The Importance of the Role of the Internship Student in the Transfer of Knowledge of Open Data and Sustainable Development Goals at the Universitat Politècnica De València. Evidence from the Càtedra De Governança De La Ciutat De Valènica

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Abstract

The achievement of the Sustainable Development Goals (SDGs) requires efforts and advances in all fields of science. However, it is essential to have the greatest amount of data available without the need to generate new data with each step of the research. However, changing the paradigm from the value of data to the value of knowledge generated by data is not easy. That is why we must begin by promoting the benefits of a good open and reusable data policy at all levels among students and professionals in the sector. The innovation presented in this work is based on how a multidisciplinary environment can provide an important role to interns for the transfer of open data knowledge and Sustainable Development Goals at the Universitat Politècnica de València (UPV), Spain. To this end, evidence of the performance of students in internships within the Governance Chair of the City of Valencia is presented, where students have carried out mentored workshops, conferences, and seminars, where they have transferred knowledge and generated dissemination of the importance of open data. To other students, improving their transversal skills, especially teamwork and oral communication.

Key words: Open data; Authentic activities; SDGs, Reverse teaching; Transversal competences

Introduction

The use of open data in academic research has become increasingly important in recent years due to the growing access to large datasets and the need for reliable and up-to-date information for research. Open data is data that can be freely used, reused, and redistributed by anyone without restrictions of copyright, patents, or other control mechanisms. The idea behind open data is that by making data more accessible and transparent, it can foster new innovations and discoveries in a variety of fields, from science and technology to politics and society at large. Open data can be particularly valuable for businesses, researchers, and governments seeking to make the most of the information available and can be used in university studies in a variety of areas, such as social science research, health, environment, and technology, where

trends and patterns can be analyzed across a wide range of topics. For example, open data on climate change can be analyzed to assess its impact in different regions of the world, as well as public opinion studies, survey analysis, social network data, artificial intelligence, data mining, and data visualization.

It is important to note that the use of open data in university studies must be ethical and respect the privacy and security of the people involved in the data. In addition, the quality and reliability of the data must be taken into account to ensure that the research results are accurate and useful in order to encourage reuse. Data reuse can be particularly valuable in the field of science and technology, where the combination of different datasets can lead to important discoveries and research breakthroughs. Data reuse can also have economic benefits, as it can save time and resources by not having to collect new data from scratch. Furthermore, by sharing data and enabling data reuse, new collaborations and discoveries in different fields can be fostered.

The innovation presented in this paper is based on the work of multidisciplinary groups, which include people with different skills, knowledge, and perspectives to tackle complex problems and carry out ambitious projects. These can be particularly effective in the field of science and technology, where specialized knowledge in fields such as computer science, physics, biology, and engineering are required to solve complex problems. By working together, members of a multidisciplinary team can bring different perspectives and solutions to a problem, which can lead to important breakthroughs in research and innovation. Knowledge transfer can be an effective way to foster collaboration and teamwork. Students can learn to work together and help each other in the process of transferring knowledge.

In addition, knowledge transfer can also help to improve the effectiveness of learning and teaching in the classroom. Instead of relying solely on the teacher, students can actively contribute to the learning process, which can improve learning and academic performance.

Finally, knowledge transfer between students can also help improve self-esteem and confidence. When one student succeeds in teaching another, he or she may feel more confident in his or her ability to understand and apply the knowledge.

David Johnson and Roger Johnson are educational researchers who have studied the effectiveness of cooperative learning in the classroom and investigated how knowledge transfer between students can improve understanding and academic achievement. In their book "Cooperative Learning in the Classroom" [1], the Johnson brothers present the theory and practice of cooperative learning and offer strategies and tools for successfully implementing this methodology. Their research has shown that cooperative learning can improve students' academic performance, motivation, and engagement, as well as foster the development of social and emotional skills.

One of Lorna Earl's main contributions has been her focus on formative assessment, which seeks to engage students in the teaching and learning process to improve their academic performance. Earl has argued that formative assessment is a powerful tool for improving learning and has developed strategies for implementing it in the classroom [2].

In addition to his work on formative assessment, Earl, L. [2] has advocated the importance of involving students in teaching and learning. He has argued that students should be seen as partners in the learning process and should be encouraged to take an active role in constructing their own knowledge. And has developed strategies for engaging them in learning, such as project-based teaching and effective feedback.

Some authors and studies support the idea that student-to-student presentations can be an effective form of collaborative learning: David W. Johnson, Roger T. Johnson, and Edythe Johnson Holubec in their book "Cooperation in the Classroom" (2000) argue that student-to-student presentations are an effective form of collaborative learning as they encourage active student participation and shared responsibility in the learning process. In the study "The Impact of Student-to-Student Presentations on Peer Learning" (2006) by J. Todd Frazier and Chris L. S. Coryn, it was found that student-to-student presentations enhance peer learning by increasing understanding of concepts and retention of information. According to the research "The use of student presentations as an effective form of collaborative learning in higher education" (2011) by L. Michelle Estes and Jennifer H. Meadows, student-to-student presentations promote active participation and shared knowledge building in the classroom. In the study "Student-to-student presentations: an analysis of the impact on learning" (2018) by Gabriela Alejandra Moreira and Liria Liliana Gisbert Cervera, student-to-student presentations were found to be an effective form of collaborative learning, as they encourage critical reflection and knowledge transfer.

In addition, the Càtedra de Governança de la Ciutat de València is a meeting point between the Polytechnic University of Valencia (UPV) and Valencia City Council to promote research, knowledge transfer, and innovation in the field of urban governance. Within it, there are students on internships collaborating and carrying out their final undergraduate or master's degree projects. Students participating in internships at the Chair have the opportunity to apply the knowledge acquired in their degree to real projects and to collaborate with professionals and experts in the field. In this context, the role of the internship student is fundamental in the transfer of knowledge of open data and Sustainable Development Goals (SDGs) in other degrees different from the UPV, participating in research projects and development of technologies for the collection, analysis, and visualization of open data; developing proposals for the implementation of sustainable development strategies and policies in the city of Valencia; designing and executing awareness and dissemination campaigns on the use of open data and the SDGs in the university community and the general public. The use of open data in the subjects taught at the Universitat Politècnica de València (UPV) and in the final degree, master's, and doctoral theses is a motivation that is pursued in order to achieve quality data since the use of data and its reuse ensures that the data are alive and thus serve to make decisions when making analysis with them.

In short, the role of the student interns of the Chair is crucial for the transfer of knowledge of open data and SDGs in various degrees of the UPV and for the advancement of research and development of technologies and policies for sustainable urban governance in the city of Valencia, as well as promoting the use of these data in the university environment, reflecting on the importance of the publication of data by the local administration and on the importance of data quality.

In addition, the authors of this innovation actively collaborate in the achievement of the objectives of the Educational Innovation and Improvement Projects (PIME), two of the 2021 call (PIME/21-22/268) and (PIME/21-22/269) and one of the 2022 call (PIME/22-23/354).

Objectives

The combination of the Càtedra de Governança de la Ciutat de València and the development of the Educational Innovation and Improvement Projects generates a multidisciplinary working group that provides a scenario conducive to fostering the transfer of knowledge from student to student in a way that improves the transversal competences of the participants and encourages the use of open data among students and professionals with potential use of open data in their professional performance.

Therefore, the main objective of this work is to demonstrate the importance of the role of the student intern in the transfer of knowledge of open data and Sustainable Development Goals at the Universitat Politècnica de València (UPV). Thus, evidence of the performance of students in internships within the Chair of Governance of the City of Valencia will be presented. Thus, the following specific objectives must be met.

• Encourage the formation of working groups in multidisciplinary teams where specific knowledge of their respective degrees can be transferred among peers.

• Mentor trainees to guide and advise them in order to improve transversal competences both within the working group (teamwork and leadership skills) and in terms of peer-to-peer knowledge transfer (public speaking).

• Use authentic activities (those that are similar to their professional activity) in the peer-to-peer transfer sessions using the Valencia City Council open data catalog as an example and in the context of the importance of geo-referencing data.

• Link and demonstrate the importance of open and quality datasets as a decision-making tool to achieve and improve the 2030 Agenda and the Sustainable Development Goals (SDGs).

• Demonstrate to students themselves the importance, regardless of field or discipline, of creating and reusing open data.

• Encourage the reuse of data as a new paradigm where the value lies in the knowledge generated through the data rather than in the data itself.

Development of Innovation

In order to achieve these objectives, we rely on the university, which is one of the fundamental environments for the promotion of the use of open data. Project-based teaching-learning methodologies are used in the teaching of subjects. Final degree projects, master's degree projects, and doctoral theses are carried out in which data are used continuously. If the university encourages the use of open data, and teachers, researchers, and, above all, students become accustomed to its use, the importance of open data and its use will become established in society and will reach other environments, such as companies and citizens. Moreover, encouraging the use of open data at the university among teachers and students will boost the improvement of the quality of the data and can lead to interesting projects that are useful for citizens and local government. It is important for students to live together and share their knowledge in order to be productive in a multidisciplinary working environment, enhancing their teamwork and leadership skills.

Figure 1: Working meetings of students of the Chair.

Therefore, the activities developed encompass the three university figures where open data can play an important role in their personal and professional development: 1. Teaching and research personnel; 2. In order to carry out this innovation, several working meetings were held (Figure 1) where the transfer workshops were prepared, and the objectives and methodology to be followed in carrying out the workshops were shared. In all the sessions, a presentation was given, with a subsequent talk on the points covered in the presentation, inviting the attendees to provide feedback (Figure 1).

Activities carried out

The activities developed to achieve the transfer of knowledge of the importance of open data and its relationship with the Sustainable Development Goals (SDGs) among students and thus achieve the objectives described are the following on the one hand, a seminar for the PDI and PAS, four seminars in different degrees on What open data of the city of Valencia gives me, and finally a seminar

in each of the courses of degree and master of the ETSIGCT and a seminar for students members of the Chair made by themselves.

PDI and PAS Conferences: Agenda 2030 and SDGs in ETSIGCT courses

The aim of this first day was to raise awareness of the Sustainable Development Goals (SDGs) in the framework of the 2030 International Development Agenda and to identify strategies to incorporate the SDGs in the degrees of the School of Geodetic, Cartographic and Topographic Engineering (ETSIGCT).

To achieve the objectives, the day began with a presentation of the SDGs in which the speakers described their experiences working with the SDGs, followed by group work and discussion on the pre-design of activities that would incorporate the SDGs into the different subjects taught at school. This session was aimed at researchers and teachers (Figure 2). The conference was held on 16 June from 10 a.m. to 12 noon in classroom 0.1 of the ETSIGCT (UPV) (Figure 2).

Figure 2: Staff and administrative and service staff day.

Student conferences. "What does the open data of the València City Council give me?

A total of four conferences have been held in four different degrees, three at the UPV and one at the UV, under the title "What do the open data of the València City Council provide me with? The aim of these conferences was to teach what open data is and the benefits of its use for society and companies. This last part was developed differently depending on the subject in which the conference was held in order to discuss the importance of open data in the field of their studies (authentic activities).

The conference ended with two surveys: one to find out the knowledge of university students about open data and the other to find out the needs and suggestions that students have on the open data portal of the València City Council.

The first survey is How much do you know about open data?

With the following questions:

- Do you know what open data is?

- Have you ever used open data?

- Do you remember what was the source of the open data you used?

- What did you use them for?

- Have you used open data provided by the València City Council?

- The second survey is "What can we do for you? With questions such as:

- What would you suggest changing, deleting, and/or adding to the València City Council open data portal?

- Which dataset and which fields would you like to have in Valencia's open data portal?

- What would you want to do with that information?

- Extra comments

Conference at GAP

This conference took place on 9 November from 12 noon to 1 p.m. at the School of Business Administration and Management (ADE, UPV) in classroom Module 4 (Figure 4). In this case, special emphasis was placed on how open data benefits public administrations and what they contribute to them (Figure 3).

Conference on Cultural Management

The aim of this conference was to show what open data is and the benefits it has for society, companies, and especially for students of cultural management, galleries, libraries, archives and museums (Figure 3).
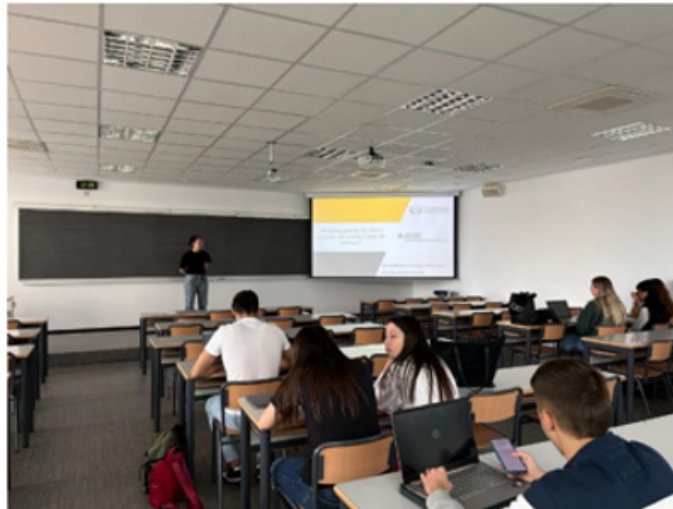

Figure 3: GAP student day (UPV).

This conference took place on 28 November from 4 to 5 p.m. in Aula 3A3 of the departmental building of the Faculty of Social Sciences at the University of Valencia (Figure 4).

Figure 4: Cultural Management Student Day (UV).

Conference at ADE

This conference took place at the Faculty of Business Administration and Management of the UPV (Figure 5), on 1 December. In this case, we sought to show the importance of open data published by companies and open data from other institutions for companies (Figure 5).

Figure 5: ADE students' day (UPV).

Chemical Engineering Conference

This conference took place at the ETSII (Figure 6) on 13 December. On this day, we discussed the more technical side of open data and its usefulness for businesses and citizens. In addition, we linked it with an explanation of the SDGs, the Valencia 2030 urban strategy, and the Valencia 2030 indicators (Figure 6).

Figure 6: Chemical engineering students' day (UPV).

Conferences at ETSIGCT

The following is a presentation of the conferences that have been held in the different courses of the ETSIGCT, where the aim was that all students of this school get to know the ODS, open data, and the use of Geographic Information Systems (GIS) and get to perform analysis with this tool, as this is a discipline highly demanded by the labor market of the degrees taught in this school. The presentations have been adapted to the knowledge of each of the courses (figure 7-11).

Figure 7: 1st Geomatics Student Day (UPV).

Figure 8: 2nd Geomatics Student Day (UPV).

Figure 9: 3rd year Geomatics student day (UPV).

Figure 10: 4th year Geomatics student day (UPV).

Figure 11: Student Chair's Day (UPV).
Student conferences of the Chair.

Survey of teachers, researchers, and practitioners: Open data for SDG achievement

In order to have a broader view of the use of open data and the needs of users for the open data portal of the València City Council, a survey of Open data for the achievement of the SDGs was carried out. In addition, questions on the SDGs were added to the survey to also measure whether the service provided by the València City Council's open data portal helps to work towards achieving the Sustainable Development Goals.

The target audience was university lecturers, researchers, and professionals. For this reason, a survey was carried out and publicized through the social networks of the ETSIGCT and the Càtedra Governança de la ciutat de València. In this way, a wider and more diverse audience was reached than the one that usually attends face-to-face conferences.

The survey (Figure 12) consisted of the following questions:

Figure 12: Survey.

- Profession

- Which Sustainable Development Goals (SDGs) are your work most closely related to?

- Do you use open data in your projects?

- Have you used open data provided by the València City Council?

- What data sources do you use in your projects?

- What data would you like the open data portal of the València City Council to offer?

- For which SDGs do you think more data is missing?

Discussion of the results

After having carried out all the informative workshops and with the survey for professionals disseminated through social networks, we will discuss the main results obtained from the surveys in this section.

Survey: How much do you know about open data?

With some 63 responses, more than 60% of respondents know what open data is, but only 54% have used it (Figure 13).
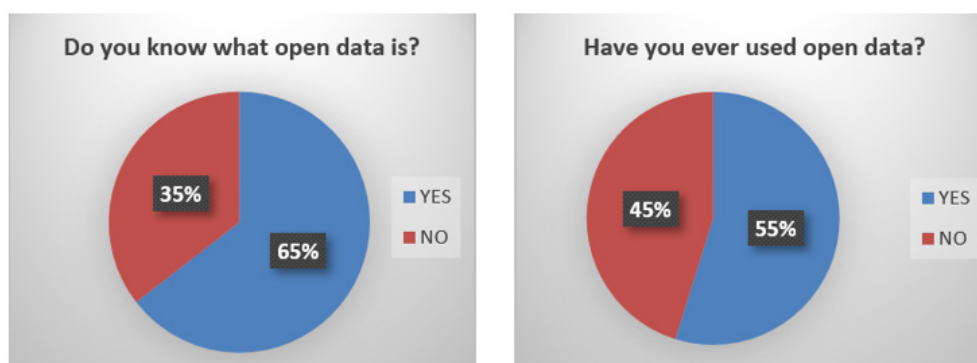

Figure 13: Questions 1 and 2 of the survey.

Respondents who have used open data have used data sources such as their local town council (municipalities in Valencia), GVA Oberta, INE, state defense, the transparency portal, Wikipedia, or similar. Most of the respondents used them for academic projects, for queries such as civil service examination scales or working conditions of women architects, and for research.

Finally, 50% of respondents have never used open data from Valencia City Council, the ones they have used are the statistics office and the open data portal, in that order. The geoportal is the least used.

Poll: What can we do for you?

This survey has 23 responses. The questions in this survey are all open-ended, as suggestions are sought for Valencia's open data portal. Respondents' suggestions are summarised below:

What would you suggest changing, deleting, and/or adding to the València City Council open data portal?

Some suggestions refer to the difficulty of finding things or knowing what there is, and for this reason, they propose "creating an index or a guide where all the open data that the portal offers can be found so that it is easier to access". In addition, they ask for more intuitive filters and for the classification by subject to be more precise with the content. On the other hand, according to the respondents, the many labels of some data confuse the user.

Which dataset and which fields would you like to have in Valencia's open data portal?

Data that respondents are missing are sports themes, data on the municipalities adjoining the city of Valencia or the Valencian Community. Also, respondents asked for data on scholarships and the economy, fields, and soil quality. Many respondents asked for more data related to culture, such as theatres, museums, cultural institutions, cultural events, theatre schools, music schools, etc.

What would you want to do with that information?

Respondents believe that they would use the information mainly for consultation but also for academic projects or professional projects (mostly related to culture).

Finally, some comments added by respondents include:

"Data can also be added on where the cat colonies in Valencia are located in order to be able to make a study of their evolution".

"In order for a proper cultural database to work, it would be essential for public institutions to keep the agenda of events organized in advance in order to be able to plan attendance at events.

Open data for achieving the SDGs

There was a total of 28 responses, most of them from geomatics engineers, topographers, and professors. But also, many professionals such as architects, designers, consultants, etc.

When asked which SDGs their work is related to, the majority related to SDG 9, Industry, innovation, and infrastructure, and SDG 11, Sustainable cities, and communities. Several also work with SDG 4, Quality education, and SDG 7, Affordable and clean energy (Figure 14).

The most important question in the survey was whether they had used open data in their work, the majority of the answers were "yes". This was answered by the majority of geomatics engineers, surveyors, university professors, and researchers (Figure 15).
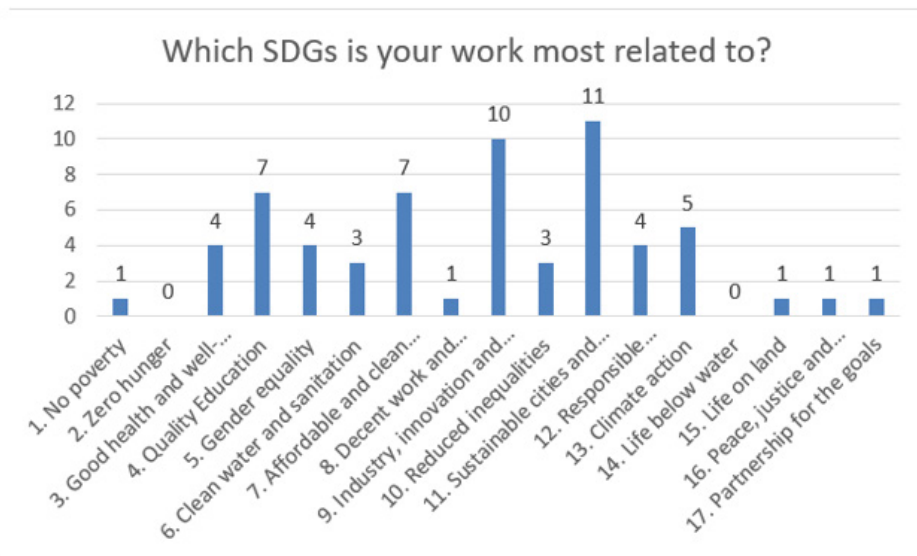
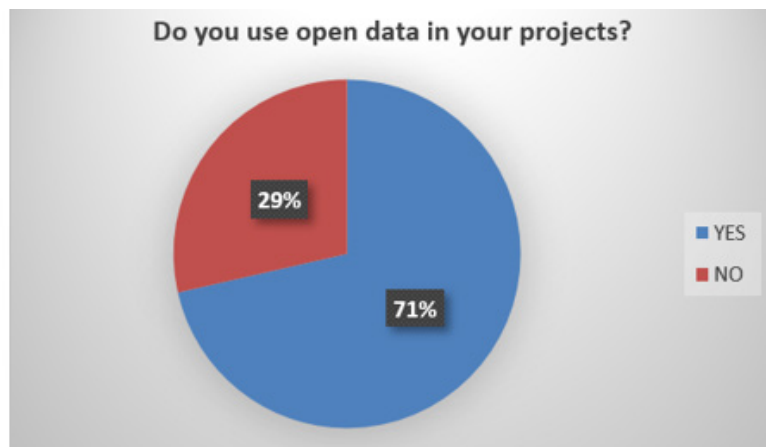**Figure 14:** Respondents' work-related SDGs.

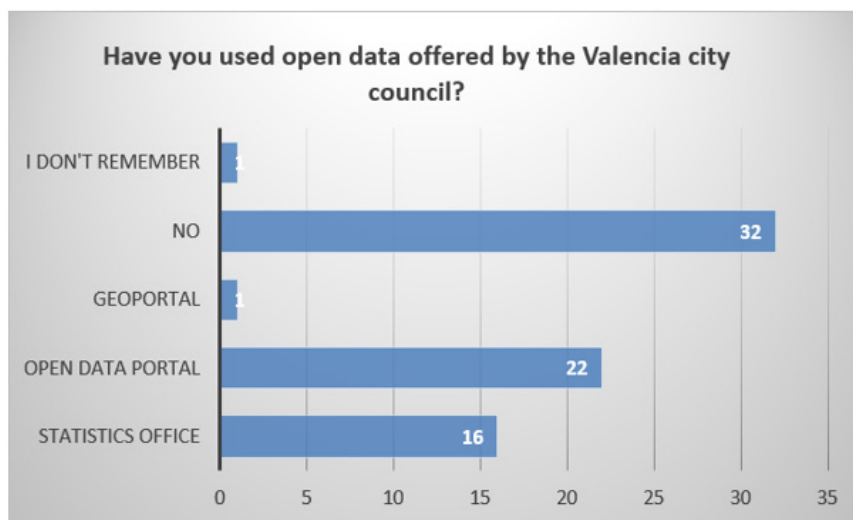**Figure 15:** Graph on respondents' use of open data.

Figure 16: València City Council's use of open data.

Respondents either did not use Valencia City Council's open data or used the open data portal. The last known source is the geoportal of Valencia city council, so accessing it from the open data portal is recommended (figure 16).

Other open data sources used by respondents include the DGT, the IGN, IGS, EUREF, CNIG, and IDEV; Cadastre and land registry geoportal, statistical portals, articles or BOE, and meteorological data platforms.

Data that the citizens surveyed are missing are population, functional areas, data on economic activities, local shops, data on sports, public land, urban planning, data on street lighting, data on crime by neighborhood, data on shops, purple spots, and NGOs.

In general, citizens demand data related to all SDGs, although data demands for SDGs 4 (quality education), 11 (sustainable cities and communities), and 14 (underwater life) stand out (Figure 17).
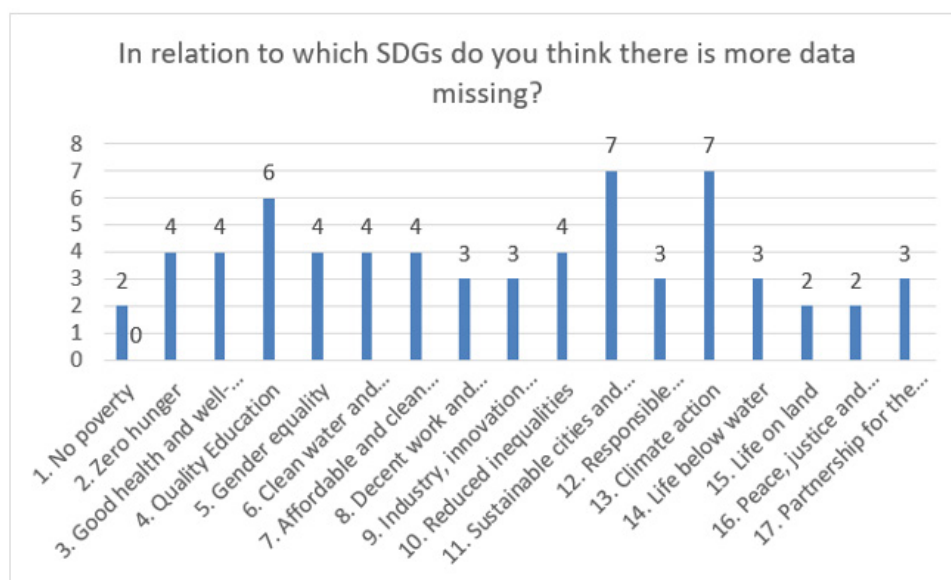

Figure 17: Demand for SDG-related data.

Conclusions on Innovation

At the end of the workshops, a working session was held with the students of the Chair, where it was concluded that transferring the knowledge to other peers had helped them improve their self-esteem and confidence. After the workshops, they are less afraid of facing an audience and have improved their public speaking skills. The chair students who attended the workshops with students from the first years of the course emphasized that, in order to make themselves understood, they needed to use simple language and look for easy examples to support their speech, sometimes without prior preparation. This adaptation demonstrates their ability to understand and apply knowledge, thus gaining self-confidence and self-assurance.

In conclusion, knowledge transfer between students from different university degrees can be an enriching and beneficial experience if carried out properly. Students can learn from each other, develop communication skills, and receive valuable feedback that can help them improve their work and skills.

However, it is important to keep in mind that there are some challenges, such as differences in knowledge levels, lack of context, and time constraints. It is important to address these challenges carefully and strategically to ensure that learners benefit the most from this experience.

In general, knowledge transfer between students from different university degrees can help foster a culture of collaboration and mutual learning in the academic environment, which can be very valuable for students' personal and professional development.

Student-to-student knowledge transfer can help strengthen understanding and retention of knowledge, foster collaboration and teamwork, improve the effectiveness of learning and teaching, and enhance students' self-esteem and confidence. It is, therefore, important to encourage and support student-to-student knowledge transfer in the classroom.

Acknowledgments

Conflict of Interest

No conflict of interest.

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