Map is a matrix whose cells contain the learning outcomes expected of students at the end of their learning process (Sánchez-Carracedo et al., 2018-1). The matrix rows contain the different Competency Units of the competency analyzed, while the columns indicate the different domain levels of the taxonomy used to classify the learning outcomes.

To define the Sustainability Maps of the degrees in the EDINSOST project, the four sustainability competencies defined by the CRUE Sector Commission on Sustainability (CADEP-CRUE, 2012) are as follows:

2.2. C1: Critical contextualization of knowledge by establishing interrelations with social, economic, environmental, local and/or global problems.
2.3. C2: Sustainable use of resources and prevention of negative impacts on the natural and social environment.
2.4. C3: Participation in community processes that promote sustainability.
2.5. C4: Application of ethical principles related to the values of sustainability in personal and professional behavior.

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As proposed by García et Al. (2014), each of these competencies has been refined in the form of Competency Units, defined on the basis of the three dimensions of sustainability (environmental, economic and social), plus a holistic dimension. The learning outcomes for each Competency Unit have been defined using a simplified version of the Miller pyramid as a taxonomy (Miller, 1990), as described by Sánchez-Carracedo et al. (2018-2). Table 1 shows the Competency Units selected for the Sustainability Map of Engineering Degrees (Engineering Sustainability Map).

***Table 1.*** *Competency Units selected for the Sustainability Map of Engineering Degrees*

| **Competencies related to sustainability** | **Dimensions** | **Competency Unit** |
|---|---|---|
| C1: Critical contextualization of knowledge establishing interrelations with social, economic and environmental, local and/or global problems. | Holistic | Has a historical perspective (state of the art) and understands social, economic and environmental problems both locally and globally. |
| | Holistic | Is creative and innovative. Is able to see the opportunities offered by the Engineering to contribute to the development of more sustainable products and processes. |
| C2: Sustainable use of resources and prevention of negative impacts on the natural and social environment. | Holistic | Takes into account sustainability in his/her work as an engineer. |
| | Environmental | Takes into account the environmental impact of his/her work as an engineer. |
| | Social | Takes into account the social impact of his/her work as an engineer. |
| | Economic | Is capable of successfully carrying out the economic management of an Engineering project. |
| C3: Participation in community processes that promote sustainability. | Holistic | Identifies when the sustainability of a project can be improved if it is conducted through community collaborative work. Performs responsibly collaborative work related to sustainability. |
| C4: Application of ethical principles related to the values of sustainability in personal and professional behavior. | Holistic | Behaves according to the deontological principles related to sustainability. |

With regard to the second sub-objective, the analysis of the current status of the curricula of the different degrees to determine how they meet the learning outcomes identified in the sustainability map of each degree, an investigation has been designed to analyze the presence of the sustainability competencies defined by the CRUE (2012) in different curricula. The purpose of this work is not to generalize the obtained results, but to acquire relevant information regarding the extent to which sustainability competencies are being developed in a set of degrees at this particular time (2019). Two instruments are used to carry out this work: The Engineering Sustainability Map and the Sustainability Presence Map.

The Sustainability Presence Map of an Engineering Degree is drawn up from a quantitative analysis of how the CRUE sustainability competencies are developed in an engineering degree. The fundamental indicator of this analysis is the number of subjects developing each competency in the degree. The objective of the methodology of this sub-objective is not to analyze how the subjects develop the competencies, nor how many hours each subject devotes to each competency, since this implies personally interviewing all the teachers involved in the subjects. With this methodology, we wish to identify which subjects develop each domain level for each CU.

The Sustainability Presence Map of an engineering degree is an Engineering Sustainability Map in which the cells corresponding to the learning outcomes contain a number greater than or equal to zero. A 0 indicates that none of the learning outcomes of the cell are developed in the Degree. A number greater than zero indicates the number of subjects that develop any of the learning outcomes of the cell. If a cell of the Sustainability Presence Map contains a number greater than zero, it is assumed that both the Competency Unit and the Competency (C1-C4) related to the cell are developed in the Degree at the domain level in which the cell is located (regardless of the number of subjects or hours dedicated to this development).

### 2.6. Objective 2. Teaching-learning strategies for sustainability education

Objective 2, validation of the didactic strategies for the acquisition of the sustainability competencies has several sub-objectives: (1) design of the application of didactic strategies for the acquisition of the sustainability competencies; (2) identification of instruments for the validation of teaching strategies; (3) application of didactic strategies in degrees and contexts; (4) evaluation of the acquisition of the sustainability competencies when applying the didactic strategies, and (5) validation and adaptation of the didactic strategies to ensure learning of the sustainability competencies.

Five teaching strategies have been selected and researched in the EDINSOST project: Problem-Based Learning; Project-Oriented Learning; Service learning; Simulation; and Case Studies.

### 2.7. Objective 3. Teachers and ESD

Objective 3, diagnosis of the status of ESD in teachers and development of a proposal for teachers' professional training are broken down into 5 sub-objectives: (1) design of the questionnaires used to analyze the status of the teachers' ESD; (2) validation of the questionnaires; (3) application of the questionnaires to the teachers involved in the degrees in the EDINSOST project; (4) analysis of the results; (5) design and establish Focus Froups with teachers belonging to the degrees involved in this study and (6) preparation of a proposal for

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teachers‘ professional training.

In order to assess the teacher training needs, a questionnaire was designed and validated for each of the four Sustainability Maps defined in the project.

The questionnaire was designed by the EDINSOST project team of experts in sustainability education, and the content and clarity were subsequently validated by experts of the Sustainability Competency Working Group of the of the CRUE Sector Commission on Sustainability. Finally, the questionnaire was piloted with a sample of teachers from the UPC.

The questionnaire evaluates three dimensions of teaching-learning: teacher competencies in relation to the Sustainability Map (1 question for each competency and domain level), pedagogical approaches (20 questions), and teaching practice (8 questions).

With respect to the qualitative analysis, the main questions to be answered by this work are as follows:

- What conceptions do teachers have about sustainability in the context of the Spanish Higher Education system?
- What are the sustainability skills of the teachers?
- How are didactic strategies for sustainability implemented in the degrees studied?
- Which teaching practices in sustainability are used in the Spanish university context?

In order to answer these questions, several Focus Groups were established in all the knowledge areas of this project. The sample of each Focus Group was composed of 5 to 9 teachers with gender equity. In total, 52 participants from 6 universities were organized into 8 Focus Groups. The criteria of diversity and opportunity were used to select the participating degrees, so that the degrees most closely related to the three sustainability dimensions (economic-business, social-education, environmental-engineering) were chosen.

The categorization system was conducted through a deductive-inductive process. Periodic meetings were held in person as each university, and virtual meetings were held via Skype to define, agree and select the categories and subcategories. This second step, together with the subsequent debate among researchers, made it possible to ensure compliance with the conditions that a system of categories must meet: mutual exclusion; homogeneity; relevance; objectivity and fidelity, and productivity (Pérez-Serrano, 1994). A document was drawn up to define the requirements that the participants in the Focus Groups should meet, and the role of both the moderator and the observer as well as other aspects to be taken into account during the discussion (relaxed, comfortable and trustworthy environment among the participants). The document also includes the guidelines for transcription, coding and analysis as well as the categorization system to be used and the questions to be asked in the different groups.

The focus groups were analyzed using a categorization descriptive-interpretive investigation of qualitative type was conducted using the discussion group as an information collection technique, which has allowed us to determine the opinions of the students and interpret the subjective states of the participants in the study (Valderrama-Hernández et al., 2019).

## 2.8. Objective 4. Students and ESD

Objective 4 has the mission of assessing the level of sustainability competencies of university students. To carry out this evaluation, both a quantitative approach and a qualitative approach have been carried out.

With respect to the quantitative approach, four questionnaires have been drawn up and validated (one questionnaire for each of the Sustainability Maps defined in Objective 1). The process of definition and validation, as well as the methodology followed for its definition, are similar to those used for Objective 3 and are described in Sánchez-Carracedo et al. (2018-3). As in the Objective 3 questionnaires, students answer using a 4-point Likert scale (Likert, 1932). Each of the four type questionnaires has subsequently been adapted to each degree. Table 2 shows an example of the questionnaire for IT students.

***Table 2.*** *Questionnaire of students of IT Engineering (Informatics and Telecommunications).*

| | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| 1 | I know the causes, consequences and solutions proposed in the literature regarding social, economic and environmental issues. | | | | |
| 2 | In solving a problem related to IT, I know how to analyze sustainability from the perspective of its three dimensions: environmental, social and economic. | | | | |
| 3 | I am able to identify the causes of a problem related to IT and to anticipate its possible consequences. I am able to relate the problem with other problems already known, and with solutions already applied. | | | | |
| 4 | I know the concepts of creativity and innovation, and strategies to develop them. | | | | |
| 5 | I understand the techniques of innovation and generation of ideas, and I participate when they are used. | | | | |
| 6 | I am able to contribute new ideas and solutions in a technological project to make it more sustainable. | | | | |
| 7 | I understand the environmental costs of IT-related products throughout their life cycle. | | | | |
| 8 | I know how to measure the environmental impact of the use of IT using the appropriate indicators. | | | | |
| 9 | I know how to assess the impact (positive and negative) of IT products and services on society and on the sustainability of the planet. | | | | |
| 10 | I take into account the environmental effects of IT products and services in my projects, including indicators to measure these effects. | | | | |

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|---|---|---|---|---|---|
| 11 | I am able to propose sustainable IT projects, taking into account holistically the environmental, economic and social aspects. | | | | |
| 12 | I know the "sustainability" technologies applicable to an IT project, and the environmental impact indicators. | | | | |
| 13 | I know the strategic role that IT plays in the sustainability of the planet, as well as the concepts of social justice, resource reuse and circular economy. | | | | |
| 14 | I know the problems associated with accessibility, ergonomics and security of IT products and projects. | | | | |
| 15 | I know the problem associated with social justice, equity, diversity and transparency. | | | | |
| 16 | I know the direct and indirect consequences that IT products and services have on society. | | | | |
| 17 | I know how to assess the degree of accessibility, ergonomic quality, the level of security and the impact on society of an IT product or service. | | | | |
| 18 | I understand the need to introduce social justice, equity, diversity, and transparency into IT projects. | | | | |
| 19 | I know how to assess whether an IT project contributes to improving the common good of society. | | | | |
| 20 | I take into account the aspects of accessibility, ergonomics and security in technological solutions. | | | | |
| 21 | I take into account social justice, equity, diversity and transparency in my projects. | | | | |
| 22 | In the projects I work on, I am able to include indicators to estimate / measure how the projects contribute to improving the common good of society. | | | | |
| 23 | I try to maximize the positive impact of my professional activity on society. | | | | |
| 24 | When I design projects, I try to help them improve the common good in society. | | | | |
| 25 | I know the process of project management, project planning techniques, social economy, and economy of the common good. | | | | |
| 26 | I understand the different economic parts of a project: depreciation, fixed costs, variable costs, etc. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 27 | I know how to carry out the economic management of a technological project throughout its useful life. | | | | |
| 28 | I know how to assess the economic viability of an IT project, and its compatibility with the environmental and social dimensions of sustainability. | | | | |
| 29 | I know the concept, examples and tools of collaborative work in the field of IT. | | | | |
| 30 | I know how to assess the implications of collaborative work in a project in the field of IT. | | | | |
| 31 | I know how to use collaborative work tools related to IT projects. | | | | |
| 32 | I know the deontological principles related to sustainability. | | | | |
| 33 | I know how to assess the implications of deontological principles related to sustainability in an IT project. | | | | |
| 34 | I am able to propose solutions and strategies to promote IT projects consistent with the deontological principles concerning sustainability. | | | | |

In addition to the information concerning the sustainability competencies, these questionnaires collect information on the following variables of the respondents: gender, age, autonomous community of origin, completed studies, area of knowledge to which they belong, whether or not they have participated in any project related to sustainability, whether or not the student has previous teaching experience (only in education questionnaires), whether or not he/she works or has worked (only in engineering questionnaires), number of approved credits, center/University to which he/she belongs, and degree
With respect to the qualitative analysis, the objectives of this work are as follows:

2.9. Determine the participation and involvement of students in sustainability;
2.10. Inquire about student sustainability knowledge;
2.11. Examine students' perception of their sustainability competencies;
2.12. Explore the sustainability learning process in the university.

In order to achieve these objectives, a descriptive-interpretive investigation of qualitative type was conducted using the discussion group as an information collection technique, which has allowed us to determine the opinions of the students and interpret the subjective states of the participants in the study (Valderrama-Hernández et al., 2019).

The sample is composed of fourth-year students or recent graduates, with Focus Groups consisting of at least five participants and with gender equity. In total, 29 participants from 4 universities are organized into 4 Focus Groups.
The categorization systems uses the same approach as in section 2.3. A pilot focus group was organized at the

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University of Seville, the objective of which was to assess whether during the discussions new relevant information emerged that might not be included in any of the proposed categories. As a result, it was decided to maintain the initial proposal, except for a new category called "Odds and Ends" in which those textual units that did not correspond to any of the proposed categories would be collected. The "Odds and Ends" category was maintained for the remaining Focus Groups, which has allowed the inclusion of emergent discourse information and thereby fulfills the inductive nature of the research. Table 3 shows the categorization system used in the investigation.

***Table 3.*** *Categories and questions as presented in Valderrama-Hernández et al. (2019)*

| Category | Questions |
|---|---|
| Sustainability Conception | What is sustainability for you? |
| Sustainability Importance | Do you think it is important to incorporate sustainability in university studies? Why? |
| Participation | What programs or projects do you know that encourage participation and commitment in socio-environmental improvement? Have you participated? |
| Previous knowledge | Did you have any knowledge of sustainability before conducting your university studies? What knowledge? |
| University Preparation | Do you consider that the degree is preparing you/has prepared you to develop sustainability in your profession? Why? |
| Subjects | What subject do you think has incorporated sustainability more during your time at the university? |
| Methodologies and resources | What methodology was used in the subject you think has incorporated more sustainability during your time at university? What procedures and resources do you know for introducing the perspective of sustainability into your practice? |
| Sustainability Competencies | What is your vision regarding integrating the approach to sustainability in your professional projects? Do you think you have the necessary skills? What would those skills be? |
| Roles, Relations and classroom climate | What aspects developed in the classroom are conducive to the acquisition of sustainability competencies? |
| Evaluation | How do you consider that sustainability can be evaluated? How can you prove that they have been acquired? |
| Curriculum organization | What possible obstacles/facilities do teachers find when organizing active teaching strategies (SL, PBL, etc.) arising from the disciplinary organization of curricula? Suggest improvement proposals. |

Motivation and commitment of teachers

Do you consider that teachers are motivated and maintain a commitment to sustainability? Why?

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## 3. Results and Discussion

### 3.1. Objective 1. Sustainability Map

Regarding the first sub-objective, definition of the sustainability maps of the degrees involved in the project, 4 competency maps have been obtained for (1) Engineering degrees, (2) Education degrees, (3) Environmental Science Degrees, and (4) Business Management degrees. As an example, the Sustainability Map for engineering degrees is presented below in Table 4. The first two columns of Table 4 correspond to the C1-C4 CRUE competencies and to the initials of the sustainability dimensions (EN -Environmental, EC-Economic, S-Social, H-Holistic), respectively. The third column contains the Competency Units identified for each of the four sustainability competencies. Columns 4, 5 and 6 contain the students' expected learning outcomes at the end of their studies. The results are described for each domain level of each Competency Unit using the simplified version of the Miller pyramid.

***Table 4.*** *Sustainability Competency Map for Engineering Degrees as presented in Sánchez-Carracedo et Al. (2018-2).*

| **SUSTAINABILITY COMPETENCY MAP of an Engineering Degree** | | | | | |
|---|---|---|---|---|---|
| C | D | Competency Unit | Domain levels (according to the simplified Miller Pyramid ) | | |
| | | | 1. KNOW | 2. KNOW HOW | 3. DEMONSTRATED + DO |
| C1 | H | Has a historical perspective (state of the art) and understands social, economic and environmental problems, both locally and globally. | Knows the main causes, consequences and solutions proposed in the literature regarding the social, economic and/or environmental problems, both locally and globally. | Analyzes the different dimensions of sustainability when solving a specific problem related to the Engineering. | Identifies the main causes and consequences of a problem related to the sustainability that a product or a service related to the Engineering may have, and is able to relate them to known problems and solutions previously applied. |

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| | | | | | |
|---|---|---|---|---|---|
| | | Is creative and innovative. Is able to see the opportunities offered by Engineering to | Has sufficient knowledge of the concepts of creativity and innovation, and about strategies to | Reflects on new ways of doing things. Knows how to use techniques that stimulate creativity, the generation of | Brings new ideas and solutions to a project related to the Engineering to make it more sustainable, so as to improve the sustainability |
| | | contribute to the development of more sustainable products and processes. | develop them. | ideas, and manages them in such a way that they become an innovation.<br>Participates actively when used. | of products, processes or services. |
| C2 | H | Takes into account sustainability in his/her work as an engineer. | Knows the concept of cost of use, direct and indirect, of the products and services of the technologies related to the Engineering.<br>Knows the strategic role that the technologies related with Engineering play in the sustainability of the planet. Knows the concepts of social justice, resource reuse and circular economy.<br><br>Knows the concept of social economy, the advantages of solidarity, teamwork and cooperation versus competition.<br><br>Knows the principles of the economy for the common good. | Is capable of assessing the impact (positive and negative) that different products and services related to Engineering have in society and in the sustainability of the planet.<br><br>Knows how to assess the economic viability of a project of the Engineering and whether it is compatible with the environmental and social aspects of sustainability. | Is capable of proposing sustainable projects related to Engineering, taking into account holistically the environmental, economic and social aspects. |

| | | | | | |
|---|---|---|---|---|---|
| | EN | Takes into account the environmental impact of his/her work as an | Is familiar with technologies of reuse, reduction, recycling and minimization of the natural resources and residues related to | Is aware that products and services related to Engineering have an environmental impact throughout their lifespan. | Takes into account the environmental effects of the products and services related to Engineering in the projects and technological solutions in |
| | | engineer. | an Engineering project.<br>Knows the life cycle of the products related to Engineering (construction, use and destruction/ dismantling) and the concept of ecological footprint.<br>Knows models for ecological footprint calculation.<br>Knows metrics to measure the environmental impact of a project (e.g. pollutant emissions, resource consumption, etc.). | Is capable of measuring the environmental impact of the use of technologies related to Engineering using appropriate metrics (e.g. pollutant emissions, resource consumption, etc.). | which he/she participates. Includes in his/her projects indicators to estimate/ measure these effects from the resources used by the project (e.g. energy consumption, pollutant emissions, consumption of resources, etc.).<br>Calculates the ecological footprint of an Engineering project. |


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|---|---|---|---|---|---|
| | S | Takes into account the social impact of his/her work as an engineer. | Knows the problems associated with accessibility, ergonomics and safety of products and projects of Engineering. Knows the problems associated with social justice, equity, diversity and transparency (gender perspective, needs of the most vulnerable groups, strategies against corruption, etc.). Knows the direct and indirect consequences that the products and services | Knows how to assess the degree of accessibility, ergonomic quality, the level of safety and the impact on society of a product or service related to Engineering. Takes into account in their work as an engineer the rights of people. Understands the need to introduce social justice, equity, diversity, transparency (gender perspective, needs of the most vulnerable groups, anti- | Takes into account the aspects of accessibility, ergonomics and security in technological solutions. Takes into account social justice, equity, diversity and transparency (gender perspective, needs of vulnerable groups, combating inequality and corruption, etc.) in his/her projects. Includes in his/her projects indicators to estimate/ measure how they improve the common good of society. Is able to maximize the positive impact of his/her professional activity on |
| | | | related to Engineering have on the society. | corruption, etc.) in engineering projects. Can assess whether an engineering project contributes to improving the common good of society. | society. Is capable of designing Engineering projects that contribute to improving the common good of society. |