

Article

The Vision of Future Primary School Teachers as to Education for Sustainable Development from a Competency-Based Approach

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Abstract: This study was established as an interpretive or phenomenological approach, based on a content analysis of the vision of future primary education teachers for education for sustainable development and its relationship with professional sustainability competencies. The sample consisted of 367 people—113 men, 247 women, and 7 who preferred not to say—with an average age of 21.82 ± 2.56 , all of whom were studying for a Primary Education teaching degree at the Universities of Zaragoza and Granada in Spain. The content analysis process followed the phases proposed by Bardin: pre-analysis, based on an adaptation of the Cebrián and Junyent questionnaire; exploitation of the material, wherein the fragments to be coded were selected and coded one by one, by consensus between the three researchers; data processing and interpretation, using the QRS NVIVO 11 software. The main results show that respect, coexistence, and collaboration are the normative principles that regulate behavior and that the competencies related to education for sustainability have to do with managing emotions, critical thinking, clarifying values, and contextualizing problems. Furthermore, there is a lack of pragmatism that shows the need to develop the field of education for sustainable development through experiential, interdisciplinary, collaborative, and critical educational plans and projects.

Keywords: education for sustainable development (ESD); sustainability competencies; pre-service teacher education; higher education; interpretative analysis



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1. Introduction

For some years now, universities have been responsible for promoting education for sustainable development (ESD) [1–4]. This involves activating a series of behaviors, attitudes, values, knowledge, and skills in line with this approach [5,6]. Despite this, there are still numerous barriers that hinder the development of ESD [7,8], and its presence on Spanish university agendas remains modest [9].

Some of the main barriers have something to do with establishing a reorientation of the curriculum [10], which still remains traditional and mechanistic [11]; modification is a slow process. On the other hand, training plans, curricula, and pedagogy remain alien to the integration of sustainability due to their disciplinary, individual, and mechanistic nature [4,12–14].

Skills associated with sustainable development, such as critical thinking, systems thinking, and participatory action, should be general, not marginal [15]. Moreover, competency work should be at the heart of ESD, even though there is currently a lack of knowledge about professional competencies in sustainability [16]. We must help future teachers to understand sustainability in all its dimensions [17], to understand the complexity surrounding ESD [15], and to develop critical and creative thinking to help these future teachers to learn and teach competently [18].

Another element that hinders the development of ESD has to do with the evaluation of programs and processes [19]. We cannot stop at simple observations but must go further

and create reflective and critical evaluations that help determine the effectiveness of the strategies being implemented [20].

The barriers and difficulties are clear: education systems prioritize the acquisition of knowledge, without understanding education as a whole when inspired by new forms of learning and teaching [21]. Taking future teachers into account in the whole process of change is a fundamental task [22] as they will be the main axis of change and the ones in charge of continuing to educate future citizens [4,12,23]. Future teachers must have the ability to reflect on the priorities of professional competencies in sustainability, in order to integrate them into their projects and curricula [21].

The barriers mentioned above point to the need for successful research to develop ESD in initial teacher education [22]. A competency-based approach is one of the most fundamental pedagogical issues, in addition to how to address competency development and appropriate learning environments [24]. Despite this, few attempts have been made to describe teachers' ESD-related competencies or to develop competency models. There are currently three models describing ESD-specific competencies: (a) the curriculum, sustainable development, competencies and teacher education (CSCT) model [24]; (b) the curricular environmentalization of higher education (ACES) model [25]; and (c) the "Learning for the Future: Competencies in Education for Sustainable Development (ECE)" model [24]. These models are based on a holistic competency framework and can serve as a basis for the design of educational programs or curricula in teacher education institutions, aligning teaching in the interests of ESD [6].

The Australian schools themselves have also begun to develop comprehensive school programs that address ESD [26,27]. These are supported by national and state education policies and professional development programs, such as the Australian Sustainable Schools Initiative (3). As a result, five enabling actions in initial teacher education were identified across the projects [28]: (a) collaborating for curriculum change; (b) developing an ethos of sustainable practice; (c) connecting to existing ESD content; (d) creating spaces and opportunities for integrated programs; (e) providing experiential learning.

Research such as the educational innovation project, "EDINSOST" (Education and Social Innovation for Sustainability), is based on the integration of competencies in higher education as a way to move toward a more sustainable society. The project aims to analyze sustainability training needs and identify the sustainability competencies to be enhanced, taking into account the students' perceptions of sustainability.

As mentioned above, there is a need for research that takes a leap toward the pragmatic. Makrakis [29] utilizes the "DeCoRe plus Model", which is the abbreviation for deconstruction–construction–reconstruction processes complemented by diagnostic evaluation, implementation, and summative evaluation, representing a model that helps to move from theory to praxis by incorporating sustainability into initial teacher training in school curricula and syllabuses. Through the model, we can move toward a transformative practice that takes into account the context and the learner as a protagonist, in order to create a sustainable and just society [29].

Ferreira et al. [30] reviewed the characteristics of "models of professional development" from different initiatives working on ESD in teacher education. From these characteristics, he highlights three different models: the collaborative resource development and adaptation model, a model that is based on adapting the curriculum and pedagogy; the action research model, where, through reflective action, the model seeks to actively engage participants by engaging their commitment; the whole-of-system model, which seeks change at all levels of the system [31]. The whole-of-system model shows a completely different nature to the other models, attempting as it does to delineate a contextual understanding of change. The model is based on the assumption that change only occurs if all levels and contexts of the system work in alignment toward ESD. Moreover, for change to occur, not all levels are treated equally; rather, specific and coherent strategies are developed for each context [32].

Creating appropriate learning environments for the development of ESD is essential [22]. Initial teacher education should not only transmit knowledge related to sustainability but also encourage critical thinking, interdisciplinarity, and transdisciplinarity [3,33]. The aim is to promote the development of competency-based learning with future teachers, based on professional competencies in sustainability [3,34]. We must remember that the compulsory education stage is a crucial moment in a child's development, wherein they acquire the knowledge, attitudes, and values that will accompany them throughout their lives to become sustainable citizens. Therefore, curricular sustainability work in initial teacher training can generate future sustainable habits that empower them as the future generation of teachers [23,34].

The development of knowledge, attitudes, and values for sustainability is an approach toward competencies in education for sustainability that aims to address challenges related to the current context [6]. The development of competency learning for sustainability is one of the greatest challenges facing universities today [33–37], as it promotes the development of professionals with the knowledge, attitudes, and values to act in a responsible and sustainable manner [2,4]. Therefore, addressing ESD in initial teacher education involves understanding the conceptual frameworks and facilitating a positive transformation of education and society, starting in primary education [21].

What has been revealed so far leads the following study to consider two main objectives:

- To analyze the vision of future primary education teachers by identifying the conceptual, procedural, and attitudinal contents related to ESD.
- To analyze the relationship between the vision of future primary school teachers and professional competencies in ESD.

2. Materials and Methods

The current study was established as an interpretive or phenomenological approach, based on the content analysis of the vision of primary education teachers regarding professional competencies in ESD. It should be noted that this research is part of the diagnostic evaluation of a doctoral thesis that aims to introduce curricular sustainability through an intervention program within the education of physical education teachers.

2.1. Participants

The sample selected included third-year primary-education teaching degree students from the Faculty of Education of Zaragoza, the Faculty of Human Sciences and Education of Huesca, and the Faculty of Social and Human Sciences of Teruel of the University of Zaragoza, Spain; in addition, participants were drawn from the Faculty of Education Sciences of Granada, the Faculty of Education, Economics and Technology of Ceuta, and the Faculty of Education and Sport Sciences of Melilla of the University of Granada, Spain.

The study population comprised 383 respondents—136 men, 245 women, and 2 who preferred not to say. Finally, after considering the exclusion criteria, 367 participants were accepted—118 men, 247 women, and 2 who preferred not to say—with a mean age of 21.82 ± 2.56 .

The inclusion criteria for the sample were based on the completion of the questionnaire and on filling in all the information requested. Thirteen subjects were excluded due to the lack of specificity in the data provided, such as the information being expressed in overly simple and unclear sentences, which meant that they could not be included as part of the system of categories.

2.2. Instrument

The professional competencies in education for sustainability were assessed based on an adaptation of the Cebrián and Junyent [21] questionnaire. The redefinition of the ESD competency framework in initial teacher education was based on the most important theoretical references or models mentioned in the introduction to this article (the CSCT model [24], ACES [25], and ECE [24]). The instrument presents students with a text based

on a real-life situation through which they will create a project with objectives and content covering the natural, social, and economic environment. Based on this context, students must answer two open-ended questions, one related to the objectives and the other to the content that they consider to be a priority for the design of the project they are asked to create, in relation to their educational practice as primary school teachers.

The students' references to the different indicators were coded on the basis of a system of categories. The references are the phrases or quasi-sentences written by the participants, as collected in a questionnaire with open questions. They have been codified based on their content, according to the category system set out below. An inductive and deductive process was combined (Table 1).

Table 1. Category system.

Dimension		Categories	Indicators
1.	Vision of primary school student teachers of ESD	1.1. Knowledge	1.1.1. Environment 1.1.2. Social environment 1.1.3. Global strategies 1.1.4. Active living
		1.2. Practical skills	1.2.1. Practical applications 1.2.2. Expansion
		1.3. Values and attitudes	1.3.1. Autonomy 1.3.2. Social behaviors 1.3.3. Environmental behaviors 1.3.4. Healthy habits

Source: Compiled by the authors.

The system of categories identifies the vision of primary education student teachers regarding the ESD dimension. Thus, category 1.1.—knowledge—is related to the fact of knowing or identifying the conceptual contents. Indicator 1.1.1.—environment—refers to all the content that has to do with the natural interaction of living beings or the circumstances that surround them. In addition, we have included those terms that allude to interaction with the environment, climate, climate change, etc. For example: “To learn about the importance of energy-saving through work in the classroom” (Oliver) (all names used in this study are fictitious, respecting the gender of the participants). Indicator 1.1.2.—social environment—refers to those contents that have to do with the interactions between the people who make up the world. This includes arguments that allude to living in society and the individual's relationship with that society; for example: “To learn about and become aware of the inequalities in the world” (Poppy). Indicator 1.1.3.—global strategies—refers to global projects or initiatives, for example: “Sustainable Development Goals (SDG)” (Olivia). Indicator 1.1.4.—active living—refers to all content related to healthy living habits, for example: “Eating habits and their impact on health and physical exercise” (Thomas).

Category 1.2.—practical skills—refers to procedural contents, techniques, or work strategies. Indicator 1.2.1.—practical applications—refers to strategies that are developed for the acquisition of content based on the interaction, involvement, or action of people. Only those arguments that describe a concrete strategy to implement content will be included, for example: “Developing recycling through service learning” (Zoe). Indicator 1.2.2.—expansion—refers to arguments about the extension of strategies and proposals. We include arguments that allude to involving different actors, creating alliances, or making initiatives visible, for example: “Getting the message across to as many people as possible” (Oscar).

Category 1.3.—values and attitudes—relates to the normative principles that regulate human behavior. Indicator 1.3.1.—autonomy—refers to behaviors that denote the independence of the individual in carrying out certain actions, for example: “Create your own 2030 agenda to change the world” (Liam). Indicator 1.3.2.—social behavior—refers to arguments that relate to the social level, for example: “Include everyone. Everyone is welcome in the school, regardless of gender, sexual orientation, ethnicity, ability, etc.”

(Jessica). Indicator 1.3.3—environmental behaviors—refers to arguments related to the environment. It includes those human behaviors related to the environment. For example: “Take care of everything around us. We have to respect the school and everything that surrounds it (the world). So we have to take care of the environment we are in, in every possible way” (Amelia). Indicator 1.3.4—healthy habits—refers to the development and implementation of these healthy habits, for example: “Developing healthy eating through a balanced diet, acquiring habits of body care and hygiene” (William).

2.3. Procedure

The questionnaires were completed in March and April of the 2020/2021 academic year. The COVID-19 situation limited the organization and planning of the study with the university teaching staff of the primary-education teaching degree course (Physical Education in Primary Education). The accompaniment for the completion of the questionnaire had to be carried out online, lasting approximately 40 min, with all the groups of students enrolled in the third year of the teaching degree. The aim of their participation was for the students to be able to understand how the research connected to their future teaching practice and how their participation could help us to promote continuous learning toward education for sustainability. In addition, they were provided with all the necessary information on the more technical aspects of completing the questionnaire. Participants filled in an informed consent form to participate in the research, which was approved by the Research Ethics Committee of the Autonomous Community of Aragon: CEICA (C.P.-C.I. PI21/076). This document explained the reason for their participation, the data privacy policy, and how the questionnaire would work.

The content analysis process, in relation to the first objective of the study, followed the phases proposed by Bardin [38]: pre-analysis, exploitation of the material, and data processing and interpretation.

- The pre-analysis phase was based on an adaptation of the Cebrián and Junyent [21] questionnaire. This questionnaire only referred to the environmental dimension, so it was opened up to the environmental, social, and economic aspects. Once the responses were obtained, a first reading was carried out and a pilot test was applied to 20% of the sample among the three researchers and authors of the study. After the first test, they agreed on the need to modify the indicators. Thus, two indicators that were considered to be essential for the analysis were added: 1.1.4, active living, and 1.3.4, healthy habits. Furthermore, one of the indicators—1.3.2, action capacity—was eliminated as it was considered to be outside the scope of the research. Afterward, training was again carried out with the researchers, conducting the concordance analysis between them using Cohen’s kappa ($k = 0.930$). To carry out the concordance test, 20% of the sample was chosen at random; that is, the responses of 20% of the study participants were chosen. With the references of this sub-sample, a database with four columns was designed: encoder 1; encoder 2; participant; and reference. In this way, and independently, each encoder will add an indicator to each of the references in its corresponding column. Once completed, Cohen’s kappa will be applied, with the detailed indicators in the columns of the two main indicators. In this way, the concordance calculation will be extracted.
- In the exploitation of the material phase, the coding of the transcriptions of all the questionnaires was carried out by consensus between the three researchers. The fragments to be coded were selected and coded one by one. Time was allowed for individual reflection, then the selection of the indicator was presented, and the argument was added. In the event of a mismatch, a discussion was initiated, based on the category system outlined above. The fragments were selected on the basis of the single dimension of analysis: the students’ vision of ESD. Once selected, one of the three possible categories was identified; finally, the indicator of the respective category was identified.

- The results were processed and interpreted independently for each subject ($n = 367$), using the QSR (Computer Assisted Qualitative Data Analysis Systems) International NVIVO 11 software, Melbourne, Australia.

In relation to the second objective of the study, a comparison was established between the indicators with the highest incidence that had been deduced from the first objective of the study and the professional sustainability competencies provided by Cebrián and Junyent [21]. Taking the definitions of these competencies into account, a relationship was established with the indicators, thus obtaining those professional sustainability competencies that the students prioritized the most.

3. Results

3.1. Respect, Coexistence, and Collaboration: Normative Principles Par Excellence That Regulate Human Behavior

Figure 1 shows, from left to right, the dimensions, categories, and indicators, specifying the number of references. The greater or lesser number of references shows the interest of the participants in the identified topic.

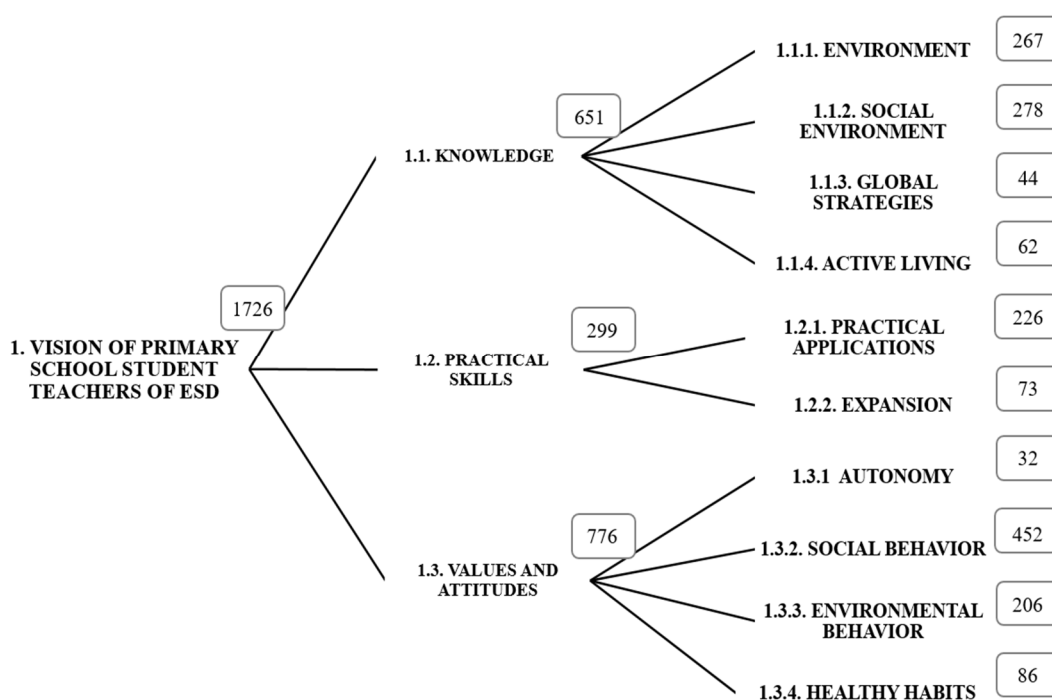


Figure 1. Number of references according to dimensions, categories, and indicators. Source: compiled by the authors.

3.1.1. Knowledge

Category 1.1.—knowledge—has the second=highest number of references (651), referring to the fact of knowing and identifying certain concepts about ESD. The references are organized around four indicators that refer to the different conceptual contents that future teachers consider to be a priority when developing a project. The indicators with the highest number of references are 1.1.2, social environment (278 references), and 1.1.1, environment (267 references), followed by 1.1.4, active living (62 references), and 1.1.3 global strategies (44 references). Figure 2 shows the four indicators around which the category has been organized, highlighting those issues most relevant to each of them.



Figure 2. The knowledge areas that future teachers consider to be a priority in a project—category 1.1. knowledge. Source: compiled by the authors.

With regard to indicator 1.1.2—social environment—students consider the development of values to be a priority: “Values such as empathy, respect, equality, companionship, solidarity . . . ” (Oliver). They also highlight the importance of valuing and respecting social and cultural diversity, diversity of the education center, gender, etc., providing references such as: “Knowing and respecting different cultures” (Amelia). On the other hand, they also mention the need for inclusive education that educates the students in feminism, reaches everyone, and is of high quality: “Students must receive a quality education, since education is a fundamental right for everyone” (William). They also claim the need for personal knowledge and group cohesion when developing a project, which will allow help, understanding, and respect to flow between members: “Getting to know our classmates better, from a deeper and more personal point of view, knowing how to favor the atmosphere so that we all feel at ease” (Emily).

Indicator 1.1.1—environment—focuses most of its references on the environment near and far from the school. The students highlight the importance of knowing and respecting the environment, knowing the natural resources it possesses, and the requisite actions for its conservation: “Natural resources that are present in the child’s immediate environment and actions that benefit the conservation of these resources” (Ava). On the other hand, they emphasize the importance of recycling, and that children should have the necessary notions to be able to carry it out, “To learn about different ways of recycling” (James). They consider the development of environmental education to be a priority, raising children’s awareness, which, in turn, will lead them to learn specific content related to sustainability. Finally, they appeal to the importance of the individual responsibility of each person to carry out sustainable habits, with contributions such as: “Valuing the physical and social environment [...] Likewise, we must take into consideration that the spaces in which we move are public, so it is everyone’s responsibility to look after them” (Poppy).

With regard to indicator 1.1.4—active living—the references obtained are organized around three aspects: the practice of daily physical activity, healthy diet, and hygiene care. Students put the development of knowledge that promotes physical activity first, although they often also refer to the importance of a good diet: “Eating habits and their impact on

health and physical exercise” (Thomas). The importance of hygiene comes third, with contributions such as: “Hygiene habits: we live in a time when hygiene is the order of the day. It would be a great time to work on them in a cross-cutting way [...]” (Olivia).

Finally, indicator 1.1.3.—global strategies—was structured among those indicators that were most frequently mentioned. Firstly, the pupils mention the United Nations’ Sustainable Development Goals and the 2030 Agenda, discussing the importance of knowing about them and integrating them into everyday life. On the other hand, they also highlight the three Rs rule: reduce, recycle, and reuse.

3.1.2. Practical Skills

Category 1.2.—practical skills—is the one with the lowest number of references compared to the other two (299 references). The references are structured around two indicators: 1.2.1, practical applications, which refers to those strategies or techniques that enhance the acquisition of knowledge, and 1.2.2, expansion, which has to do with those arguments that enhance the impact on the society to which they are addressed. Figure 3 shows the ratio between the two indicators. In addition, the participants’ arguments have been organized around the main themes that are most frequently mentioned.

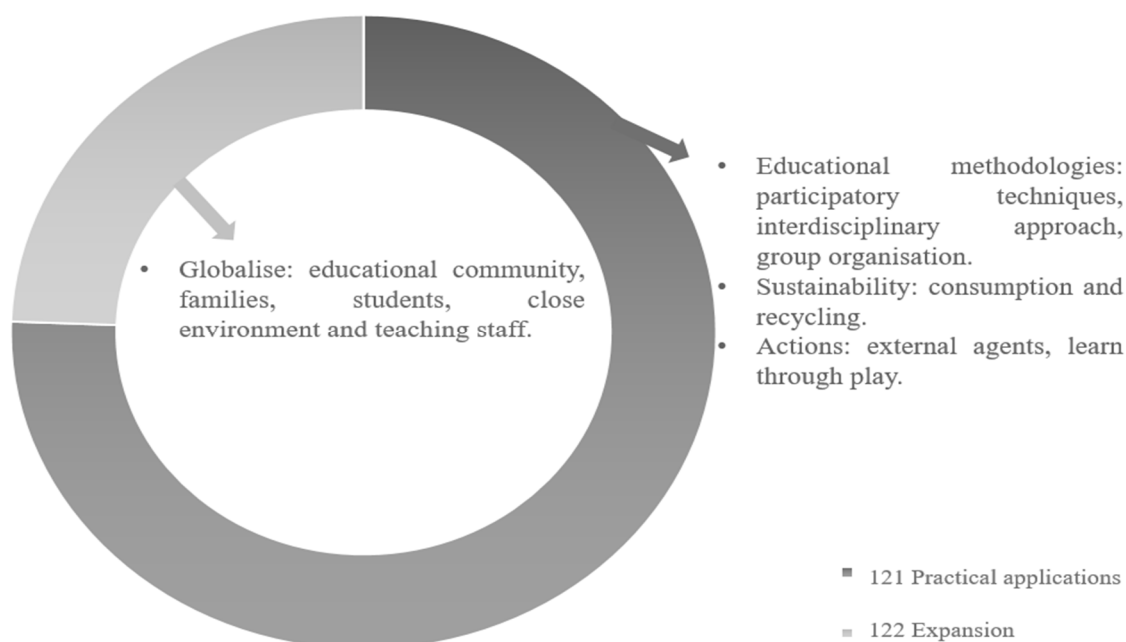


Figure 3. Practical skills for carrying out a project—category 1.2. Source: compiled by the authors.

In indicator 1.2.1, practical applications, with 226 references, the contributions mainly refer to educational methodologies. Students consider as a priority the development of participatory techniques that encourage collaboration, companionship, teamwork, etc., with contributions such as: “Encourage group work and cooperative learning” (Lily). They also highlight the development of interdisciplinary approaches: “To become aware of the influence that the context (personal and environmental) has on student learning, and to relate content from different curricular areas, thus promoting interdisciplinarity” (Zoe). Another educational methodology that the students highlight is the emancipatory style, defining it as follows: “Making students participants in their learning and becoming responsible for their actions” (Oscar).

On the other hand, students highlight the importance of putting sustainability into practice, focusing on two main aspects that have to do with consumption and recycling. Some students make references such as: “Remember to use water properly, don’t leave taps running, etc.” (Luc), or “We could achieve the objective that when the children leave the classroom, they should turn off the lights and try to do the same at home” (Lily). In terms

of recycling, the following stand out: “Visit to a recycling plant” (Esmeralda) or “Getting to know the different containers in the city” (Oscar). Finally, the future teachers provide practical applications that could help the students to lead an active life, such as traveling in a sustainable way by bicycle, talks to promote mental health, sport, etc.: “Discuss the importance of physical health through sport and nutrition and especially mental health, either with talks or real examples” (Olivia).

On the other hand, in indicator 1.2.2—expansion—the references mainly allude to the importance of globalizing, of taking the projects to others. They mainly emphasize expansion toward the school community: “To encourage the responsible participation of each and every member of the school community [...]” (William); toward families: “To accept the ideas of the pupils’ parents” (Thomas); toward the rest of the pupils in the school: “To achieve the maximum possible participation by the pupils” (Ava); toward the immediate environment: “To work together with organizations and professionals in the neighborhood (health center, civic center, social services, leisure time education, etc.)” (Emily); and toward the rest of the teaching staff: “To integrate teaching professionals in the sustainable project by providing them with the necessary tools to be able to carry it out” (James).

3.1.3. Values and Attitudes

Category 1.3—values and attitudes—has the highest number of references (776 references), and refers to those normative principles that regulate behavior. This category is organized around four main indicators: 1.3.1, autonomy, which refers to behaviors that denote the independence of the individual; 1.3.2, social behaviors, which refers to actions related to the social sphere, solidarity, empathy, etc.; 1.3.3, environmental behaviors, related to behaviors specific to the environment; and 1.3.4, healthy habits acquired from a particular behavior or attitude. Figure 4 includes the four indicators, highlighting the most relevant aspects of each. As can be seen in indicator 1.3.2, social behaviors, those values most frequently mentioned by the participants are included.

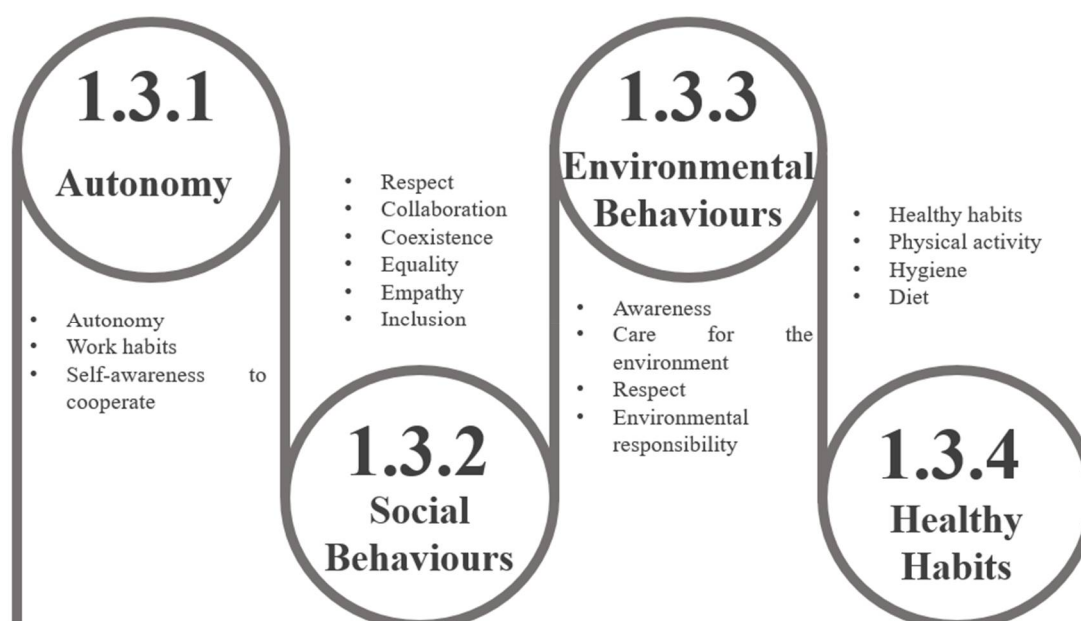


Figure 4. Values and attitudes that regulate human behavior—category 1.3. Source: compiled by the authors.

The first indicator, 1.3.1—autonomy—is the one with the lowest number of references [32]. The future teachers limit themselves to specifically mentioning the importance of developing this independence through a series of work habits, such as:

“Developing habits of individual and teamwork, effort and responsibility in study, as well as attitudes of self-confidence, critical sense, personal initiative, curiosity, interest and creativity in learning, and entrepreneurial spirit: also linked to the competency of developing entrepreneurial spirit”. (Jessica)

Indicator 1.3.2—social behaviors—is the indicator with the highest number of references (452). Among the different behaviors mentioned by these future teachers, respect for all people, social norms, opinions, etc. should be highlighted. “Respecting the opinions of colleagues (listening to and respecting all opinions as they are all equally valid. If you don’t agree, show your disagreement without disrespecting other people” (Liam).

Another behavior that stands out is that of coexistence within the educational community, knowing the values and rules to carry it out. “Knowing and appreciating the values and rules of coexistence, learning to act in accordance with them, [...]” (Jack). On the other hand, it is worth mentioning that students consider it a priority for there to be an atmosphere of collaboration among classmates, teachers, students, etc.: “Create an atmosphere of collaboration between classmates and teachers” (Thomas). They also consider that equality should govern the behavior of students, “Generate equal opportunities for all students in the school, regardless of personal conditions” (Lily). They also allude to the importance of emotional intelligence, which would help the relationship and coexistence among students: “Develop emotional intelligence. To be able to have a good relationship and know how to get along with others” (Poppy).

Indicator 1.3.3.—environmental behavior—is also highly significant within the category, with 206 references. The priority is based on the importance of environmental awareness. The following contributions stand out:

“Raising awareness about caring for the environment. It is very important that they learn, from an early age, as much as possible about this subject, as this is where we obtain water, food, or the raw materials used to manufacture the objects we all use. We must make them see that it is our home and that, without it, we would not be able to exist. We must encourage the care of nature since both air and water are increasingly polluted, forests are disappearing, and many animals are becoming extinct”. (Amelia)

In addition to this awareness, future teachers consider it important to promote respect and improvements that help to preserve the environment: “Adopt urgent measures to combat climate change and its effects” (Olivia), or “Review and improve the forms of organization, curricular content, and environmental values that are transmitted” (William).

Indicator 1.3.4—healthy habits—obtained 86 references. Unlike indicator 1.1.4—active living—in this case, the future teachers no longer referred to the knowledge to be acquired, but to those healthy attitudes that should be inherent to the person. Once again, they emphasize the importance of physical activity, hygiene, and nutrition. Some of the contributions are: “Preparing projects aimed at the development of an active, critical and healthy lifestyle, using their ability to search for, organize and process information, and being able to present it orally and/or in writing, relying on Information and Communication Technologies” (Ava), or “Understanding and reflecting on the effects that the practice of physical activities and hygiene have on our health” (Jessica).

3.2. Managing Emotions, Thinking Critically, Clarifying Values and Contextualising: The Professional Competencies Considered by Students

Cebrián and Junyent [21] (Table 2) highlight a series of professional competencies in ESD considered to be skills that teachers should acquire. A relationship is then established between the indicators that have been given the highest priority by future teachers (sorted according to the number of references that have appeared in relation to them) and these professional competencies. Once the relationship between the definition of each competence and those indicators of the category system to which it could be related had been established, the next step consisted of counting the arguments (n) that each indicator had in order

to establish a ranking of the competences that were given more or less priority by the participants (Table 2).

Table 2. Relationship between competencies and indicators.

Professional Competencies in Education for Sustainability	Indicators
1 Managing emotions (n = 730)	Social environment (n = 278) Social behaviors (n = 452)
2 Thinking critically (n = 690)	Social behaviors (n = 452) Environmental behaviors (n = 206) Autonomy (n = 32)
3 Clarifying values (n = 658)	Social behaviors (n = 452) Environmental behaviors (n = 206) Environment (n = 267)
4 Contextualizing (n = 618)	Social environment (n = 278) Expansion (n = 73)
5 Taking decisions, participating in and taking action for change (n = 331)	Practical applications (n = 226) Expansion (n = 73) Autonomy (n = 32)
6 Establishing a dialog between disciplines (n = 270)	Global strategies (n = 44) Practical Applications (n = 226)
7 Envisioning future/alternative scenarios (n = 117)	Expansion (n = 73) Global Strategies (n = 44)
8 Working and living with complexity (n = 44)	Global Strategies (n = 44)

Source: professional competencies in EDS [21], compiled by the authors.

According to the relationship established with the professional competencies in ESD, these future teachers consider it important for there to be clear values and behaviors regarding sustainability. They emphasize the priority of respecting and caring for the environment, as well as developing other values in pupils (collaboration, coexistence, equality, awareness, etc.) that help to reinforce education for sustainability. With the same degree of importance, they recognize the relevance of pupils being able to listen to themselves, to know themselves, to discover what they like or what makes them take action, that is, to work on emotional intelligence that leads to a more reflective knowledge of the situations around them. At the same time, they show that it is important for there to be critical thinking, for them to be capable of assessing and deciding on their own actions, forming an opinion on the issues that surround them.

Another competency that is mentioned repeatedly has to do with contextualizing problems, accessing knowledge from the different dimensions of the problem. In addition, they reflect the importance of participating, acting, and making decisions so that changes can take place, highlighting the importance of creating awareness and taking responsibility, promoting participatory techniques and interdisciplinary approaches that lead them to find solutions and act within the context. Finally, there is also the importance of envisioning future or alternative scenarios, and working and living with complexity, promoting the expansion of all projects toward different horizons and different futures.

4. Discussion

In the introduction, the problem that currently surrounds the education system with regard to ESD has been described; more specifically, curricula need to be reoriented [11] as they are still traditional and mechanistic [12]. In this regard, critical thinking, systems thinking, and participatory action [16] must be integrated into the curricula and, of course, competencies must be placed at the epicenter of these educational reforms [17]. Another problem is linked to the evaluation of programs, which are superficial and should allow for reflection and criticism, in order to incorporate effective strategies [20,21].

Therefore, these problems must be solved by modifying the curricula, and it is upon these future teachers that part of this responsibility falls [22,39]. For this reason, the results

of this study have made it possible to understand the vision that student teachers have of ESD, which is essential for introducing changes to curricula that are adapted to their professional imagination and needs.

Taking into account the first objective, the results obtained from the research, according to the priority of knowledge, are mainly geared toward social knowledge, linked to the immediate environment and toward learning that is not isolated from society [5]. Students demand knowledge that fosters values and attitudes for the benefit of society, that is, to become professionals who are capable of using the knowledge acquired to create a way of life that is coherent with the future [13]. Furthermore, they have considered the need to contextualize knowledge regarding the environment around them, knowledge based on reality, on global and local socio-environmental problems, and casuistry [7,30,37].

When these future teachers were asked about values and attitudes, they again prioritized the development of social behaviors. Teacher training programs should not be limited to the development of knowledge but should integrate the development of values and attitudes, to prepare them as professionals when teaching in schools [5]. ESD training is mainly characterized by a transversality that allows promoting a balance between the three dimensions, i.e., it allows for economic growth, while preserving the environment, cultural diversity, social well-being and values education [40,41].

When we inquired about what knowledge, they responded that their priorities would be those related to the social environment, when asked about what attitudes and values, they again prioritized social behaviors. Some authors [3,28] argue that if we are to educate for the future we need to place greater emphasis on the social, cultural, and moral dimension of education. This is because we need to build a strong education community that is able to commit to improving the quality of education for all [39,40].

Taking into account the second objective set out by the research, the students prioritized the development of professional sustainability competencies that are close to the social element. They highlight the priority of promoting the students' ability to listen and channel emotions as a means to achieve knowledge [11,21], considering that by working from a human level, the depth of the problems and their solutions can be reached. Another professional sustainability competency that they consider to be a priority has to do with the ability to reflect on each opinion, criticism, or way of seeing things, having the ability to question knowledge, and going a step further. In addition, they promote value-based work among students and the importance of contextualizing problems.

We must bear in mind that in order to guarantee quality teacher training programs, they must incorporate ESD competencies [42], with a versatile character that will allow individuals to adapt their actions to changes that occur in the context [6]. Thanks to the development of these competencies, future teachers will be able to adapt to the requirements of the context and transmit this sense to their students [12]. Sustainability competencies not only address the development of knowledge, attitudes, and values, but also take into account training for action [43], something that our future teachers have not prioritized. It is necessary to know in order to do, to put into practice and to be able to internalize the problem [12].

The incorporation of ESD in teacher education must be immediate. Future teachers must understand that they are the key to change and that their present actions will determine future consequences. We need to help them understand that by incorporating ESD into their way of life and schools, this can ensure a sustainable future for the planet and for the people on it [44]. Although the application of ESD in the university context has a long history [45], the field of teaching seems to be the most complex when it comes to introducing changes and working on professional competencies in ESD [3,24,46]. Hence, we are met with the challenge and need to integrate curriculum sustainability into initial teacher education. Working from competencies in sustainability [26] facilitates the teaching and learning process for students, as it is based on interdisciplinary, systemic, discovery, and creativity-oriented learning [3,6]. It is also a difficult task for teachers to implement [47,48] and is not yet oriented toward ESD approaches and assessments [12]. In terms of the study's

limitations, we can highlight two main ones. On the one hand, with regard to the instrument, it is made up of two questions that certainly do not invite reflection. Before the participants started, the intention was always for them to offer a reflection in their answers that would help us with the subsequent analysis. However, in most cases, the answers were limited to simple sentences or even unconnected words that were difficult to understand and categorise. This lack of development meant that many responses could not be analyzed and had to be excluded from the study.

On the other hand, the COVID-19 situation is noteworthy. Although not new, this research has also been affected by it. Given the global momentum that accompanied the research at the time of data collection, the research had to reinvent itself and take a leap toward the virtual and online. All questionnaires were transmitted online via Google Forms. Initially, the approach was to conduct the research virtually via their computers and telephones, even though the researchers were present. However, given the situation, it was not possible to be present in person either. For this reason, virtual meetings were held with most of the groups via Google Meet. These allowed us to offer participants an explanation of the instrument and to resolve any doubts that might arise while they were completing it. However, the fact that we were unable to travel to some faculties meant that the number of participants was exponentially reduced.

5. Conclusions

Firstly, and referring to the results obtained from the research, it could be affirmed that future teachers consider that there is a need to promote social aspects, behaviors, values and attitudes that shape people. In the majority of their discourses, they defend the need to work on values such as respect, empathy, the need to collaborate, learning to coexist or to live with an understanding of the equality of all people. University students consider the development of diversity and inclusive education where everyone is included to be a priority. It is a society that demands the need to work and live as we are, social beings. People who coexist, cooperate, and collaborate, rowing together toward the same goals. Perhaps the current situation, which forces us every day to stop being social beings, is what drives the participants to trust even more in these values.

In addition to considering the development of all this as a priority, they relegate action and practice to second place when putting knowledge, values, and attitudes into practice. This lack of pragmatism is also reflected in ESD today. For this reason, few future teachers are trained in ESD through curricula, subjects, collaborative, and comprehensive educational projects, where they can experience and live ESD.

This study, framed within the diagnostic phase of a doctoral thesis, is a first step toward an educational project that will integrate ESD into the initial education of Primary Education teachers. It will try to bring it closer to the students and work with them from an experimental, interdisciplinary, collaborative, and critical point of view. We need teachers capable of developing ESD with their students in the future, but to achieve this they must be trained in the same way. Initial education must become a wheel of knowledge that can be transmitted from teacher to teacher and from teacher to student, with continuous feedback that constantly nurtures the teaching and learning process.

Taking into account the results obtained, and alluding to the need to train future teachers who are critical and capable of analyzing this knowledge and transmitting it in a sustainable way, the following recommendations are established:

1. Identify the social and environmental problems or needs of the immediate environment (in school communities, in relation to the University of Zaragoza), through the co-design of service-learning projects with future teachers.
2. To develop the capacity of future teachers as agents of change, in order to be able to identify and encourage in others those concerns and skills that collectively respond to the complex challenges of today's and future society.

3. To turn university teaching staff into active agents in a process of transformation in their role as educators, acquiring, in the process, strategies and tools to help them guide students to be aware of their power to improve the world and use it.
4. Create and develop teams and learning communities in faculties of education to co-design a specific structure and competency model for educating agents of change, built on the concept of “learning by doing”.

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