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Spanish University Students' Awareness and Perception of Sustainable Development Goals and Sustainability Literacy

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Abstract: The implementation of Agenda 2030 and the Sustainable Development Goals (SDGs) by the United Nations in 2015 focuses on making a more sustainable world in all countries and for all stakeholders. Higher education institutions (HEI) play a key role in increasing students' sustainability knowledge, transforming their attitudes and motivating them to promote or engage in sustainability behaviors. HEI can take several measures to fulfill these objectives, but it is important to develop efficient tools to assess the starting point at which university students are at. In this study, a survey was conducted that addressed students from different Universitat Politècnica de València (UPV) degrees to investigate their knowledge and awareness of sustainability and SDGs. This survey ($n = 321$) showed students' levels of knowledge and initial awareness. Many UPV students state that they are aware of the SDGs, but most do not fully understand these 17 goals and their current implementation but think that the SDGs are important for their daily lives. Therefore, finding links between the SDGs and daily interests is necessary to advance toward further implementation to allow us to fulfill all SDGs. These results offer a good starting point for evaluating future training and awareness actions to improve sustainability-related educational strategies.

Keywords: sustainability; ASK survey; SDGs; higher education



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1. Introduction

The planet Earth, our common home and its people and ecosystems face different problems (e.g., hunger, poverty, illness, armed conflicts, depletion of natural resources, contamination in all its forms, climate change) [1,2]. These problems can differ depending on a country's wealth, and also accessibility and level of education, technology development, social inequalities, concern for environmental care, etc. [3,4]. We all, individually and/or collectively, should form part of the solution to these problems, regardless of social, economic or environmental aspects. Here, higher education plays an essential role in training students who, in their personal and professional lives will be able to act in favor of solving these problems by applying the most appropriate technologies, developing more efficient industrial processes, promoting the individual development of people and societies, participating in the development of less developed countries, etc. The future of humanity and our planet lies especially in the hands of today's younger generation. Principle 3 of the report from the United Nations (UN) Conference on Environment and Development states that "The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations" [5].

Sustainable development (SD) was defined in a report, *Our Common Future*, by the World Commission on Environment and Development (also known as the Brundtland Report) in 1987 as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [6].

The UN’s General Assembly adopted the Millennium Declaration in September 2000 [7]. From this declaration derived a set of eight measurable development goals, entitled the Millennium Development Goals (MDGs), with targets set for 2015 [7].

In 2015, the progress made in achieving the MDGs was evaluated and, as part of Agenda 2030 for sustainable development, approved in September 2015 by the UN’s General Assembly [8]; sustainable goals were redefined, and the list of objectives was extended and named the Sustainable Development Goals (SDGs). Agenda 2030 has an extensive plan of action based on three axes: people, the planet and prosperity. The SDGs are a set of priorities that address humanity’s most pressing challenges [8]. The SDGs present a set of social, economic and environmental challenges. To fulfill them, they entail transformations in the functioning of societies and economies, and in the way we interact with our planet [9].

1.1. Role of Universities in Education toward SD

Education is the most promising mechanism for cultivating a more sustainable future [10–12]. According to the Global Education Monitoring Report [13], “Education has long been recognized as a critical factor in addressing environmental and sustainability issues and ensuring human well-being”. Despite sustainability knowledge acquisition being a necessary element for students to engage in SD, it is not the only one. According to Michel and Zwickle [14] “increasing students’ level of sustainability knowledge should be a top priority of institutions of higher learning”. Universities are a key element to achieve SD and SDG by considering their three basic functions par excellence: training, research knowledge creation and transfer [15,16]. They have a moral responsibility to future citizens to develop a more sustainable and engaged world [12,17,18]. Moreover, future professionals must have the tools to solve sustainability dilemmas in their professional lives. Universities should provide students with skills, knowledge and encouragement to address sustainability challenges in a globally complex world [19], by helping future generations to become responsible and active citizens, by not only increasing their academic knowledge but also improving their attitudes and behaviors toward a more sustainable society [19,20].

Dzimińska et al. [21] stated that universities might create a culture for SD through: (1) teaching which addresses sustainability challenges; (2) using inspired real-world problems-based research; (3) engagement with individuals and institutions. Lozano et al. [22] distinguished four different strategies for integrating SD into curricula: (1) infusing some environmental issues into an existing course; (2) developing a separate SD course; (3) integrating the SD concept into each course; (4) providing SD specializations in the faculty curricula. Maruna [23] highlights key aspects to improve the curricula and includes the sustainability concept: (1) the structure of the course curricula; (2) interdisciplinarity; (3) partnerships with institutions and communities; (4) links with scientific research work; (5) practice orientation; (6) improving teachers’ competence levels; (7) improving the accreditation process.

Membrillo-Hernández et al. [24] stated that the original concept of sustainability should be extended to the competencies that higher education graduates develop, regardless of their academic program. They suggest sustainability as a transversal competence and provide a definition of it: “The student possesses the knowledge, skills and attitudes necessary for the successful performance of the task and the resolution of problems related to the challenges and opportunities for sustainability in today’s world”. Dzimińska et al. [21] drew up a list of various skills (e.g., social, personal, intercultural, service, and business in the real world) that are recognized as being the most important ones for SD, given their support for problem-solving and decision-making, and universities should help graduates to develop these skills.

To create a more sustainable world and address the sustainability-related issues outlined in the SDGs, individuals must become agents of change [25] and see challenges as opportunities. Raising public awareness of the SDGs is one of the key factors for their implementation [26]. According to Alomari and Khataybeh [27], when university students comprehend the scope of SDGs, they can contribute to and support, encourage and achieve development. Both teachers and students can be transformative agents of change to create a better global future. To do so, teaching–learning activities must be able to challenge and transform students. For this transformation, it is necessary for students to receive quality education on SD issues. However, knowledge is essential for promoting pro-sustainability and pro-SDG actions, but is not enough to develop students' views about SD [28]. As Mason [28] mentions, affective learning for personal transformation related to SD attitudes is also important, as is the motivation to promote or engage in sustainability behaviors.

Universities should promote students' critical reflective thinking about sustainability and complex aspects of SD and SDGs. Dzimińska et al. [21] recently proposed a conceptual model that presents interconnections between universities and SD and can serve to guide academia and public policymakers on how universities might get involved in pro-SD activities and, therefore, become culture change agents for SD. Many universities are working on integrating the SDGs into their institutions, university life, and also into the curriculum of undergraduate and postgraduate degrees [29–39]. Leal Filho et al. [40] mention that the SDGs offer opportunities to strengthen SD at universities and identify the fundamental obstacles to incorporating SD into universities. Universities can contribute to innovative approaches and can conduct sustainability research [12,41]. Sustainability should be embedded in students' whole curriculum [11] as it is a field of study that is interdisciplinary in nature [42,43]. However, taking only one sustainability course can increase students' pro-sustainability behavior [44,45]. In several studies, the relationship of contents of curricula, syllabi and training programs with SD and SDG is analyzed [31–33,46–49]. Lectures, case studies, interdisciplinary team teaching, collaborative learning methodology, serious games, etc., are some tools used to generate and transfer awareness about SD and SDGs to students [22,50–53]. Some networks and researchers are compiling, to join forces, good practices (teaching methods and pedagogical approaches) to include SD and SDGs into subjects [54–56]. Alm et al. [57] state that “in higher education, faculty from different disciplines can and should work together to significantly contribute to student learning about sustainable development”. Students need to integrate knowledge from various disciplines to propose solutions to the problems targeted by the SDGs [9]. Koprina [49] has integrated lectures on SD into several courses and placed a specific emphasis on SDGs. After courses, students had developed a certain degree of critical, imaginative and innovative thinking about SD in general, and SDGs in particular. Koprina [49] makes recommendations as to how SDGs can be critically taught. Ferrer-Estévez and Chalmeta [58] proposed a framework to guide academic institutions in integrating SDGs into their activity. In short, higher education has been designated as one of the most promising mechanisms to prepare future generations for sustainability [11].

1.2. Instruments Developed to Measure Sustainability Literacy, SD and SDG

Mason [28] mentions that “Sustainability literacy is conceived to be the knowledge, skills and mindsets that allow individuals to become deeply committed to building a sustainable future and helps them to make informed and effective decisions toward this end”. Several instruments, such as questionnaires or structured interviews, have been developed to measure sustainability literacy (Table 1). The objective of a questionnaire might be to assess specific knowledge gaps or obstacles in implementing sustainable actions [59]. One of the developed questionnaires is the Assessment of Sustainability Knowledge (ASK) [60,61]. It attempts to measure general knowledge of sustainability and includes questions about three domains: environmental, economic and social [14,62,63]. The environmental domain is related to the impact of humans on the ecosystem [64]. The economic domain is related to using resources to create goods and services that add value

to their lives [65]. The social domain is associated with the relationship linking human rights, environmental justice and corporate foresight [66].

Other questionnaires attempt to measure attitudes, such as the New Environmental Paradigm (NEP) [67] or the Sustainability Attitudes Scale (SAS) [60]. Sulitest (the sustainability literacy test) [68] designed an initial platform to foster a mission to “support expanded sustainability knowledge, skills and mindset that motivate individuals to become deeply committed to building a sustainable future and to making informed and effective decisions”. This test has been used by universities, companies, institutions, NGOs, citizens, etc., to assess and improve individuals’ sustainability knowledge and awareness [28,68]. The test itself consists of a series of international core questions taken from a test bank and a series of questions adapted to the specific testing location [69]. According to Kuelh et al. [69], the four themes of core questions are (1) sustainable humanity and ecosystems on planet Earth; (2) global and local human-constructed systems to cover people’s needs; (3) transition toward sustainability; (4) we each have roles to play to create and maintain individual and systemic changes. As part of Project EDINSOST [70,71], a student questionnaire was designed with 18 questions about the four sustainability competencies defined in 2011 by the Conference of Rectors of Spanish Universities (CRUE): (1) critical knowledge contextualization; (2) sustainable resources use; (3) participation in community processes; (4) the application of ethical principles [72]. With this questionnaire, Muñoz-Rodríguez et al. [72] measured the domain level of the sustainability competencies presented by students when they began and finished their studies to evaluate the students’ degree of improvement in sustainability competencies achieved in each analyzed degree. As part of Project EDINSOST2-SDG, another questionnaire was developed for students, which now contains 10 questions and 41 sub-questions to analyze how they self-perceive their sustainability training [73]. Akeel et al. [74] designed a closed-ended survey of questions and a sustainability literacy test (SLT) to examine the sustainability knowledge of the Nigerian engineering community, including engineering students. The SLT was designed according to several sustainability literacy assessment tools in the literature. It includes 15 questions covering the environmental, economic, social, and crosscutting domains of sustainability with an element of contextual issues. As Akeel et al. [74] mentioned, these domains are not visibly delineated in the SLT because questions are mixed to avoid a modular test design. Yuan et al. [75] designed a questionnaire survey for senior high school students to measure self-reported knowledge, information sources of their SDGs knowledge, involvement of SDGs in their courses and the corresponding subjects, the impact of their personal lives on SDGs, individual priorities among SDGs and career planning in relation to SDGs to understand their cognition, learning motivation and social readiness. Zamora-Polo et al. [76] designed a questionnaire to evaluate students’ knowledge. Students were asked about their previous knowledge of the SDGs, the source where they obtained this knowledge, the relationship between the SDGs and the profession for which they are being trained and their personal lives, and the development of the theme of each SDG in university studies. Aginako et al. [77,78] developed a questionnaire with two scales: one to know how engineering students perceive the level of SD insertion into their academic programs from a frequency perspective; the other, to measure the importance of students in their training process to the three sustainability dimensions (economic, environmental, and social), both personally and professionally. Yamane and Kaneko [79,80] conducted two online surveys in Japan. One of them targeted the whole adult population, which allowed the authors to compare different generational preferences for sustainable lifestyles between younger and older cohorts. The importance of this survey lies in the fact that the way we live must change for greater sustainability to take place [80]. To measure the sustainability of the respondents’ lifestyles, the authors asked about the expectations of society’s efforts to contribute to the SDGs, their work value and pro-sustainable behavior, including pro-globalization, pro-environment and pro-sustainable consumption behaviors. The other survey was designed for university students and investigated their preferences for companies depending on their SDG contributions and offered salary, and how student preferences

were affected by information on the SDGs. Sekhar and Raina [81] assessed the sustainability literacy levels of future managers from India in social, environmental, economic and crosscutting sustainability issues both nationally and globally with students from management education institutions. They also studied the self-assessment of sustainability knowledge and awareness of the “United Nations Decade of Education for Sustainable Development” (UNDESD). Alomari and Khataybeh [27] developed a questionnaire to assess the level of understanding of the SDGs by university students from the scientific colleges at Yarmouk University, Jordan. They prepared the questionnaire by considering international tests and the 2019 and 2020 UN reports on the SDGs. Smaniotto et al. [59] developed a questionnaire to assess knowledge of the SDGs and key sustainability issues (concepts, indicators, documents/models), information sources for such topics, and the expectations of the university to acquire such knowledge by first-year students from nine Italian universities. When the questionnaire was complete, they attached links to websites for further information and courses or events organized by each university. Aleixo et al. [82] administered a questionnaire to all the students of Portuguese public HEIs to explore their SD perspectives by examining their SD-related habits, behaviors, and experiences, what they knew about the SDGs and how SD would influence their decisions as future professionals. They used previous studies from other sources to prepare the questionnaire. Afroz and Ilham [83] designed a questionnaire that was administered to all the students at the University of Malaya to analyze their knowledge of and attitude toward, and their practice of the SDGs.

Table 1. Questionnaire for assessing sustainable literacy.

| Target Population | Name | Type of Questions | Reference |
|--------------------------------|--|---|---------------|
| The Ohio State University | Assessing Sustainability Knowledge (ASK) | Multiple Choice | [14,60,61,84] |
| Sulitest.org | Sulitest | Multiple Choice | [28,68,85] |
| Spanish Universities | Edinsost | Multiple Choice | [71–73] |
| Nigerian Universities | Sustainability Literacy test | True/False | [74] |
| Chinese Senior High School | Awareness of the SDGs | Likert Scale | [75] |
| Spanish University | Knowledge SDGs | Likert Scale | [76] |
| Spanish University | Students Perception SDGs | Multiple Choice | [77] |
| Secondary schools in Germany | Sustainability knowledge | Multiple Choice/Likert Scale/True/false | [86] |
| Online survey Japan | Sustainable lifestyles | Likert Scale | [79,80] |
| Indian Management Institutions | Sustainability Literacy questionnaire | Likert Scale | [81] |
| Jordan University | Understanding SDGs | Multiple Choice | [27] |
| Italian Universities | Awareness SDGs | Likert Scale | [59] |
| Portuguese Universities | Perceptions SDGs | Likert Scale | [82] |
| U.S. population | Climate Change knowledge | Multiple Choice | [87] |
| U.S. population | Environmental literacy | Multiple Choice | [88] |
| U.S. population | NEEF survey | Multiple Choice | [89] |
| Malaysia University | SDGs adoption | Multiple Choice | [83] |

Other studies have focused on awareness of the SDGs. Some have targeted general populations, while others have addressed university students (Table 2). These surveys or questionnaires ask about awareness of the SDGs, and often about where the respondents acquired the information from, or if they knew the influence of SDGs on their daily lives.

The Global Survey on Sustainability and SDGs [90] targeted private individuals and representatives of politics, business, academia, the media and civil society worldwide to ask for their opinions and expectations about sustainability and the SDGs. The aim was to prioritize relevant topics related to the environment, social issues and the economy in the respective countries and sectors, and to establish an urgency for action. The Global Survey contributes to the MY World survey. MY World [91] is the UN survey that asks citizens if they are aware of the SDGs and which 6 SDGs of the 17 existing ones are of immediate concern to them, and if their situation has improved, stayed the same or worsened in the past 12 months. Leal Filho et al. [92] developed a questionnaire to collect data on the SDGs and sustainability teaching at universities. It was structured in a manner that it could give information on the SDGs addressed in teaching, the degree of priority given to the SDGs in the learning process, reasons why SDGs are not included in the teaching practices, etc. The Afrobarometer is a pan-African research network that uses SDG scorecards to highlight citizens' experiences and evaluations of their country's performance in terms of democracy and governance, poverty, health, education, energy supply, water and sanitation, inequality, gender equity and other priorities reflected in 12 of the 17 SDGs [93,94]. These citizen assessments can be compared to official UN tracking indicators. SDG scorecards present both summary assessments for each SDG via blue, green, yellow, and red "stoplights", as well as the data behind these assessments [94]. Seven rounds of surveys have been conducted. The analysis of surveys is designed to help governments and advocates to assign more effective interventions via a better understanding of how their intended beneficiaries perceive and prioritize SDGs [94]. Suzuki et al. [95] designed a questionnaire survey to ask the general public in Japan about their individual concerns and interests in 25 MDG/SDG-related issues. In 2019, a survey, in which 28 countries participated, was conducted by Ipsos for the World Economic Forum to identify adults' familiarity with the SDGs and the importance they attach to each SDG [96]. In 2021, another survey was conducted by Ipsos to collect citizens' opinions on the priority SDGs to be addressed, and how they perceived the efforts of government, businesses and people to fulfill SDGs [97]. In 2016, the International Association of Universities (IAU) developed the first Global Survey on Higher Education and Research for Sustainable Development (HESD), a showcase to reveal what HEIs around the world are doing for SD. One hundred and twenty universities completed the survey. In 2019, a second edition of the Global Survey on HESD was developed. The second survey built on the first one but included more questions (with 35 vs. the previous 30) to focus more specifically on SDGs [98]. Using an online questionnaire, Jati et al. [99] assessed the level of university students' awareness and knowledge of the SDGs to check the accessibility of SDG information at Universitas Muhammadiyah Yogyakarta (Indonesia). A cross-sectional survey was conducted with 450 students and the staff of the Osun State University, SW Nigeria [100]. Data were collected by a semistructured questionnaire. The study population was made up of the students and staff (academic and non-academic) of this university. The study variables included awareness about, knowledge of, and attitude toward the SDGs. There were 25 knowledge questions. Most questions focused on the start date and/or period of the SDG duration, the dimensions of SDGs and the chronology of the SDGs in relation to MDGs, as well as a comparison of their contents. There were also five attitude questions. Alvarez-Risco et al. [101] developed a questionnaire for young university students to evaluate their knowledge of SDGs, their careers with SDGs, the importance of SDGs for economic development after the COVID-19 pandemic, and student's interests in research into SDG issues. Ando et al. [102] conducted a questionnaire by targeting Kyoto University students to investigate their perception of knowledge of SDGs, the source of information from which students became aware of the SDGs and their understanding of the current situation of each SDG. The last question was "to what extent do you think that Japan has achieved on each goal?". In 2017, the Vietnamese Center for Sustainable Development Studies implemented a questionnaire for young Vietnamese people aged 16–30 to explore their level of knowledge and understanding of the SDGs and to identify the priority SDGs upon which young people will act [103].

Table 2. Questionnaires about awareness of Sustainable Development Goals (SDGs).

| Target Population | Name | Type of Questions | Reference |
|------------------------------------|--------------------------|---------------------------------|-----------|
| Global survey | Awareness SDGs | Likert scale | [90] |
| Global survey | Awareness SDGs | Likert scale | [92] |
| Africa population | Afrobarometer | Multiple Choice | [93] |
| Japan population | MDGs/SDGs-related issues | Multiple Choice | [95] |
| 28 countries | Public opinion SDGs | Multiple Choice | [97] |
| World Universities | IAU survey | Multiple Choice | [98] |
| Indonesia University | Awareness SDGs | Multiple choice/Likert scale | [99] |
| Nigeria University | Awareness SDGs | True/False | [100] |
| Japan population | Dentsu survey | Multiple choice | [104] |
| Colombia, Ecuador, Mexico and Peru | Expectations SDGs | Likert scale | [101] |
| Kyoto University, | Consciousness SDGs | Likert scale Multiple choice | [102] |
| Vietnam | Youths Survey | Multiple choice | [103] |
| Nigeria University | Awareness SDGs | Multiple Choice | [105] |

Therefore, we can state that: sustainability assessment tools are prepared to collect information from students about self-reported knowledge on sustainability, SD or SDGs (including the reasons underlying each SDG, as well as targets, indicators, etc.) and the learning level (subjective knowledge and objective knowledge) [106]. We can also see how this knowledge changes over time [76] by achieving learning outcomes regarding sustainability across disciplines and courses [61], through students' perceptions of the sustainability competencies acquired in degrees [70,77], the relationship between SD and/or SDGs and the profession for which they train, alongside their personal lives and the academic sphere [29,77]. From the sustainability assessment tools, we can also understand the development of the theme of each SDG in university studies [29] and the sources of information used to acquire SD- and SDG-related competencies [59], the level of importance that students attach to SDGs [76], and how students perceive the relationship between SDGs and the professional career that they pursue [101]. Furthermore, interest in research about each SDG [101], students' participation in SDG implementation, and their attitudes and commitment are also understood through these assessment tools. The results of these assessment tools should provide insights to enhance students' awareness, knowledge and competencies in relation to sustainability, and encourage student engagement in global SD [75]. The interesting point is, that questionnaires can go further, because, for the Sulitest survey, Mason [28] mentions that generating interest in sustainability-related issues, improving sustainability-related understandings and motivating participants to learn more and to act, is done so learners can see sustainability opportunities in the world around them, which also helps learners to "understand the bigger picture" [28].

Preparing a sustainability assessment tool is no easy task, given the need for economic resources to design, collect, and interpret data [28]—mainly when the sample size is large—as well as the need for scientific, social, legal and historic knowledge about sustainability, pedagogical knowledge and a thorough bibliographic review. The most frequently used instrument to test sustainability knowledge comes in the form of a quiz [74]. It is important for questionnaires to include a validation process (independent experts, experts in survey design in the science education field, and to pilot test the questionnaire with a student population subset, clean datasets, check the internal consistency of questions (e.g., using Cronbach's alpha), etc.) and to be sure to differentiate between the categories (e.g., gender, kinds of studies, etc.). Students must be informed about the research purpose and give

their consent to use the data obtained from questionnaires. They will be informed about aggregate data processing and other ethical aspects of the research work.

Many of the questionnaires herein presented were completed online by students. The employed online tools were the Google Form[®] tool [76,77,107], SurveyMonkey [40,108], the EUSurvey platform [59], and learning platforms such as Sakai or Moodle, etc. However, paper-pencil questionnaires have also been utilized [86].

1.3. Implementing SDG at the Universitat Politècnica de València

The Universitat Politècnica de València (UPV) is working on implementing the SDGs. The Times Higher Education (THE) Impact Rankings assessed 768 universities from 85 countries against the UN's SDGs [109]. The UPV is particularly notable in SDG 12, which is responsible for production and consumption, and occupies position 16 in the 2021 ranking.

In 2020, the UPV presented its first "SDGs in Spanish Universities Report results: a UPV proposal to measure their degree of compliance", prepared by the UPV Center for Development Cooperation [110]. This document proposes a battery of indicators to measure the degree of implementation of Agenda 2030 in the university institution. The obtained data must be used to make decisions about the suitability of the strategies or initiatives underway, adopting corrective measures and launching new ones.

At the UPV, the Lifelong Learning Centre offers a workshop on Agenda 2030 and tools to integrate and implement the SDGs into a business strategy, while the Institute of Educational Sciences offers a workshop for students on Agenda 2030 and the SDGs.

One study by Millán and Pérez [111] shows that only 36% of students (51% from the Universitat de València, 49% from the UPV; both in Valencia, Spain) knew about Agenda 2030 and the SDGs. In 2021, and as part of an Educational Innovation and Improvement Project (PIME), Lull et al. [112] carried out a preliminary analysis of UPV students' knowledge about the SDGs by means of a simple questionnaire.

2. Main Objectives

The main objective of this work is to look closely at the awareness and perception of the SDGs, and to assess SD literacy, of the UPV students enrolled in different programs and subjects, as well as to study the influence of variables, such as gender or age, making comparisons with previous studies. The results will help to review the curricula of the involved programs and to design teaching methodologies to support university students' improved sustainability.

The specific objectives that have been defined for this study are to assess:

- The initial awareness of SDGs and the source of information from which students first became aware of the SDGs.
- Students' sustainability literacy regarding the different sustainability domains (environmental, economic, and social domains) according to gender, subject, level and study year.
- The perception of the SDGs in students' daily lives and future career choices related to SDGs.

According to the literature review and based on the objectives described above, the following research hypotheses have been developed.

Although the interest in SD has been present for some years, the efforts in introducing the SDGs to students are relatively recent.

Therefore:

Hypothesis 1 (H1). *The level of awareness of SDG in UPV students is low.*

Some initiatives have already been developed at the UPV in the past years to encourage SD knowledge among students [110]. For this reason, a second hypothesis can be analyzed:

Hypothesis 2 (H2). *Sustainability literacy of UPV students is good or, at least equal to the one assessed in similar studies.*

In a deeper level of interiorization, the third hypothesis addresses the perception of UPV students regarding the SDGs. Interested in the self-reported knowledge, the research hypothesis to test is:

Hypothesis 3 (H3). *There are significant differences between the level of understanding of the SDGs when considered separately.*

Finally, the last research hypothesis correlates students' expectations regarding SDGs in society and their personal involvement:

Hypothesis 4 (H4). *Higher expectations related to SDGs among UPV students correspond to active commitment to the SDGs at a personal level.*

3. Materials and Methods

3.1. Research Design and Materials

The final used questionnaire in this study has been elaborated based on questions from several validated and published surveys. It includes 23 questions organized into three parts (List S1). In the first part, the students' consent, age and awareness of the SDGs were assessed based on the previous work of Ando et al. [80]. In the second part, sustainability literacy was assessed by the revised ASK questionnaire of Zwickle et al. [61], adapted to our local context. In the last questionnaire section, the perception of the SDGs was assessed based on the previous works of Ando et al. [102] and Yamane and Kaneko [80].

The variables from the ASK questionnaire have been evaluated using discrimination and difficulty parameters. Discrimination regards how well an item can distinguish between individuals with different levels of the trait that the questionnaire intends to measure [113]. When applied to a knowledge questionnaire, as in this case, difficulty parameters relate to the percentage of respondents who correctly answer the item correctly [114]. Thus, high values suggest the easiness of the question.

3.2. Sample and Data Collection Procedure

The sample comprised 321 students out of 644 possible respondents from seven degrees (Table 3) of UPV (Valencia, Spain). Students voluntarily participated and their participation was not related to the qualifications of any subject.

Table 3. Samples included in the research.

| Level | Degree ¹ | Year | No. Participants |
|----------|---------------------|------|------------------|
| Bachelor | BDB | 1 | 124 |
| Bachelor | BDFEE | 1 | 18 |
| Bachelor | BDABE | 1 | 59 |
| Bachelor | BDAE | 1 | 18 |
| Bachelor | BDES | 2 | 32 |
| Bachelor | BDIT | 3 | 31 |
| Master | MDAE | 5 | 39 |

¹ BDB: Bachelor's Degree in Biotechnology; BDFEE: Bachelor's Degree in Forest and Environmental Engineering; BDABE: Bachelor's Degree in Agricultural and Biological Engineering; BDES: Bachelor's Degree in Environmental Sciences; BDIT: Bachelor's Degree in Interactive Technologies; BDAE: Bachelor's Degree in Aerospace Engineering; MDAE: Master's Degree in Agricultural Engineering.

Data were collected during the 2021/22 autumn term. Lecturers presented the project and study objectives in class. An online questionnaire on an online learning platform (PoliformaT) based on the Sakai system was used to collect answers.

3.3. Data Analysis

Statistical analysis was performed using Microsoft © Excel (Microsoft 365; Washington, DC, USA) and Statgraphics © Centurion XVI software version 18.1.13 (The Plains, VA, USA). Tukey's test was used to determine if the differences in the observed variable among groups according to the considered factors were significant or not [115].

4. Results and Discussion

Participation in the study was high (50%). The response rate for other studies about sustainability knowledge was lower (around 20%) but the target populations were bigger [61,84]. Online surveys normally obtain responses of around 20–30% and this range is considered an acceptable level of response [116]. Therefore, the answer rate obtained in this study can be considered representative of the target population. In our case, the response rate was higher, which could be due to teachers' involvement in promoting the questionnaire during the lectures and by email; these techniques can increase response rates [117]. Students' age was between 18 and 25 years (95.3%) because most were studying bachelor's or master's subjects. Some were aged between 26 and 33 years (3.4%) or between 34 and 41 (0.9%). Only one student was reluctant to give his/her age. No older students participated in the study. This means that the participating students belonged to the Z or Y generation (millennials) [118]. Age can be a predictor of sustainability knowledge [84], and generational differences can explain environmental concerns [119]. For these reasons, the results should be considered after taking the target population into account. The target populations' genders were half females and half males (50.5% vs. 49.5%) with a slightly higher response rate for females than for males (60.2% vs. 42.4%).

4.1. Awareness of SDGs

Only 15.9% of the students thought that they knew the SDGs well. Most answered that they knew them only by name (60.7%) and 23.4% stated that they did not know them (Figure 1). No gender differences were observed (data not shown) as in other studies [75]. This rate of awareness about the SDGs is slightly lower than in previous studies conducted at a university with Japanese students [102], or in the general Japanese population [104]. Japanese university students' awareness has improved in the last few years [120,121]. An OECD report [122] indicates differences between countries, but less than 20% of the population reports knowing the SDGs well. A global survey conducted at the beginning of 2020 places the percentage of awareness at nearly 50% [90]. A Spanish university sample also found little awareness of the SDGs, with no differences in engineering, education or health students [76], or in several engineering degrees [77]. Similarly, being less aware of the SDGs was found in a Chinese high school population [75], pre-service teacher degrees in Spain [123], in a Nigerian university population [74,99,100] and in a young Vietnam population [103]. However, more awareness for students from Latin America [101] or Indonesia [99] has been reported. More awareness has been observed at the leadership level in HEIs [98].

The main source of information (Figure 1) was from lectures (31.2%), followed by social media (14.5%) and web news (12.0%). Similar sources have been reported by Japanese university students [102], however, television was the main source of information for the general Japanese population [104]. The results obtained at a U.S. university showed that the main source of information was social media, followed by higher education coursework [14], and similar results have been obtained at a Spanish university [76]. For Chinese high school students, the main source of information about the SDGs was from lectures and traditional media [75], as it was for Italian university students [59]. In our study, no differences were observed between the students with a high SDG knowledge level compared

to the students who know SDGs only by name in regards to the source of information. This result indicates that universities and high schools are a key point for increasing SDG knowledge, although many students (23.4%) are unaware that they exist. Prior knowledge is important for building student learning [124]. In higher education, prior knowledge about sustainability can come from one's own personal experiences, academic background, the media, or family and friends [125]. Formal education, in both secondary and postsecondary classroom settings, showed the closest relationship to knowledge [14], and supports the effectiveness of implementing sustainability into the education curriculum [12,14]. Social media and websites are an important source of information, especially for younger generations [126], and social media algorithms seek what interests people. Thus, the students who report acquiring more knowledge from social media are more likely to be interested in sustainability issues [14]. However, traditional media are perceived as being more credible than social media sources [126]. Information obtained from parents and friends is poorly related to sustainability knowledge, which indicates that this prior knowledge can be incorrect [14]. This fact offers the opportunity to challenge students to compare old and new ideas and to improve their learning [127]. In short, prior knowledge ought to be used by teachers to deepen learning about sustainability [14]. There is still room for improvement in disseminating SDG information at universities [76], however, the approach must be multidisciplinary [128]. The education for sustainability (Efs) concept seeks to develop students with knowledge, attitudes and behavior that favors the environment [125], and to make the best of students' prior knowledge.

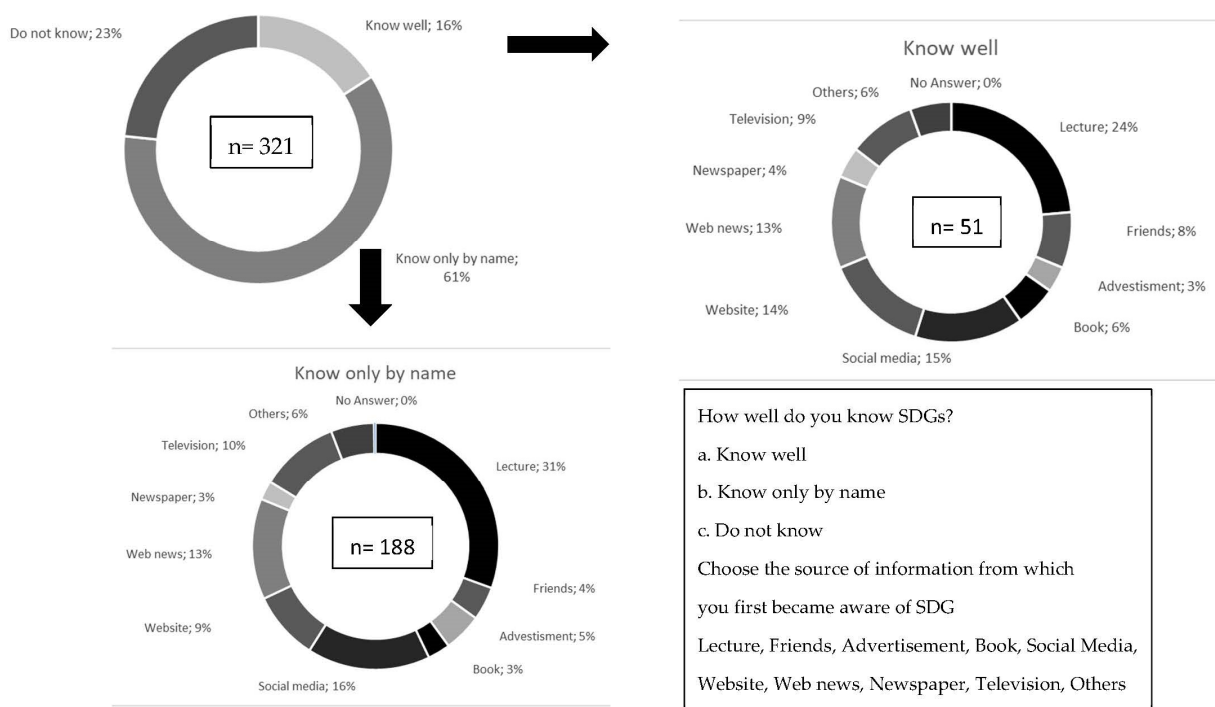


Figure 1. Awareness of Sustainable Development Goals and their sources of information.

4.2. Perception of SDGs

Questions 1 to 3 of the questionnaire, part 3, were about collecting students' opinions on all the SDGs. Question 1 was about students understanding the situation of all 17 goals (Figure 2). The most understood goals, from most to least, were SDG 5, 4, 13 and 10, and the least clear ones were the first nine, followed by 14 and 17. Similar results were obtained in a similar study from Japan [102]. One possible reason for this is that these SDGs are more or less understandable by the name SDG itself.

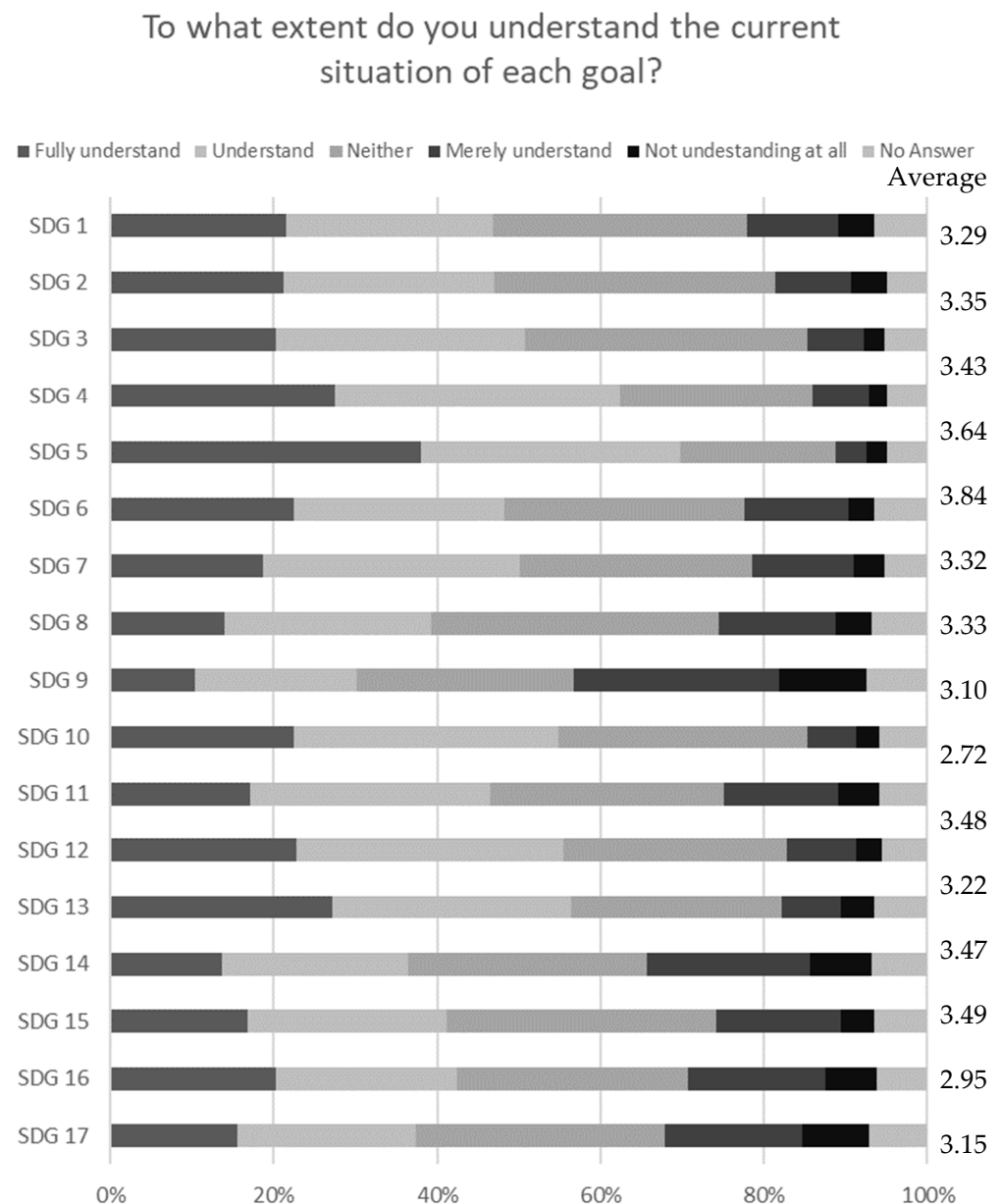


Figure 2. Students' perception of their understanding of the current situation of each of all the Sustainable Development Goals.

In Question 2 of part 3, students were asked about the importance of each goal in their daily life (Figure 3). The most important SDGs were SDG 4, followed by 3 and 6, and the least important ones were first SDG 17, followed by 14 and 9. The "2021 UN report about SDG public opinion" [97] indicated that the most important SDGs were 2, 1 and 3, and in that order, while the least important ones were SDGs 9 and 5. A survey in Africa [93] revealed that the most important SDGs were 8, 2 and 3 and the least important ones were 5 and 10. In a Japanese study [102] the most important SDGs were 3 and 4, similar to a global report [90], whereas the least important one was SDG 17, probably because it is somewhat abstract and hard to connect to one's daily life. SDG 4 was important for the Chinese high school population, together with SDGs 5 and 6 and the least important ones were 17, 1 and 16 [75]. For young people from Vietnam [103] the main ones were 4, 3 and 5 and the least important ones were 17, 12 and 7.

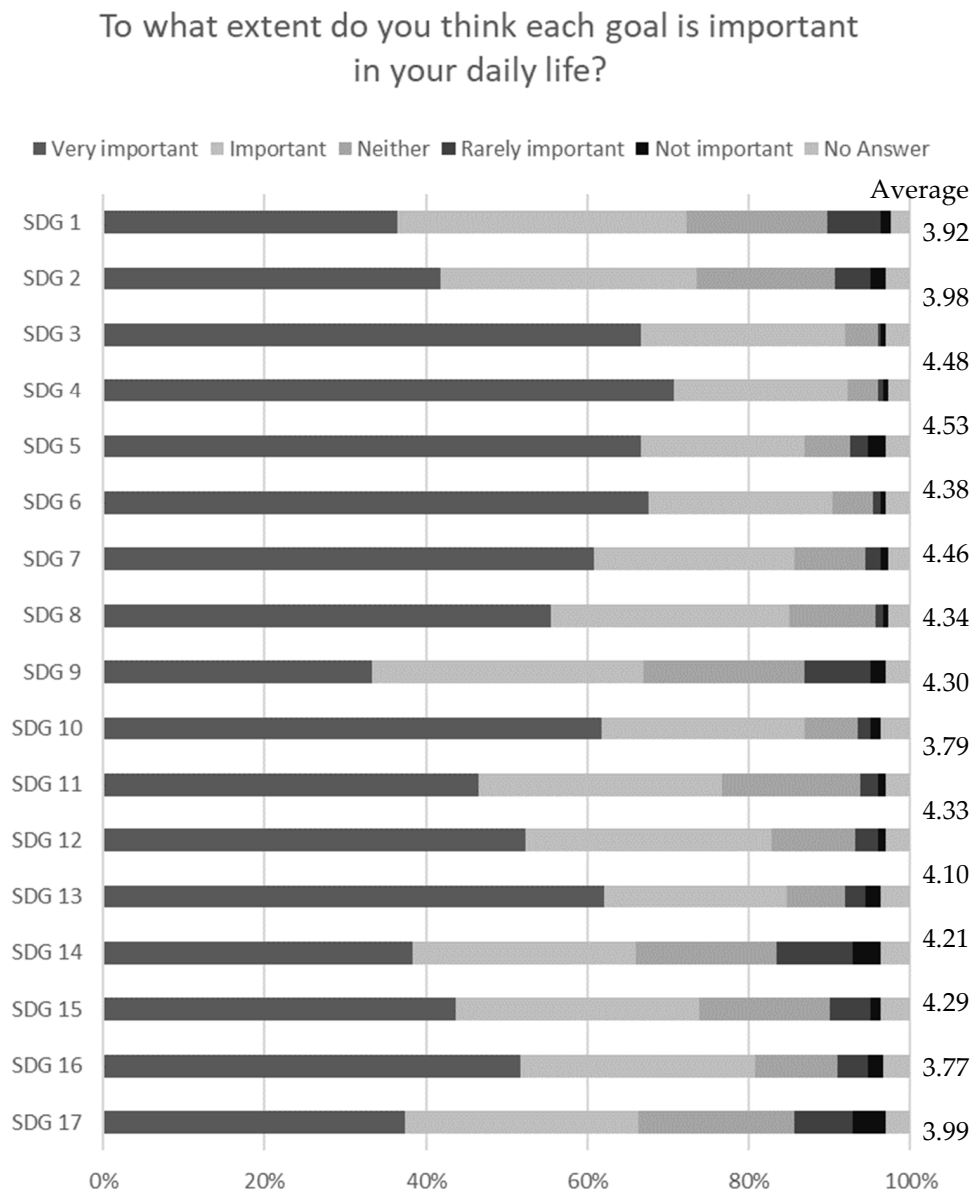


Figure 3. Personal importance that students give to each Sustainable Development Goal in their daily lives.

Our study results are similar to the Japanese study. Differences were observed compared to the UN survey [97] the African survey [93] or a global survey [90] but most certainly due to economic and social differences among the target populations. Differences have been reported for age [90] with young people being more worried about SDG 13, middle-aged people's concerns lie with SDG 3 and 4, and the elderly are concerned about SDG 14 and 15. The most frequently cited SDG of personal interest [129] is SDG 13, followed by SDGs 3 and 4. These results are broadly consistent with regional terms, although climate action in Africa tends to be less common than more pressing social issues such as SDGs 4, 1 and 2. In a study performed in Colombia, Ecuador, Mexico and Peru, [101] about the importance of SDGs for economic development, Colombian students indicated that SDGs 13 and 15 were the most important ones, while SDGs 6 and 12 were the most important ones in Ecuador. In Mexico and Peru, SDGs 3 and 9 were the most relevant. Seventy-seven percent of students at the University of the West of England (UWE) agreed that sustainability is relevant to their personal life. The UWE students prioritized health, education and fighting poverty [130].

In Question 3 of part 3, students stated their opinion about fulfilling each goal in Spain (Figure 4). The most fulfilled goals were SDG 3, 5 and 6, while the least fulfilled ones were SDG 14 and 15. The indicators of the Sustainable Development Goals Report [131] show that Spain has improved from previous data in some SDGs, such as 1, 3, 5 or 16, but with worse results for SDGs 2, 13 or 15. The SDG index assesses the overall performance of the 17 SDGs in each country [131]. The 2021 European report about the SDGs reveals that the SDG index score for Spain is 68.5 [132] and that the most fulfilled SDGs are the same ones that our students reported, plus 7 and 11, however, they all have pending challenges and none of the 17 SDGs have been fully fulfilled. In our world, marked differences appear between countries [131]. University students in Japan reported [102] that the most fulfilled SDGs are 6 and 2, while SDG 5 remained the least fulfilled, with some differences from the SDG index of Japan [131]. The Afrobarometer [93] pointed out that SDG 8 was the most priority objective, however, the government does not support its development. SDG 2, 3 and 16 were also important. Only 28% of clinical medicine students agreed that the Nigerian government supports the SDGs being fulfilled [133].

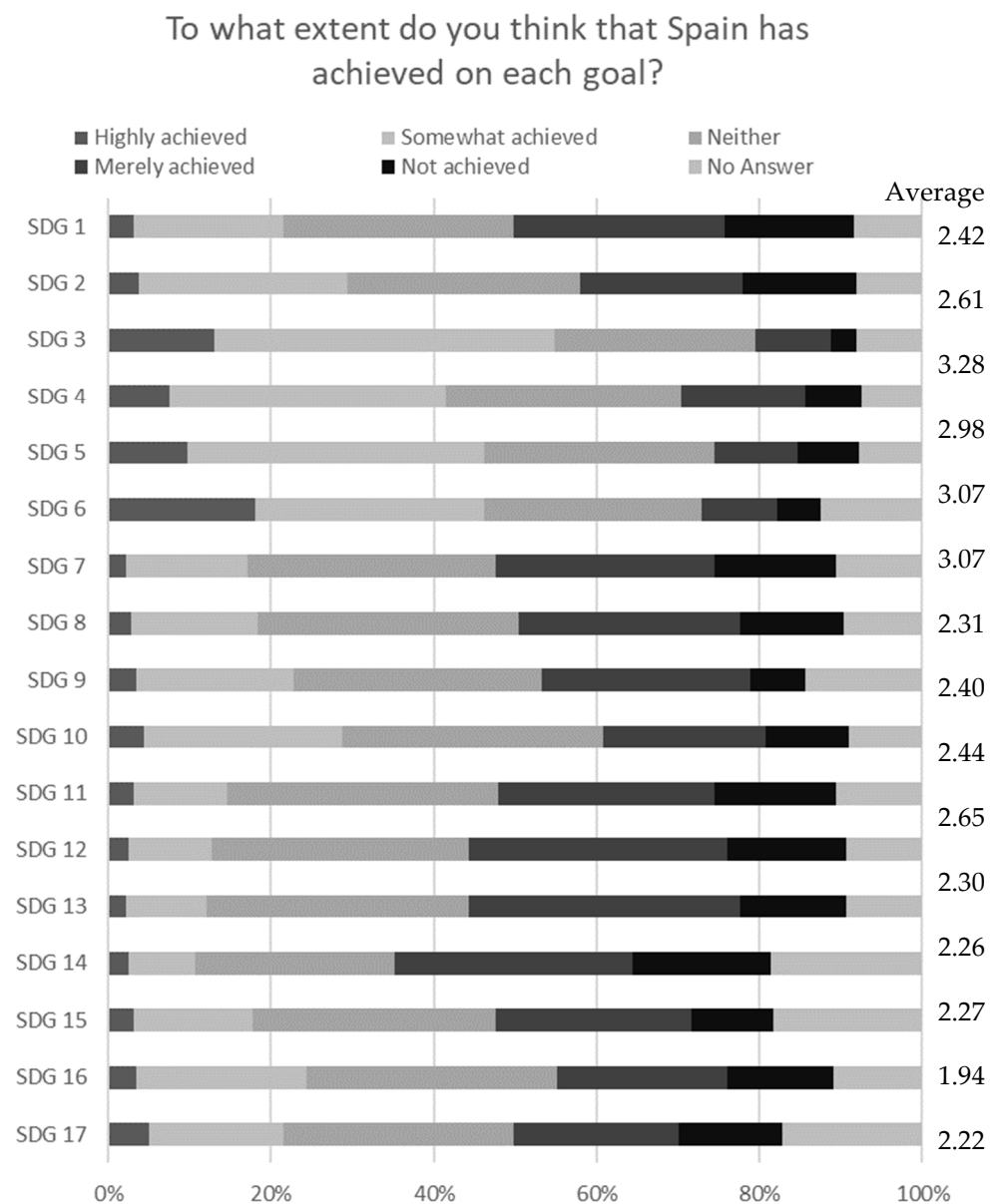


Figure 4. Students' impression of how well Spain has achieved each of the Sustainable Development Goals.

Questions 4 and 5 of part 3 were about students' opinions on their expectations of society regarding the implementation of the SDGs (Table 4). Questions 6 and 7 were about their expectations and in the same line, but applied to their future decisions regarding their municipality and workplace. Values were quite high, given that most students agreed with the statement. There were differences in gender, subject or year. The same question was asked of a Japanese population [120] and the values obtained from the younger generation of that study were lower than our results. Questions 6 and 7 were about the importance that they attached to SDG involvement in future decisions on moving or choosing work. The obtained values were high and were higher than those of the Japanese study [80,120]. Millennials typically prefer responsible companies [134], and they feel more attracted by active corporate social responsibility (CSR) [135]. When comparing the importance that students attach to SDG involvement, there was no significant difference in their answers about their current expectations of their municipality or town. When comparing expectations of school or work, we found more substantial positions for their current occupation rather than for their future projections to their future.

Table 4. Measure of society's expectations to implement SDGs per gender, subject, level and year. Q 4: I hope the municipality I am currently living in gets actively involved in SDG. Q 5: I hope the university I currently belong to gets actively involved in SDG. Q 6: If I were to move to a different location in the future, I wish to live in a municipality that is actively involved in the SDG. Q 7: If I were to get a job or change occupation, I wish to work for a company that is actively involved in SDG. Q 8: I am actively involved in SDG.

| | | Q 4 | | Q 5 | | Q 6 | | Q 7 | | Q 8 | |
|--------|--|--------------------------|----------------|-------------|----|-------------|----|-------------|----|-------------|---|
| All | | 0.88 ± 0.01 ¹ | | 0.90 ± 0.01 | | 0.87 ± 0.01 | | 0.84 ± 0.02 | | 0.62 ± 0.02 | |
| Gender | F | 0.91 ± 0.02 | B ² | 0.93 ± 0.01 | b | 0.90 ± 0.02 | b | 0.89 ± 0.02 | b | 0.63 ± 0.02 | a |
| | M | 0.86 ± 0.02 | a | 0.87 ± 0.02 | a | 0.83 ± 0.02 | a | 0.79 ± 0.02 | a | 0.61 ± 0.03 | a |
| Degree | Biotechnology | 0.93 ± 0.02 | b | 0.93 ± 0.02 | ab | 0.90 ± 0.02 | b | 0.88 ± 0.02 | ab | 0.57 ± 0.03 | a |
| | Forest and Environmental Engineering | 0.83 ± 0.06 | ab | 0.83 ± 0.08 | ab | 0.88 ± 0.06 | ab | 0.75 ± 0.09 | ab | 0.56 ± 0.08 | a |
| | Agricultural and Biological Engineering | 0.88 ± 0.03 | ab | 0.91 ± 0.03 | ab | 0.91 ± 0.03 | b | 0.86 ± 0.03 | ab | 0.69 ± 0.04 | a |
| | Environmental Sciences | 0.95 ± 0.03 | ab | 0.98 ± 0.01 | b | 0.93 ± 0.02 | b | 0.95 ± 0.02 | b | 0.71 ± 0.04 | a |
| | Interactive Technologies | 0.78 ± 0.05 | a | 0.81 ± 0.05 | a | 0.70 ± 0.06 | a | 0.72 ± 0.06 | a | 0.53 ± 0.06 | a |
| | Aerospace Engineering | 0.79 ± 0.09 | ab | 0.85 ± 0.08 | ab | 0.76 ± 0.09 | ab | 0.68 ± 0.10 | a | 0.68 ± 0.07 | a |
| | Agricultural Engineering | 0.85 ± 0.04 | ab | 0.88 ± 0.04 | ab | 0.87 ± 0.03 | ab | 0.85 ± 0.04 | ab | 0.68 ± 0.04 | a |
| Level | Bachelor | 0.89 ± 0.01 | a | 0.91 ± 0.01 | a | 0.87 ± 0.01 | a | 0.84 ± 0.02 | a | 0.62 ± 0.02 | a |
| | Master | 0.85 ± 0.04 | a | 0.88 ± 0.04 | a | 0.87 ± 0.03 | a | 0.85 ± 0.04 | a | 0.68 ± 0.04 | a |
| Year | 1 | 0.90 ± 0.02 | ab | 0.91 ± 0.01 | ab | 0.89 ± 0.02 | b | 0.85 ± 0.02 | ab | 0.61 ± 0.02 | a |
| | 2 | 0.95 ± 0.03 | b | 0.98 ± 0.01 | b | 0.93 ± 0.02 | b | 0.95 ± 0.02 | b | 0.71 ± 0.04 | a |
| | 3 | 0.78 ± 0.05 | a | 0.81 ± 0.05 | a | 0.70 ± 0.06 | a | 0.72 ± 0.06 | a | 0.53 ± 0.06 | a |
| | 5 | 0.85 ± 0.04 | ab | 0.88 ± 0.04 | ab | 0.87 ± 0.03 | b | 0.85 ± 0.04 | ab | 0.68 ± 0.04 | a |

¹ Answer in a five point scale ranging from Strongly agree (1) to Strongly disagree (0). ² Different letters in the same column indicate significant differences (p -value < 0.05) between groups according to Tukey's test.

Gender differences were observed in Questions 4 to 7 of part 3. Female students' expectations were stronger expectations than those of males. Several studies suggest a positive relationship between women and a sustainable attitude from either a managing position at a company [136], as a consumer [137] or, as the case, from their role as students [138]. Regarding degrees, students of the bachelor's degree in interactive technologies took the minor demanding positions, with significant differences compared to students enrolled for the bachelor's degree in biotechnology in relation to their municipality or students of the bachelor's degree in environmental sciences when referring to their school or workplace. These observations match the existing literature, where agriculture students tend to have higher pro-environmental attitudes in relation to sustainability [139]. No significant differences were found when considering the level of studies.

Question 8 of part 3 attempted to assess students' current and active involvement with the SDGs from their subjective point of view. The results showed a surprising gap in their previously expressed expectations (questions 4 to 7), with values exceeding the results obtained from other studies and their admitted degree of involvement. This finding follows the same path as that observed in Japan [77], although improvements were observed in latter surveys [120]. No significant differences were found in this item, regardless of gender, subject, level of studies, or year.

4.3. Sustainability Literacy

The ASK developed by Zwickle and Jones [60] was used to assess sustainability literacy. As explained, this test consists of 12 questions that assess sustainability literacy in three domains (environment, social or ethics and economy domains) [61]. The total score was 7.52 out of 12 (Table 5), which is slightly lower than other studies with university students [84], but higher than the general population [84]. This result supports the hypothesis that sustainable literacy assessments cannot be generalized to broader populations [140–142]. University students have previously received sustainability knowledge through the curricula of high schools' programs, and universities encourage students and faculties about sustainability [143–145]. Previous research indicates that university promotes sustainable behaviors and attitudes [141,146,147], but more efforts should be made with the general public [84]. For example, a study performed with the U.S. population revealed that Americans have a poor in-depth understanding of climate change, and important knowledge gaps and common misconceptions [87]. Another study showed that the U.S. population believes that they know more about the environment than they actually do, which reveals a persistent pattern of environmental ignorance, even among the most educated and influential members of society [88]. Campaigns are carried out in different countries to improve sustainability literacy [148]. The Sulitest online questionnaire obtains an average score of 59.9% with more than 200,000 people that have done this test until 2021 [149]. However, some concerns have been posed about the questionnaire's internal structure [69]. The EDINSOST Project seeks to assess students' sustainability competencies [70,71]. This questionnaire gives a medium score for sustainability competencies to Spanish university students [72]. The EDINSOST questionnaire has been used to assess improvements in sustainability competencies in a university degree. It indicates improvement only in some subjects that fail to train students in sustainability [150] with differences for distinct universities degrees [72]. Little awareness of sustainability literacy has been detected in other studies [27,59,75,76,100], however, better results have been obtained in some cases [86].

The medium ASK value indicates that there is space to improve our students' sustainability knowledge, although differences were observed between students with previous SDG knowledge. The students with previous knowledge (they knew the SDGs well or by name) scored higher (8.02 ± 0.29 and 7.73 ± 0.13 , respectively) than the students who did not know the SDGs (6.63 ± 0.23). We should bear in mind, that sustainability knowledge is not always related to sustainability behavior [140]. The "knowledge deficit model" [151] has been argued for not relating knowledge to behavior [140] and it is important to examine their relationship and the influence of other variables to strengthen sustainability curricula [140]. Pro-environmental behavior can be influenced by personal and social factors [119]. However, students are not likely to adopt sustainable behavior if they are unaware of environmental problems [140]. The first step taken to introduce sustainability is through education [152], which is one of the reasons explaining the increment in sustainability-related bachelor's, master's and PhD degrees [153]. Making informed pro-environmental choices is difficult without acquiring correct knowledge or not having knowledge. Thus, knowledge is necessary, but not a sufficient condition [119]. Higher education can play an important role to increase sustainability literacy [44,154]. Assessing ASK is helpful for gauging if curricula are providing students with sustainability knowledge. We have to consider that students will need to address sustainability problems [140]. As students must actively participate in sustainable development matters, students are

connected to the social context of these topics [155,156]. Moreover, the way that knowledge is disseminated is a key point to increasing sustainability behavior. For example, some studies point out that social media is more important for promoting sustainability behavior than traditional campus marketing in electricity use [157]. However, college students who have been more exposed to sustainability communication tend to have more positive attitudes toward sustainability behaviors [141].

Table 5. Number of responses and scores in the Assessment Sustainability Knowledge (ASK) questionnaire and its related domains per gender, subject, level of studies, and year.

| | | Number Responses (%) | Total Score (0–12) | | Environmental Domain (0–5) | | Social Domain (0–3) | | Economic Domain (0–4) | |
|--------|---|----------------------|--------------------|----------------|----------------------------|----|---------------------|----|-----------------------|---|
| All | | 321 (0.50) | 7.52 ± 0.11 | | 3.08 ± 0.05 | | 2.29 ± 0.05 | | 2.15 ± 0.06 | |
| Gender | F | 162 (0.60) | 7.58 ± 0.15 | a ¹ | 3.07 ± 0.08 | a | 2.34 ± 0.06 | a | 2.17 ± 0.09 | a |
| | M | 159 (0.42) | 7.46 ± 0.16 | a | 3.09 ± 0.07 | a | 2.24 ± 0.07 | a | 2.13 ± 0.09 | a |
| Degree | Biotechnology | 124 (0.89) | 7.78 ± 0.18 | ab | 3.19 ± 0.09 | ab | 2.36 ± 0.07 | ab | 2.23 ± 0.10 | a |
| | Forest and Environmental Engineering | 18 (0.17) | 7.28 ± 0.46 | ab | 3.06 ± 0.22 | ab | 2.33 ± 0.20 | ab | 1.89 ± 0.27 | a |
| | Agricultural and Biological Engineering | 59 (0.31) | 7.02 ± 0.26 | ab | 2.86 ± 0.13 | ab | 2.03 ± 0.12 | a | 2.12 ± 0.13 | a |
| | Environmental Sciences | 32 (0.68) | 8.13 ± 0.25 | ab | 3.47 ± 0.14 | b | 2.59 ± 0.10 | b | 2.06 ± 0.18 | a |
| | Interactive Technologies | 31 (0.84) | 6.77 ± 0.33 | ab | 2.77 ± 0.14 | ab | 2.06 ± 0.15 | ab | 1.94 ± 0.19 | a |
| | Aerospace Engineering | 18 (0.38) | 6.50 ± 0.53 | a | 2.50 ± 0.20 | a | 1.78 ± 0.26 | a | 2.22 ± 0.24 | a |
| | Agricultural Engineering | 39 (0.53) | 8.13 ± 0.30 | b | 3.26 ± 0.15 | ab | 2.59 ± 0.11 | ab | 2.28 ± 0.17 | a |
| Level | Bachelor | 282 (0.49) | 7.44 ± 0.12 | a | 3.05 ± 0.06 | a | 2.25 ± 0.05 | a | 2.13 ± 0.07 | a |
| | Master | 39 (0.53) | 8.13 ± 0.30 | b | 3.26 ± 0.15 | a | 2.59 ± 0.11 | b | 2.28 ± 0.17 | a |
| Year | 1 | 219 (0.45) | 7.43 ± 0.14 | ab | 3.03 ± 0.07 | ab | 2.22 ± 0.06 | ab | 2.17 ± 0.07 | a |
| | 2 | 32 (0.68) | 8.13 ± 0.25 | b | 3.47 ± 0.14 | b | 2.59 ± 0.10 | ab | 2.06 ± 0.18 | a |
| | 3 | 31 (0.84) | 6.77 ± 0.33 | a | 2.77 ± 0.14 | a | 2.06 ± 0.15 | a | 1.94 ± 0.19 | a |
| | 5 | 39 (0.53) | 8.13 ± 0.30 | b | 3.26 ± 0.15 | ab | 2.59 ± 0.11 | b | 2.28 ± 0.17 | a |

¹ Different letters in the same column indicate significant differences (p -value < 0.05) between groups according to Tukey's test.

No gender differences were observed in our study, which follows others [146,147,158]. However, males scored higher than females in some studies [14,144,159] or females scored higher [64]. The effect of gender is not clear and some authors state that it can be modified by personality [160] or political ideology [161], which indicates a complex relationship. For example, men have shown more knowledge, but women have more environmental concerns [119,146], while other studies reveal that it is not associated with CSR [162].

Differences were observed in degrees or levels of studies. Differences in major studies between science and non-natural science [14] or scientific studies [59] have been previously observed and can explain some differences regarding sustainability knowledge. For example, students with a bachelor's degree in interactive technologies, a major in non-life science, obtained the lowest values in the ASK questionnaire, but significant differences were observed only in the comparison to the scores of students with a master's degree in agricultural engineering. These differences might also be due to students' different levels, their age or prior knowledge [14]. Younger people voice more environmental concern or display more environmental behavior [84,119,163], but age is not a good predictor of sustainability knowledge [84]. Our results showed higher values for the last years of university education, but no difference for the first years (Table 5). This could support the notion that age is not related to sustainability literacy and, as other studies have pointed out, age is related more to behavior [147].

Three domains have been identified in sustainability (environmental, social, economic) [63] and they are related to the SDGs [164], although some authors identify a general integral sustainability domain [164]. The results for UPV per domain (Table 5) show them having less knowledge in the economic domain, which coincides with other studies [77] that observed differences for courses and degrees, as in our case. In other studies, the social domain was worse performed [74] with differences for the respondent's category (students, educators or practitioners). Other studies have indicated better perfor-

mance in the social domain, but in social degree students [123]. Some authors state that sustainability should be tackled with an integrative approach and categorization poses clarification criteria problems [30].

ASK questions, response options and the percentage of student results are found in List S2.

The response rate was high in all the questions with the “No Answer” percentage below 1%. There was wide variability in the percentage of correctly answered questions, from 22% (Question 1) to 96% (Question 2) with a mean of 53.4%. In a similar investigation, college students obtained 63.1% for correct ASK questions, on average [14]. It has been verified that the percentage of correct answers in Spanish students is similar to that observed in studies conducted with American students [14,61]. For example, in Question 2 about the ozone, the percentage of correct answers came close to 90%. In Question 9 on CO₂ emissions, the percentage of correct answers came close to 80%. However, in other questions, such as number 12 on the environmental impact of some activities, the response is totally different among both students. The fact that these differences exist reinforces the need for a good initial evaluation to correct any deficiencies in knowledge of the SDGs.

In Table 6, the discrimination and difficulty parameters of each ASK questionnaire were observed. The most difficult questions were 1 and 10, and the most discriminant ones were 12, 8, and 10. The easiest questions were 2 and 3, and the least discriminant ones were 2 and 6. One possible explanation for this is that Questions 1 and 10 have a high level of difficulty, probably because the other answers are less correct but not wrong answers. Similar results have been obtained in the common questions with the questionnaire used by Zwickle et al. [61].

Table 6. Discrimination and difficulty parameters for all the ASK questionnaire items.

| Domain | Item | Discrimination Parameter | Difficulty Parameter |
|---------------|------|--------------------------|----------------------|
| Environmental | 1 | 0.30 | 0.78 |
| Environmental | 2 | 0.08 | 0.04 |
| Environmental | 3 | 0.36 | 0.16 |
| Environmental | 4 | 0.46 | 0.53 |
| Social | 5 | 0.45 | 0.22 |
| Social | 6 | 0.13 | 0.21 |
| Economic | 7 | 0.17 | 0.51 |
| Economic | 8 | 0.54 | 0.45 |
| Economic | 9 | 0.32 | 0.21 |
| Economic | 10 | 0.51 | 0.67 |
| Social | 11 | 0.43 | 0.28 |
| Environmental | 12 | 0.62 | 0.42 |

5. Conclusions

Sustainability is a global concern. Younger generations will need to deal with increasing problems related to it. This issue, although known for decades, has become an emergency in the past years. In this study, we examined a sample of university students to know more about their current awareness and perception of the SDGs and their SD literacy. This valuable information will help to address actions to enrich curricula at HEIs with the aim of contributing to the building of a more sustainable society through their most prepared members.

5.1. Main Findings

Awareness of the SDGs, by the students who filled in the questionnaire, was low (15.9% answered they knew SDGs well), although this result is similar to that observed in other countries. The main source of information reported by students was from lectures, but less than one-third of students indicated that they received information about SDGs during their university studies.

One of the main findings of the study is that the level of literacy about sustainability assessed with the ASK questionnaire was intermediate, with a rating of 6.3 out of 10 (7.52 out of 12), which indicates a lack of knowledge. Results showed lower knowledge in the economic domain while it was in the environmental field that received the best scores. Despite these results, students perceived the importance of SDGs and their influence on their lives, which indicates a positive attitude toward SDGs and their importance for their future lives and careers.

Another important finding is the gap that exists between the high importance conferred by UPV students to SDGs at different social levels, such as municipalities, universities or companies (ranging from 84% to 90%), and their reported personal involvement (62%).

Significant differences have been found in the expectations and sustainability literacy according to the student's degree, showing those related to life sciences have higher interest and knowledge than those with non-related degrees, this being a result consistent with prior literature [139]. Differences were also found regarding gender when analyzing their expectations in relation to the SDGs, being females, the ones that showed stronger hopes.

5.2. Implications

The main aim of the study was to explore the level of awareness and perception of the SDGs and to assess the SD literacy of university students. Our findings show that, although the knowledge of sustainability was intermediate, it becomes low when referring to SDG awareness. These results evidence that there is still much to do in this field and that HEIs have a key role in the education of future professionals. Different strategies are being implemented to improve knowledge and compliance with the SDGs by the entire UPV community. In addition to academic work, the UPV carries out multiple activities to promote awareness of the importance of the SDGs (agroecological market, energy-saving measures and development cooperation activities among others, etc.)

The results herein obtained, set a starting point to evaluate how the different actions influence these three aspects. Future observations will allow us to assess the impact of the training actions that are being carried out in university programs and curricula, and it will be possible to determine which of them are more effective to influence behavioral change.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/su14084552/s1>, List S1: Survey submitted to the students of the study; List S2: Revised assessment of sustainability knowledge (ASK) questions and answers.

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