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Systematic Review

Assessing University Students' Beliefs and Attitudes towards Sustainability and Sustainable Development: A Systematic Review

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Abstract: (1) Background: contents and strategies related to sustainability and Sustainable Development Goals (SDGs) are being introduced in academic curricula, and the organization of the university environment is evolving to adopt sustainable practices. One of the main aims of this evolution is to raise students' awareness of sustainability and to encourage them to develop attitudes, knowledge and competencies for acting as future responsible citizens. This implies the need to examine and understand students' attitudes and beliefs towards sustainability. (2) Method: a systematic literature review has been performed to examine the most recent studies focused on university students' beliefs and attitudes towards sustainable development. Three educational online databases were searched for identified research papers, and in the end, 20 papers have been included in the analysis. (3) Results: in recent years there has been a growing interest in the topic of university students' assessment of sustainability beliefs and attitudes. Assessment was frequently limited to the environmental dimension of sustainability, placing the economic, social and educational dimensions in the background. Most of the assessing tools have been developed as quantitative questionnaires. (4) Conclusions: understanding the attitudes and perceptions of university students about sustainability issues is an essential task for helping higher education institutions to effectively infuse the contents and principles of sustainable development into their environments.

Keywords: sustainable development; attitudes; beliefs; university students; SDGs

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1. Introduction

Currently, there is an increasing awareness about the urgence of addressing particular issues related to sustainability and sustainable development. Major concerns about environmental problems, including the need for more social equity and justice and the inadequacy of the current economic system in addressing sustainability issues, have become urgent issues for all the countries around the world and have led some international organizations like the UN to define some specific indications for adopting new perspectives in all the fields of human activities. This is the main condition under which the SDGs included in the Agenda 2030 [1] has been defined. The Agenda 2030 has been developed as an international framework for offering indications for promoting more sustainable actions at an institutional level. Different areas have been included in order to promote an exhaustive overview of human development, which is intended to be respectful not only of people and the environment here and now, but also of future generations in a long-term perspective.

The need to become aware of the main topics of sustainable development has become particularly relevant for educational institutions and agencies where children, adolescents and young adults are preparing to develop their potentials, with the aim of becoming active and responsible citizens in the future. In educational contexts, students not only have the possibility of acquiring content and information about the most urgent themes related to sustainability, ecology, justice and social equity, but also of developing positive attitudes

toward sustainable development through the promotion of critical thinking in learning activities [2]. Although very complex, this condition seems crucial because the change in behavioral patterns cannot ignore correct information and the modification of attitudes toward the topic in question. Considering this purpose, formal and informal educational contexts should work collaboratively to contribute to the promotion of the main values of sustainable development [3]. From this perspective, higher education and university are considered as pivotal for developing future critical thinkers, problem solvers and active citizens [4] who may be aware of the main topics in the perspective of sustainable development and may be able to face related issues. However, the trends and opportunities for creating campus sustainability are focused predominantly on the environmental dimension, underlining the need for a more balanced perspective that does not lean predominantly to environmental elements [5]. As sustainability is a multifaceted concept and covers different dimensions [1], universities and higher education institutions should embrace a holistic perspective and implement attitudes and beliefs toward sustainability in order to promote real and comprehensive changes in all the sustainable dimensions. Sustainability topics can be introduced and developed in every academic field, not only in courses dealing with the environment and ecology, for addressing the great variety of needs that have been identified for promoting a more sustainable future: this would be in line with the four pillars for sustainability proposed by UN [6], which consider the economic, environmental, social and cultural dimensions of sustainable development. In addition, the pedagogical model should shift from a transmissive approach to a transformative approach to academic learning [7], which could encourage students' proactive attitudes toward sustainable solutions to current challenges. In the last years, many initiatives were undertaken for infusing the principles of ESD in higher education, such as the revision of institutional curricula [8,9], the professional development of academic staff [10] and green campus initiatives [11–13]. All of these actions aim to impact student development in order to not only make the new generations aware of the challenges that sustainability poses, but also to offer ideas and possibilities for developing sustainable attitudes and behaviors in various areas of daily life.

Specifically, university programs should respond to the dual objective of training both the citizens and the professionals of the future [14]. Several actions have been taken for including themes and approaches related to sustainable development and for introducing education for sustainable development into academic curricula [8], raising teaching and administrative staffs' awareness of sustainability issues. The main approach of ESD refers not only to the introduction of specific content in different academic subjects and courses, but also to the adoption of pedagogical and teaching methods, strategies and perspectives that are coherent with the main aims of sustainable development in a perspective of transformative learning which is in contrast with the traditional transmissive approach to the teaching and learning processes [15].

Because one of the main educational goals of infusing sustainability and SDGs into academic courses is to impact students' awareness and perspectives about these urgent topics, it becomes essential to examine how the students perceived issues related to sustainable development and what the impact of higher education could accomplish in transforming their attitudes, beliefs and behaviors toward sustainability.

2. Materials and Methods

The overall aim of this current systematic review is to examine how the attitudes and beliefs of university students toward sustainability issues, sustainable development and education for sustainable development have been considered and assessed in the context of higher education. From the analysis of the main literature contributions, several research questions have been derived:

RQ1: What components of sustainable development have been considered when assessing university students' attitudes toward sustainability and education for sustainable development?

RQ2: What kinds of strategies and tools have been used to assess university students' attitudes towards sustainability and education for sustainable development?
RQ3: In which contexts has this assessment been performed (e.g., within a specific course, as a general assessment)?

2.1. Definition of Inclusion Criteria

This systematic analysis has been based on the model of PRISMA statement [16]. In order to address the stated research questions, some specific criteria for the online search were identified:

1. All documents considered for research were to be those published in peer-reviewed scientific journals. They had to be published in the period of time between the beginning of 2014 and the first half of 2023 (10 years), in order to include the most recent publications in this field. Only peer-reviewed scientific journals with impact factors were considered, in order to guarantee a high-quality standard. More narrow intervals of time could have been used, but the topic selected is very specific and a 10-year interval was considered more suitable for collecting a relevant number of documents.
2. The documents were to be research papers (not literature reviews, commentaries, book chapters, etc.).
3. The language of the document should be English.

Because the population target of this review was university students, some specific keywords were chosen for searching the databases: "assessment", "sustainability", "sustainable development", "attitudes", "beliefs", "university" and "students". They were combined in the following ways:

"Assessment" AND "sustainability" AND "attitudes" AND "university students;"
"Assessment" AND "sustainability" AND "beliefs" AND "university students;"
"Assessment" AND "sustainable development" AND "attitudes" AND "university students;" and
"Assessment" AND "sustainable development" AND "beliefs" AND "university students".

2.2. Searching Process

Three online databases focused on educational research were selected for searching the documents (Eric EBSCO, Science Direct, and Web of Science); these were selected from the most relevant databases in the education field. Using the keywords combined as previously mentioned and the defined criteria, 68 results were found in the first phase (the identification phase, according to PRISMA statement) for the database Eric EBSCO, 7201 for Science Direct and 187 for WOS. Two results were discarded in this phase because they were duplicated records.

Subsequently, in the following phase (the screening phase), the results were carefully examined in order to assess their relevance to the research topics. Papers that did not cover all the topics mentioned in the keywords, or which covered them only as a secondary topic in the research, were not considered for the following phase. The main reasons for excluding a paper were: the subject target did not focus on university students, the research variables did not include attitudes or beliefs about sustainability or the articles did not specifically report new research studies. From these results, 15 papers were selected from Eric EBSCO, nine from Science Direct and six from WOS. The full-text documents were retrieved for all papers.

A third phase was dedicated to examining the full texts, evaluating their relevance to the main topics, categorizing some of their main features related to publication information (authors, years, nationalities of the research) and considering some research elements (research methodologies adopted, assessment tools used for collecting data, main topics and variables considered in the research questions, and main findings). After examination, 10 papers were discarded because they did not correspond to this study's search criteria,

or because their topics were not specifically focused on the main topics that this study considered. In the end, 20 papers were included in the current review.

The selected papers were analyzed by adopting a mixed-method approach with quantitative (frequencies) and qualitative analyses (categorization of the main topics).

Following the PRISMA statement [16], the whole search process is reported in Figure 1.

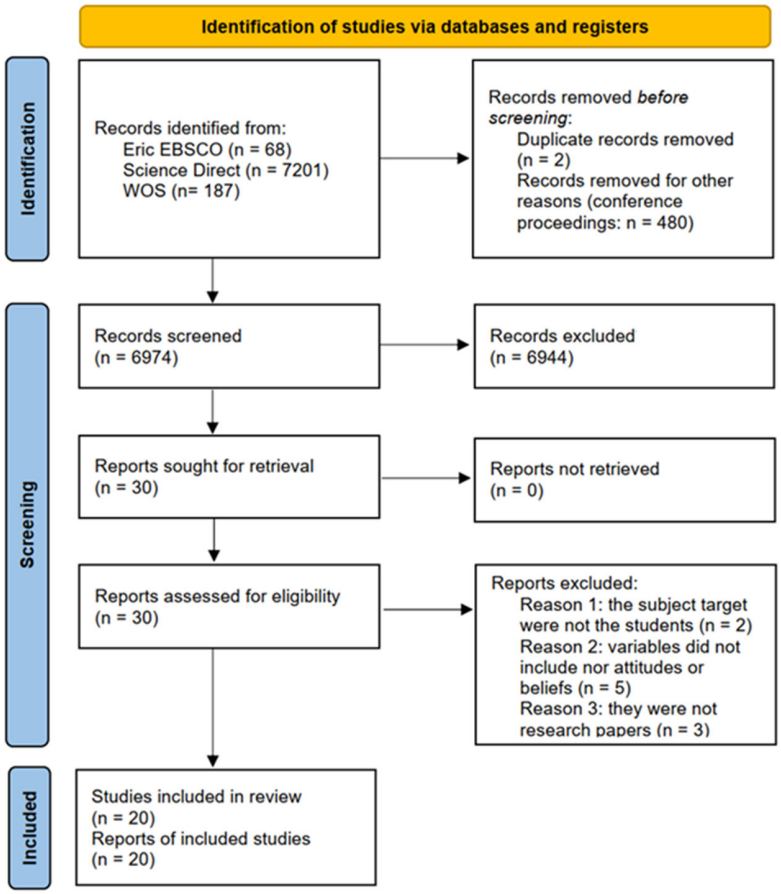

Figure 1. Flow diagram (PRISMA) summarizing the searching procedure (Adapted from Page et al. [16]).

3. Results

3.1. Analysis of the Documents

Twenty research papers were considered for the analysis. They were carefully reviewed and categorized in an Excel sheet that included the following key features: year of publication, geographical place in which the study was carried out (nationality), research methodology adopted, tools used for assessment, main topic considered in the assessment and the main findings. The results are reported in Table 1.

Table 1. Systematic analysis of the documents including consideration of the authors, years of publication, nationalities of the research, research methodologies, assessment tools, main topics and main findings for each document (Authors' own work).

	Authors	Year	Nationality	Research Methodology	Assessing Tools	Main Topic	Main Findings
[17]	Abd-Elwahed, M.S., Al-Bahi, A.M.	2021	Middle East	Quantitative research (descriptive)	Close-ended questionnaire	Student's awareness of sustainability	The students reported awereness of the three Unesco pillars of sustainability one by one but not linked to the SD.

Table 1. *Cont.*

	Authors	Year	Nationality	Research Methodology	Assessing Tools	Main Topic	Main Findings
[18]	Ahamad, N.R., Ariffin, M.	2018	Malaysia	Quantitative research (correlational)	Close-ended questionnaire	Knowledge about, attitudes and behaviors toward sustainable consumption	Although students showed a relatively high level of knowledge about sustainable consumption, they also exhibited low levels of attitudes and behaviors related to it.
[19]	Aikowe, L.D., Mazancova, J.	2023	Nigeria/ Czech Republic	Quantitative research (correlational)	Evaluation test (true/false)	Knowledge about and attitudes toward sustainable development topics (in all its dimensions)	In general, Nigerian students showed very low levels of knowledge about and attitudes toward sustainable development topics. This kind of assessment should be performed regularly, in order to offer indications for universities for introducing sustainable development topics into the courses.
[20]	Al-Nuami, S.R., Al-Ghamdi, S.G.	2022	Qatar	Quantitative research (descriptive)	Close-ended questionnaire	Knowledge about, attitudes and behaviors toward sustainable development and education for sustainable development	Most of the students in Qatar were aware of content and issues related to sustainable development; however, only some of them (just over half of the participant group) put this knowledge into practice with attitudes and behaviors related to sustainability.
[21]	Alvarez-Nieto, C., et al.	2022	UK, Spain, Germany, Sweden, and Australia	Quantitative research (correlational)	Close-ended questionnaire	Awareness of and attitudes toward sustainability and climate change issues and other relevant topics in nursing curriculum	Nursing students from different countries seemed aware of climate change and sustainability issues, and they valued the introduction of sustainability topics into their academic curriculum.
[22]	Attaran, S., Celik, B.G.	2015	USA	Quantitative research (correlational)	Close-ended questionnaire	Environmental attitudes and how such attitudes, when combined with a specific cost, can affect environmental behavior	A difference in environmental responsibility based on gender was reported, i.e., women were more environmentally responsible. As the student population became more environmentally responsible, their willingness to pay for sustainable lifestyles increased
[23]	Avelar, A.B.A., Farina, M.C:	2022	Brazil	Quantitative research (correlational)	Close-ended questionnaire	Validation of a scale for assessing self-reported sustainable behavior of students in higher education institutions (HEIs) mediated by the social, economic and environmental attitudes	Students' sustainable behavior was affected by their economic attitude and their knowledge of sustainability. However, the economic dimension received more attention.
[24]	Bask, A., Halme, M., Kallio, M., Kuula, M.	2020	Finland	Quantitative research (correlational)	Close-ended attitude questionnaire	Values and priorities about sustainable development	Business students showed a positive attitude toward sustainable development, although their awareness seemed limited and educational support should be recommended.

Table 1. *Cont.*

	Authors	Year	Nationality	Research Methodology	Assessing Tools	Main Topic	Main Findings
[25]	Biasutti, M., Frate, S.	2017	Italy	Quantitative research (correlational)	Close-ended questionnaire	Validation of a questionnaire for assessing university students' attitudes toward the dimensions of sustainable development (environment, economy, society, education)	The questionnaire showed good statistical properties and it could be used as a tools for assessing university students' attitudes toward sustainability. It provides possible indications for including sustainability topics in university curricula.
[26]	Cho, M.	2019	USA	Quantitative research (correlational)	Close-ended questionnaire	The factors (attitudes, subjective norms, perceived control, self-percived emotions and motivations) influencing college students' campus recycling intentions and actual recycling behavior	Findings revealed that college students were more likely to recycle if they expected to feel negative emotions about not engaging with recycling behaviors. Turning to predictors of campus recycling, the results show that recycling intention and self-determined motivation predict college students' campus recycling behaviors.
[27]	Fang, X., Qu, Z., Sun, C., Wu, C., Wei, J.	2022	China	Quantitative research (correlational)	Close-ended questionnaire	Attittudes toward the environmental issues of sustainable development, with specific references to renewable energies	Chinese students seemed favorable to the application of nuclear energy and, in general, they showed positive attitudes toward renewable energies.
[28]	Leal Filho, W.L., et al.	2023	Different countries in Europe, North-America, Africa, Asia, Oceania	Quantitative research (correlational)	Close-ended questionnaire	Knowledge and attitudes toward sustainability and issues related to climate change	In all the researched countries, university students seemed quite aware about climate change topics and the main problems that derive from it. However, a small part of the group thought that climate change is not as an urgent problem as it is represented by the media and other institutions.
[29]	Margaça, C., Sanchez, B.H., Sanchez-Garcia, J.C.	2022	Spain	Quantitative research (correlational)	Close-ended questionnaire	Validation of the Sustainable Consumption Scale for Spanish students for assessing sustainable consumption behaviors	The questionnaire seemed useful for assessing students' behaviors associated with sustainable consumption.
[30]	McCormick, M., Bielefeldt, A.R., Swan, C.W., Paterson, K.G	2015	USA	Quantitative research (correlational)	Close-ended questionnaire	Validation of a questionnaire for assessing university students' attitudes toward the specific domain of sustainability engineering, analyzing three components (self-efficacy, values, affect/feeling) and participation in different learning experiences	The three components are correlated and the involvement in more experiential learning experiences had a good impact on sustainable engineering self-efficacy, value and affect/feeling

Table 1. *Cont.*

	Authors	Year	Nationality	Research Methodology	Assessing Tools	Main Topic	Main Findings
[31]	Maurer, M., Bogner, F.X.	2019	Switzerland	Quantitative research (correlational)	Close-ended questionnaire	Beliefs about environmental education and education for sustainable development	Students showed many conceptions about the environmental dimension of sustainable development, but seemed to attribute less importance to the social dimension.
[32]	Mohamad Saleh, M.s., Mehellou, A., Huang, M., Briandana, R.	2022	Malaysia/ Indonesia	Quantitative research (correlational)	Close-ended questionnaire	Correlations between sustainable attitudes, knowledge, intentions and behaviors	The positive impact of students' attitudes was more relevant than that of their knowledge on the development of sustainability intentions.
[33]	Navarro, V., et al.	2020	Spain	Quantitative research (experimental)	Close-ended questionnaire	Knowledge and behaviors about sustainable development (pre- and post-academic courses infused with SDGs topics)	After the courses, the knowledge about sustainable themes increased; however the same was not true for the expression of intentional sustainable behaviors in students' daily lives.
[34]	Ovais, D.	2023	India	Quantitative research (correlational)	Close-ended questionnaire	Sustainability consciousness (which includes knowledge, attitudes and behaviors) considering three dimensions: economy, environment and society.	Sustainable behaviors were mainly influenced by sustainable attitudes more than by sustainable knowledge.
[35]	Sonetti, G., Sarrica, M., Norton, L.S.	2021	Italy	Quantitative research (correlational)	Close-ended questionnaire	Knowledge and value attributed to SDGs and sustainability	Knowledge about sustainability was mainly focused on the environmental dimension, while little importance was given to the societal dimension. In addition, different values were assigned to some SDGs when considering their importance for the self and for the academic world.
[36]	Ulkhaq, M.M., Joseph, R.S.G.	2023	Sweden	Quantitative research (correlational)	Close-ended questionnaire	Attitudes towards campus sustainability	Three dimensions were identified in campus sustainability: the environmental management system, public participation and social responsibility. Students attitudes highly depended upon some contextual features linked to the academic environment

Two kinds of analysis have been performed on the selected documents:

- Analysis of the frequencies of the above mentioned features; and
- Categorization of the main topics of the papers in order to answer to the RQs

3.2. Years of Publication (Frequencies)

Considering the number of documents published for each year since 2014, there has been an increase in the frequency of research papers focused on attitudes and beliefs about sustainability in university students. Almost half of the papers on these topics have been published in the last two years (respectively, six in 2022 and four in 2023), confirming that

there is a growing interest in these topics. The frequencies of publication per year are reported in Figure 2.

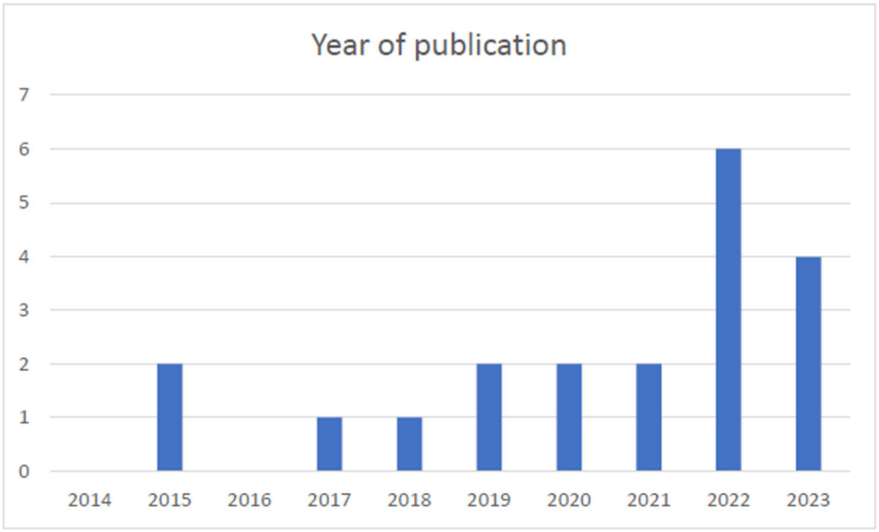

Figure 2. Frequencies of publication per year (Authors' own work).

3.3. Main Nationality of the Research (Frequencies)

With regard to the nationality of the research, there was a great variability among the main countries in which the studies have been implemented. Several countries are included in the list, and they are representative of all the world's continents. The country with the highest number of studies is the United States, followed by multiple nationalities of those research projects that involve the cooperation of institutions from different countries. The results of the frequencies of studies per country are reported in Figure 3.

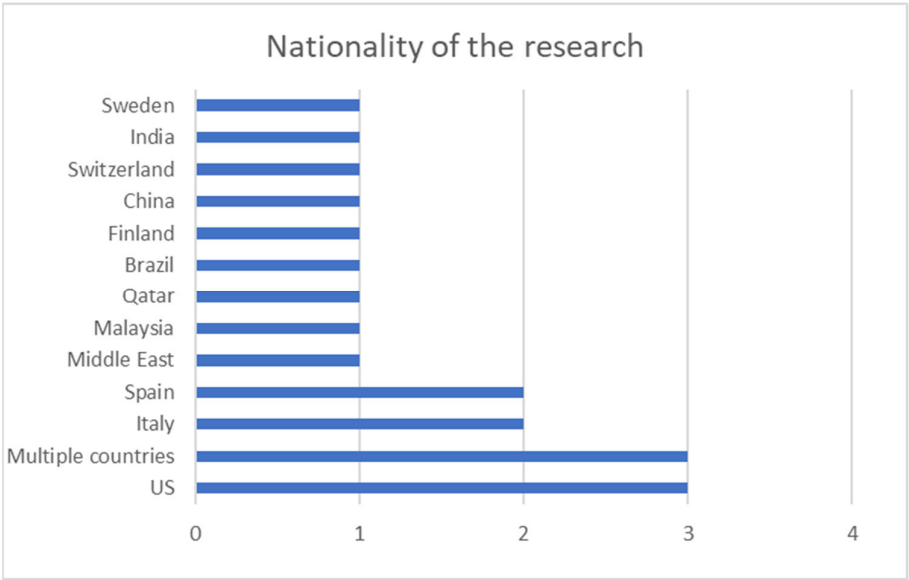

Figure 3. Frequencies of publication per country (Authors' own work).

3.4. Research Method (Frequencies)

Regarding the research methods adopted in the examined papers, the studies presented are all based on quantitative methodologies. Most of them were planned as correlational studies, in which the relations between different variables are examined [18,19,21–32,34–36]. Only two are based on descriptive designs [17,20], which present the frequencies and percentages of

the responses. Just one study is based on an experimental design [33], in which attitudes and beliefs are assessed before and after an intervention course. The frequencies of the research methods are reported in Figure 4.

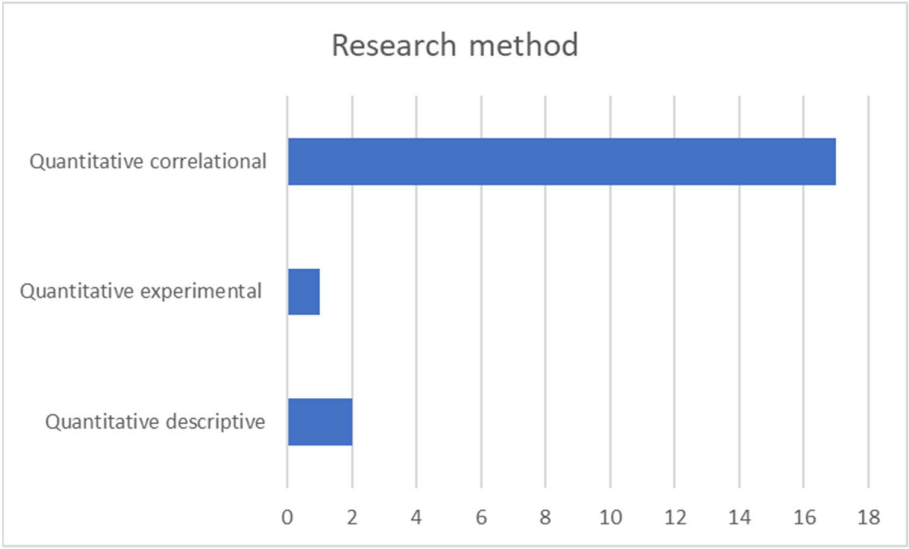

Figure 4. Frequencies of publication per research method (Authors' own work).

3.5. Main Themes in the Documents

Regarding the defined RQs (RQ1: What components of sustainable development have been considered when assessing university students' attitudes toward sustainability and education for sustainable development? RQ2: What kind of strategies and tools have been used for assessing university students' attitudes toward sustainability and education for sustainable development? RQ3: In which contexts has this assessment been performed (e.g., within a specific course, as a general assessment?), some themes were considered in the analysis of the main findings of the documents: (1) the dimensions of sustainable development considered in the assessment, with reference to the four UN pillars for sustainable development (2012), (2) the tools proposed for assessing students' attitudes and beliefs, and (3) the impact of students' attitudes on higher education practices.

3.5.1. Dimensions of Sustainable Development Considered in the Assessment

When assessing attitudes and beliefs about sustainability and sustainable development, specific dimensions were considered. It was note that most of the papers examined presented a perspective of sustainability that can be considered partial, because they did not include all the areas that are mentioned in the UNESCO pillars of sustainable development. Several studies focused only on the environmental dimension of sustainable development and climate changes issues [21,22,26–28], highlighting that these areas seem to be given the most consideration. Another dimension which has been frequently considered is that which is associated with the economic issues of sustainable development, considering also its relationship with the environmental themes [18,23,29]. Other studies focused mainly on the relationship between environmental topics and the social impacts that they could have [31,36], introducing also the theme of the role of education for sustainable development in promoting awareness of sustainability topics. The multidimensional perspective of sustainable development was addressed in only some of the studies, which tried to define students' overall attitudes toward the main SDGs and the areas they covered [19,20,24,25,30]. In these articles, all the dimensions of sustainable development were considered, particularly by examining the awareness of possible relationships between the environmental, social, educational and economic areas of human activity [31].

3.5.2. Tools for Assessment

All the studies considered in the selected articles implemented a quantitative research methodology, in which a close-ended questionnaire was used for collecting data. These questionnaires are usually multiple-choice, requiring the respondent to indicate their level of agreement (on a Likert scale or ordinal scale) with several items, including knowledge and attitudes toward sustainability. Some of the papers specifically analyzed the validity of an instrument for assessing the sustainable attitudes of higher education students [23,25,29,30] in order to collect data for assisting higher institutions in planning curricula revisions for infusing sustainable development content, approaches and teaching strategies.

3.5.3. Impact of Students' Attitudes on Higher Education Practices

When considering the main findings, many studies also considered the impact that students' attitudes may have on the organization and the management of higher education courses and practices. Based on the findings considered, higher education institutions seem to be key environments for promoting the development of positive attitudes toward sustainability themes in their students. The assessment of students' attitudes toward sustainability was often proposed as a general assessment within the context of innovating teaching and academic practices in order to specifically address the main issues of sustainable development [29–32] and to encourage the adoption of more sustainable behaviors [26]. In one case, the assessment aimed to evaluate the effectiveness of a course on sustainability [33]. The studies that were examined underlined the facts that, when implementing green policies within a university campus, it was essential for students to support this effort and their attitudes seemed to represent the level of their possible engagement [26]. Because sustainability attitudes seem to be related to sustainable behaviors, more than knowledge about sustainability topics [32,34], one of the goals of the academic context is to promote proactive attitudes toward sustainable development and associated issues [36] in order to support students' personal and professional growth as responsible citizens. The findings reported the need of periodical assessments of students' attitudes and their knowledge of sustainability, SDGs and sustainable development in order to gain information that could be used as an indicator of the effectiveness of university curricula in promoting approaches and perspectives regarding sustainable development [19]. In addition, academic events and policies based on sustainability usually act as "good models" for students; in these situation, the effectiveness of these actions should be assessed in order to provide realistic indications of their impacts on students' beliefs and attitudes.

4. Discussion

The current systematic review of the literature aims to define the main features that are associated with the assessment of university students' attitudes towards sustainability. In general, the findings have highlighted an increasing interest in examining how students perceive and value topics related to sustainable development, SDGs and education for sustainable development.

Considering the first research question (RQ1: What components of sustainable development have been considered when assessing university students' attitudes toward sustainability and education for sustainable development?), a limited perspective of sustainability is still widespread, which views sustainability mainly as an environmental issue [21,22,26,27]. Currently, some correlations are being defined within the economic dimension [18,23,27] and, less frequently, within the social dimension [31,36]. In academic contexts, it is essential to take into account all the dimensions related to sustainable development, because they cover all the areas of human activity. In addition, the social and educational functions of higher education requires particular attention not only to sustainability contents and knowledge but also to teaching practices that are in line with the main pedagogical framework of education for sustainable development [8], with particular reference to the social and the cultural dimension of sustainability [6].

With reference to the second research question (RQ2: What kinds of strategies and tools have been used for assessing university students' attitudes toward sustainability and education for sustainable development?), all the studies considered in the analysis adopted a quantitative methodology, which developed or used closed-end questionnaires for collecting data about students' attitudes toward sustainability [23,25,29,30]. The use of quantitative tools seems particularly helpful when quantifying the level of specific attitudes, which allows us to make comparisons pre- and post-quantification for verifying the potential effectiveness of specific courses or the strategies adopted for promoting sustainable perspectives in higher education [33]. Moreover, the questionnaires are particularly efficient because they allow researchers to collect a large amount of data with little effort and in a relatively short time. However, quantitative data do not offer an exhaustive overview of students' attitudes and beliefs: for example, particular false beliefs and anti-sustainable attitudes may be present [19,28] but could not emerge completely because they were not listed in the items of the instrument. In addition, data from quantitative instruments may suffer from the "social desirability bias". In this circumstance, it could be possible to integrate data from these tools with information from qualitative strategies, such as interviews and open-ended questions. This will also allow a better understanding of the underlying meanings that students attach to certain beliefs or attitudes.

When examining the last research question (RQ3: In which contexts has this assessment been performed?), the main findings from the studies considered the assessment of sustainability beliefs and attitudes as an indicator for the level of general awareness about sustainable development issues among the populations of university students [23–25]. Students' attitudes and beliefs toward sustainability may support, or conversely, get in the way, of the efforts of academic institutions to adopt more sustainable green policies [26]. Higher institutions' students may influence all the members of the academic community, promoting personal and collective values regarding the crucial role of sustainability in shaping the human future [19,30]. This may offer several indications for restructuring university curricula and courses, introducing content, topics, methods and approaches that could respond to the need for a more sustainable future [15]. To infuse information and content about sustainability into university courses, it is not sufficient to merely encourage the development of individual sensitivities toward a more sustainable future [20,30]. This approach seems merely informative and less formative: academic institutions should encourage actions and practices that may allow a full expression of a sustainable approach to education [24], not only in class (with participative and student-centered teaching strategies) but also outside of the classroom, by offering a more inclusive and ecological perspective toward students and the general society. The awareness of the main contents and issues is the first step, but it has to be followed by the need to attribute specific meanings and values to these contents.

Some limitations can be identified in the current analysis. First, only a limited portion of the articles available have been screened, because only three of the main databases for educational research have been considered. This condition may also be the cause of the limited representation of qualitative research studies on the topic considered. In future research, it is recommended that the database search be enlarged (to consider other relevant databases), in order to fill in this gap. In addition, the consideration of only those articles from peer-reviewed journals has caused the loss of potentially relevant findings from numerous conferences about sustainability and sustainable development issues. Regarding future analysis of the literature on these topics, it would be useful also to consider and examine the possible connections between students' attitude, beliefs, knowledge and behaviors related to sustainable development themes.

5. Conclusions

The need to address sustainability themes and issues in education has required higher institutions to understand what college students' attitudes are toward sustainable topics and behaviors. This seems a very complex task, not only for practical reasons (reaching a large number of respondents while keeping costs minimal) but also for the multidimen-

sional perspective of sustainable development, which includes several different areas. To respond to the need for a general assessment of students' attitudes in order to re-orient strategies and practices, several quantitative instruments have been developed. However, their application has shown that the concept of sustainability not only covers many knowledge areas, but also has a huge impact on daily life, including the educational dimension. To explore the subject in depth, it may be advisable to integrate quantitative instruments with group discussions, debates and essays, which could offer a more exhaustive overview on the ways that students consider and value sustainability in their educational paths and in their daily lives. It becomes essential for higher education institutions to address these issues in order to offer educational experiences that may promote the vision proposed by the Agenda 2030.

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