

DIASDGES: A PROJECT FOR DESIGN AND IMPLEMENT TEACHING-LEARNING ACTIVITIES FOR TRAINING IN SUSTAINABLE DEVELOPMENT GOALS (SDG) IN AN INTEGRATED WAY WITH ENGINEERING STUDIES SUBJECTS

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Abstract

The Sustainable Development Goals (SDGs) are a universal call to action to end poverty, protect the planet and improve the lives and prospects of people around the world. In 2015, all United Nations Member States approved 17 Goals as part of the 2030 Agenda for Sustainable Development, an initiative that establishes a plan to achieve the Goals established within 15 years. Currently, progress is being made in the development of this SDG initiative in many places, generating and implementing actions, strategies and policies to achieve the 17 SDGs.

Nevertheless, tackling the challenges of the SDGs will require new knowledge, new ways of doing things, making tough choices between competing options, and in some cases profound transformations.

Of course, this directly involves Universities, as organizations that promote technological and social progress through research, discovery, creation and adoption of knowledge. However, are college students aware of all this? They are who, in the near future, must develop and support the strategies and actions necessary to meet these objectives. Without them and their support, it is practically impossible to achieve these goals. Therefore, it is essential that university students know the SDGs and their contents. And of course, it is necessary that they are also aware of the importance they have, both for the present and for the future, and of the role that they can play in achieving those objectives, both personally and professionally.

However, university students, in general, say they do not know the Sustainable Development Goals and that the information they have received through various means, including university teaching and social networks, is very scarce. In addition, in achieving the SDGs, they value professional implications less than personal ones.

This article presents the DIASDGES, an Educational Innovation and Improvement Project. This project aims to investigate the degree of knowledge about the SDGs that university students have, as well as the awareness they have towards them, and in this way to be able to propose appropriate training strategies and activities that can integrate the SDGs into university education.

Keywords: Sustainable Development Goals; SDG; Engineering Studies; Teaching-Learning activities.

1 INTRODUCTION

The Sustainable Development Goals (SDGs) are a universal call to action to end poverty, protect the planet, and improve the lives and prospects of people around the world. In 2015, all United Nations Member States they agreed to focus on 17 Goals as part of the 2030 Agenda for Sustainable Development, an initiative that establishes a plan to achieve the Goals established within 15 years.

Those 17 SDGs have their focus on, as their name suggests, achieving sustainable development, which can be defined as “development capable of meeting the needs of the present without compromising the ability of future generations to meet their own needs” [1]. This sustainable development requires focused efforts to build an inclusive, sustainable and resilient future for people and the planet. According to the UN's own proposal [1] to achieve sustainable development, it is essential to harmonize three basic elements, which are the following: economic growth, social inclusion and environmental protection. The three elements are interrelated and all are essential in order to achieve the well-being of individuals and societies.

Currently, progress is being made in the development of this SDG initiative in many countries, generating and implementing actions, strategies and policies to achieve the results intended by SDG. Even so, the action to achieve them has not yet advanced at the speed and scale necessary for the

results to be relevant. With less than 10 years to achieve the Sustainable Development Goals, world leaders called for a decade of action and results for sustainable development, promising to mobilize funds, improve national implementation, and strengthen institutions to achieve the Goals on time, 2030.

The Secretary-General of the United Nations called at the Summit on the SDGs held in September 2019 for all sectors of society to mobilize for a decade of action at three levels:

- Action at the global level to ensure greater leadership, more resources and smarter solutions regarding the Sustainable Development Goals;
- Action at the local level that includes the necessary transitions in policies, budgets, institutions and regulatory frameworks of governments, cities and local authorities;
- And the action of people, including young people, civil society, the media, the private sector, trade unions, academia and other actors, to generate an unstoppable movement that drives the necessary transformations.

Following this line, the Government of Spain has actively worked in the elaboration of this universal and transformative agenda [2].

Addressing the challenges of the SDGs will require new knowledge, new ways of doing things, making difficult decisions between competing options and, in some cases, deep transformations. Of course, this directly involves Universities, as organizations that promote technological and social progress through research, discovery, creation and adoption of knowledge [3]. Universities attract and foster talent and creativity and are key players in regional and national innovation systems. These roles are critical to helping the global community understand the challenges, opportunities and interactions between the SDGs; develop and implement solutions; develop and evaluate policy options and pathways for transformation; and track progress. Universities have already started to implement programs to adapt to this initiative [4, 5]. But are college students aware of all this? In the near future, they must develop and support the strategies and actions necessary to meet these objectives. Without them and their support, it is nearly impossible to achieve these goals. Therefore, it is essential that university students have a good knowledge of the SDGs. Even more, it is necessary that they are also aware of the relevance they have, both for the present and for the future, and of the role that they can play in achieving those objectives, both personally and professionally. For this reason, different activities are developed to promote the SDGs in university subjects [8-10]

However, previous studies carried on with university students, in general, show that most of them are not aware of the relevance of the Sustainable Development Goals and that the information they have received, even in university environment and social networks, is very rare [6; 7]. Furthermore, in achieving the SDGs, they value professional implications less than personal ones [6]

In this way, given this situation that exists in the university environment, the development of an Educational Innovation and Improvement Project (PIME) is proposed to be able to investigate the degree of knowledge about the SDGs that university students have, as well as the awareness that have about them, and thus be able to propose appropriate training strategies and activities that can integrate the SDGs into university education. The objective of this work is to publicize this PIME and its main characteristics

2 METHODOLOGY

In this section, we describe how the project, and its estimated work plan will be approached, establishing its objectives, tasks and estimated calendar, as well as the participating entities and resources.

3 OBJECTIVES

The ultimate goal of the teaching innovation project is to make university students of engineering studies appreciate the importance of the SDGs, and the possible influence that they, on a personal, but especially professional level, may have in achieving their achievement. In this way, in the future, they will be able to orient their professional activity towards the achievement of the SDGs in an integrated way with their particular professional objectives.

To achieve this final goal, the PIME is proposed, which aims to design and develop teaching-learning activities, appropriate to the situation and degree of knowledge of university students, so that they can be put into practice in an integrated way with the contents engineering studies subjects, thereby training students on the SDGs, and how they can help achieve them.

To achieve the general objectives of the PIME, these are broken down into more concrete, achievable and measurable specific objectives. These specific objectives, which are detailed below, should be achieved in a staggered way over time, based on the established planning, thus reaching the purpose of the project.

- Objective 1. Analyze the degree of knowledge that university students have regarding the SDGs
- Objective 2. Analyze the perception that university students have regarding the SDGs and the relationship that may exist between their future profession and the SDGs
- Objective 3. Design teaching-learning activities that can develop, in a positive way, the knowledge and perception of the SDGs by students
- Objective 4. Design teaching-learning activities that can develop professional skills that can lead to the development of the SDGs in an integrated way with their profession.
- Objective 5. Implement the activities designed in the classrooms and analyze their results
- Objective 6. Identify good practices, recommendations and areas for improvement of interest to teachers to work and develop skills that help the development of the SDGs

3.1 Project Plan

The tasks to be carried out for each of the proposed objectives are described below.

Objective 1. Analyze the degree of knowledge that university students have regarding the SDGs. For this, a questionnaire must be designed that will be passed on to the students for completion, in such a way that it will allow them to obtain the necessary information to carry out the planned analysis. The tasks that must be carried out in order to achieve the objective are the following

- Task 1.1 Survey Design
- Task 1.2. Survey pass
- Task 1.3. Survey results analysis

Objective 2. Analyze the perception that university students have regarding the SDGs and the relationship that may exist between their future profession and the SDGs. For this, in a similar way and integrated with the previous objective, a questionnaire must be designed that will be transferred to the students for its completion, in a way that allows obtaining the necessary information to carry out the planned analysis. The tasks that must be carried out in order to achieve the objective are the following

- Task 2.1 Survey Design
- Task 2.2. Survey pass
- Task 2.3. Survey results analysis

Objective 3. Design teaching-learning activities that can develop, in a positive way, the knowledge and perception of the SDGs by students

- Task 3.1 Identify knowledge gaps on the part of students regarding the SDGs, and their degree of awareness towards them
- Task 3.2 Design of activities that can develop knowledge and awareness of the SDGs

Objective 4. Design teaching-learning activities that can develop professional skills that can lead to the development of the SDGs in an integrated way with their profession.

- Task 4.1 Analysis of subject competencies and relationship with the SDGs
- Task 4.2 Design of activities that can help develop professional competencies of the subjects in a way related and integrated with the development of the SDGs

Objective 5. Implement the activities designed in the classrooms and analyze their results

- Task 5.1. Planning of tasks to develop activities in the classroom
- Task 5.2 Development of activities
- Task 5.3 Data collection for the final situation analysis
- Task 5.4 Data analysis of the results obtained

Objective 6. Identify good practices, recommendations and areas for improvement of interest to teachers to work and develop skills that help the development of the SDGs

- Task 6.1. Preparation of a report of good practices and recommendations to work and develop skills that help the development of the SDGs in the classroom

✦ *Schedule of the work plan*

The Project will be developed between Months M01 (September 2021) to M24 (August 2023).

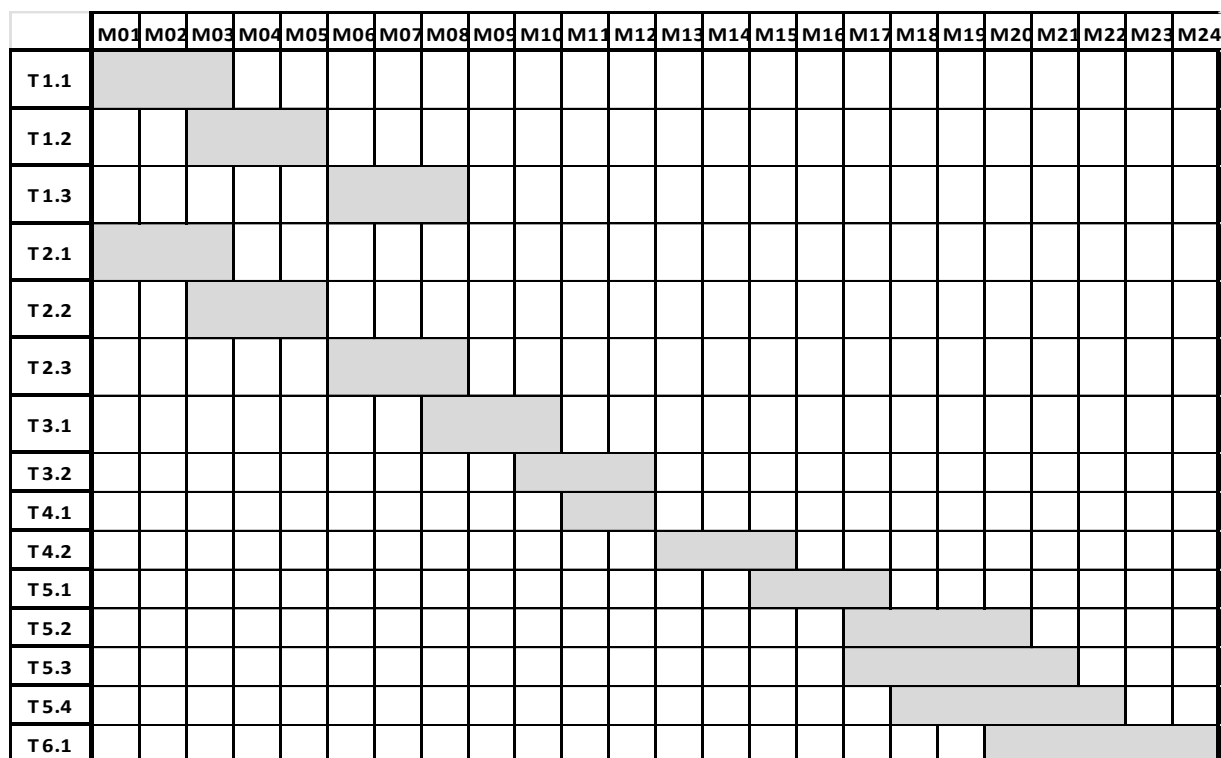


Figure 1. Scheduled DIASDGES project's work plan.

3.1.1 Participant Entities

The DIASDGES Project is being developed with the participation of four entities, being all of them UPV's schools. Concretely, these are the School of Industrial Engineering, the School of Telecommunications Engineering, and the Higher Polytechnic School of Alcoi. The project is run in five different degrees. Table 1 shows the participating degrees and entities.

Table 1. Degrees and entities participating in the DIASDGES project.

<i>Degree</i>	<i>Entity (School)</i>
Bachelor's Degree in Industrial Engineering	School of Industrial Engineering
Bachelor's Degree in Informatics Engineering	Higher Polytechnic School of Alcoi
Master's Degree in Telecommunication Engineering	School of Telecommunications Engineering
Bachelor's Degree in Digital and Multimedia Technology	School of Telecommunications Engineering
Bachelor's Double Degree in Mathematics + Telecommunication Technologies and Services Engineering	School of Telecommunications Engineering
Bachelor's Degree in Industrial Organization Engineering	School of Industrial Engineering

4 RESULTS

Regarding the results of the project, we expect to generate a set of tools, documents, evidences, advices and best practices that can help to develop the knowledge and awareness about the SDGs, and that can be shared and used by the whole academic community. More precisely, the outcomes of the project, given by each project's objectives, are the following:

SO 1: Analyze the degree of knowledge that university students have regarding the SDGs

Evidence SO 1.1: Questionnaire developed

- Evidence SO 1.2: Document with the analysis of the surveys carried out

SO2: Analyze the perception that university students have regarding the SDGs and the relationship that may exist between their future profession and the SDGs

- Evidence SO 2.1: Questionnaire developed
- Evidence SO 2.2: Document with the analysis of the surveys carried out

SO3: Design teaching-learning activities that can develop, in a positive way, the knowledge and perception of the SDGs by students

- Evidence SO 3.1: Documentation of designed activities

SO4: Design teaching-learning activities that can develop professional skills that can lead to the development of the SDGs in an integrated way with their profession

- Evidence SO 4.1: Documentation of designed activities

OE5: Implement the activities designed in the classrooms and analyze their results

- Evidence 5.1: Activities implementation plan
- Evidence 5.2: Analysis of the activities carried out and their result
- Evidence 5.3: Analysis of student satisfaction with the activities developed

SO6: Identify good practices, recommendations and areas for improvement of interest to teachers to work and develop skills that help to develop the SDGs

- Evidence 6.1: Document of Recommendations and good practices for the development of competencies that help the development of the SDGs in the classroom

In this way, the concrete improvements shown below can finally be achieved, as a result of the educational innovation proposed:

- Improve the degree of knowledge and perception of the SDGs by students (and teachers).
- Integration of the SDGs in the professional competences of the subjects
- Adapted, quality learning activities within an improved training itinerary

The results of this project will be 100% transferable to other groups of students. Both the questionnaire for the analysis of the initial situation of the degree of knowledge and perception regarding the SDGs, as well as the results obtained after the analysis, can be used not only in the subjects and degrees participating in this project, but can be transferred as starting point of other subjects in the same degrees, and can also be applied to other degrees.

Also the activities that are designed and developed can be applied in other groups of students. Of course, taking into account the characteristics of your environment

5 CONCLUSIONS

In the environment in which we find ourselves, and the current economic, social and environmental situation, reaching the SDGs must be a priority for the whole world. And for this, professionals are necessary aware of them, and with the knowledge to apply them. However, university students, in general, say they do not know the Sustainable Development Goals and that the information they have received through various means, including university teaching and social networks, is very scarce. In addition, in achieving the SDGs, they value professional implications less than personal ones.

In this way, given this situation that exists in the university environment, the development of an Educational Innovation and Improvement Project (PIME) is proposed to be able to investigate the degree of knowledge about the SDGs that university students have, as well as the awareness that have towards them, and thus be able to propose appropriate training strategies and activities that can integrate the SDGs in university education.

In this paper, we have presented an overview of the DIASDGMSES project. The project is centered in the SDG's and its main objective is to increase the awareness and level of knowledge of the students regarding these SDG's.

We have presented the project, its methodology, and the environment where the project is gonna be implemented. We have also presented the objectives, tasks, and the scheduled work plan. At the time of writing, the project is still being developed, and the presented activities and tasks are being carried out too.

The project is being implemented in some of the planned subjects, and, soon, results from the firsts steps of the project will be published. The results and the feedback obtained so far are quite promising, so that we expect to confirm this trend at the end of the project.

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