frontiers | Frontiers in Education

TYPE Original Research
PUBLISHED 05 January 2024
DOI 10.3389/feduc.2023.1205478

OPEN ACCESS

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RECEIVED 13 April 2023
ACCEPTED 12 December 2023
PUBLISHED 05 January 2024

CITATION
Álvarez-Vanegas A, Rieckmann M, Lopera Pérez M and Aguirre PM (2024) Teaching with A Rounder Sense of Purpose: a survey study on education for sustainable development competences in Latin America. *Front. Educ.* 8:1205478. doi: 10.3389/feduc.2023.1205478

Teaching with A Rounder Sense of Purpose: a survey study on education for sustainable development competences in Latin America

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Through support and guidance in fostering competences in ESD, educators can help students to evolve into engaged citizens capable of addressing the current ecological crisis. However, in order to provide effective guidance, educators need to become proficient in sustainability. In this line, this study investigates (i) the depth of knowledge about sustainability (including teaching for sustainability), (ii) stances toward the Sustainable Development Goals, and (iii) competences that Latin American university educators perceive they possess. A survey was designed, including elements from previously validated instruments and using the competences framework A Rounder Sense of Purpose. It was answered by educators from Latin America (N=197), mainly Colombia and Ecuador. Through a statistical analysis, ranks were developed, and further analyses were made. Although this research is based on the self-perception of respondents, findings suggest that educators have some knowledge about ESD. However, there is room for improvement, particularly in terms of action. Additionally, there are inconsistencies between the competences they aim to develop in their students and the ones they currently possess. Such an assessment had not been done specifically for the Latin American context, and the A Rounder Sense of Purpose framework of competences had yet to be explored with a large sample of educators. The results of this research will allow for the offering of a more adequate and pertinent capacity-building program for university educators.

KEYWORDS

education for sustainable development, education for sustainability, sustainability competences, A Rounder Sense of Purpose, higher education

1 Introduction

As critical thresholds to maintain a healthy planet are transgressed (Rockström et al., 2009; Steffen et al., 2015; Persson et al., 2022; Wang-Erlandsson et al., 2022), humanity stands before a growing challenge: providing opportunities for a high-quality life for almost eight billion people without further harming the global ecological systems

(Raworth, 2017a,b; O'Neill et al., 2018). Although the global environmental problems are manifold and interlinked, climate change alone poses a major threat to humanity. Therefore, a form of development that is resilient to climate and embraces "mitigation, adaptation and inclusive sustainable development to advance planetary health and well-being for all" (Singh and Chudasama, 2021, p. 1) is needed. Nonetheless, the Intergovernmental Panel on Climate Change (IPCC) warns that "there is a rapidly narrowing window of opportunity to enable climate resilient development" (IPCC, 2022, p. 29). This means that actions that lead to a climate-resilient and sustainable development are urgent, and all sectors are called upon to implement actions for sustainability.

In all levels of the education sector, there is potential to enrich the societal learning process required to shape a culture of sustainability. Changing the dominant culture involves not only the acquisition of knowledge, but also transforming attitudes and other dispositions related to motivations and the attitudinal domain. It is here that the notion of competence becomes relevant, as it is a "cluster of specific and interrelated individual dispositions comprising knowledge, skills, motives, and attitudes, i.e., combining cognitive, affective, volitional and motivational elements" (Brundiers et al., 2021, p. 17). Higher Education can make essential contributions by supporting students in developing sustainability competences to tackle social, ecological, and economic problems as citizens and professionals. However, this can only be accomplished if a reorientation toward Education for Sustainable Development (ESD) is achieved. In turn, for this reorientation to happen, educators are expected to develop sustainability competences themselves (Corres et al., 2020; Rieckmann and Barth, 2022). This paper seeks to enrich the discussion about sustainability competences in universities by exploring how educators of different higher education institutions in Latin American countries (mainly Ecuador and Colombia) perceive (i) their knowledge about sustainability, (ii) their position (degree of familiarization, relevance and consideration) toward the Sustainable Development Goals (SDGs), and (iii) their own competences around teaching for sustainability. Data was collected through a survey ($N = 197$) that included parts of an instrument reported in previous literature (to reflect on their knowledge around sustainability and teaching for sustainability) (Leal Filho et al., 2021). Respondents could also evaluate themselves against the background of 12 ESD competences proposed by the A Rounder Sense of Purpose (RSP) project (Millican, 2022), one of the frameworks of ESD competences for educators discussed in the literature (Corres et al., 2020; Rieckmann and Barth, 2022).

The remainder of this paper is structured as follows. Section 2 shows a background on sustainability, ESD and the role of educators' ESD competences. Section 3 outlines the methodological approach used in this research, including information about the survey and the methods used to analyze the obtained data. In section 4, we present and discuss our findings, and section 5 draws on conclusions and possible next steps.

2 Background

Humanity depends on nature's contributions for survival and a good quality of life. Sustainability means using and distributing these contributions in a just way that preserves ecological systems that produce them, ideally benefiting them as well (Díaz et al., 2018). However, we are currently on an unsustainable path of development, with human activity on Earth resulting in what some researchers and civil society organizations term as "Ecocide" (Higgins et al., 2013; Martinez-Alier et al., 2014). The transgression of several Earth System's boundaries (climate change, biodiversity loss and geochemical flows, among others) has led to a change in the so far rather stable (and for humans, favorable) conditions of the Holocene and we have entered the Anthropocene (Lewis and Maslin, 2015; Steffen et al., 2015; Nature News, 2019). What is worse, the ecological crisis is occurring in a world where poverty, injustice, and conflicts are prevalent. Despite the harm to ecological systems, most of the global population still lacks elements for a good life.

2.1 Education as a leverage point for sustainability

Against this background, demands for action and collaboration for sustainability are increasingly heard. The SDGs exemplify concerted global efforts to act for a better present and a flourishing future (United Nations, 2015). Education is included in the SDGs because it plays a vital role as an enabler and a pivotal point for societal change. SDG 4 includes a target (4.7.) in which ESD is explicitly referred to. Furthermore, UNESCO has set a roadmap for ESD aligned with the SDGs (ESD for 2030), which builds upon previous efforts and emphasizes the need for concrete action. From 2014 to 2019, UNESCO deployed a Global Action Programme for ESD (GAP-ESD) in which five Priority Action Areas (PAAs) were defined, also present in the ESD for 2030 roadmap. While students are at the center of the education efforts and different frameworks of sustainability competences have been elaborated for them (Rieckmann, 2011; Wiek et al., 2011; UNESCO, 2017; Brundiers et al., 2021; Leal Filho et al., 2021), it is clear that educators influence how the learning processes occur. From the selection of content to the implementation of pedagogical strategies and the construction of a respectful and empowering learning atmosphere, educators can favor the development of sustainability competences. In line with this, one PAA is related to building capacities for educators (UNESCO, 2014, 2020), as they "can help learners understand the complex choices that sustainable development requires and motivate them to transform themselves and society" (UNESCO, 2020, p. 30).

The policy mission of encouraging educators to become sustainability champions aligns with academic literature. It has been acknowledged that the ability and willingness of academic staff to support learning processes that lead to transformative changes largely determine their success (Hegarty, 2008). However, engaging educators in ESD is not free of challenges. An analysis in the upper secondary Swedish context showed that regarding ESD "the most common obstacles were that the teachers lacked inspiring examples of how to include SD in their teaching and that they lacked the necessary expertise about SD" (Borg et al., 2012, p. 185). The authors recommend offering additional training tailored to different disciplines' specific requirements (Borg et al., 2012). The case of pre-service secondary teachers in Malaysia enrolled in a Biology Teaching Methods course showed that even if teachers have positive attitudes toward the environment and are ready to integrate ESD into biology teaching, they might lack sufficient environmental knowledge (Esa, 2010). It is

also believed that the implementation of ESD through international initiatives has been impeded due to the absence of clear guidance on its execution (Vare et al., 2019).

At the level of higher education, there are also barriers for educators to advance ESD. These can be "lack of time and financial resources, lack of deep understanding of sustainability, current curriculum structures and ways of delivery, academic pressures, external factors, lack of organizational support and existing organizational conditions block their engagement," (p. 79) as reported by Cebrián et al. (2015) for the UK. The challenge also remains of bringing ESD into established disciplines, as described by Lans et al. (2014), who present the case of sustainable entrepreneurship in the Netherlands, where educational scholars treat education for sustainability (EfS) and entrepreneurship education separately and there is lack evidence of any attempt to explore their intersection. A study performed in Australia showed low implementation of EfS (its pedagogies and teaching methods) and suggests that it "has not yet prompted academics to move toward pedagogical innovation" (Christie et al., 2013, p. 405). According to Busquets et al. (2021), there was an identification in Spain of the need for training faculty in sustainability competences, as well as a lack of awareness on their part. As a solution, it was suggested that training be provided to faculty in sustainability competences and pedagogical approaches for sustainability and that opportunities for discussion, reflection, and collaboration among teachers be promoted to increase their awareness and motivation.

There are also successful cases of incorporation of ESD in higher education. In contrast to the aforementioned difficulties found in the field of entrepreneurship and business within the Dutch context, a Swedish initiative proposes to teach for sustainability using a strategy of business model innovation that pursues not only profit but also social and ecological positive impact (Hoveskog et al., 2018). In Spain, Tejedor et al. (2019) conducted a study exploring diverse pedagogical strategies to promote sustainability competences, providing synthesized objectives, foundations, and stages that offer valuable guidance for educators. Despite the positive examples, educators at all levels can still contribute more to ESD given the gravity of today's sustainability challenges. To achieve this, they need to acquire knowledge and develop ESD competences to implement teaching strategies effectively.

2.2 Competences not only for students, also for educators

As mentioned before, the discussion around sustainability competences for students has already advanced significantly. Since the last decade, different frameworks have been developed. In the beginnings of the last decade, de Haan (2010) provided a "Model of Competence for ESD in the formal education sector" (p. 315) based on the concept of *Gestaltungskompetenz*, related to the capacity to act and solve problems. According to the authors, "those who possess this competence can help, through active participation, to modify and shape the future of society, and to guide its social, economic, technological and ecological changes along the lines of sustainable development" (de Haan, 2010, p. 320). This competence is divided into 12 sub-competences grouped in three clusters related to the Interactive use of media and methods, Interacting in socially heterogeneous groups, and Acting autonomously. One year after, Wiek et al. (2011) proposed a framework based on a systematic literature review and suggesting a set of key competences in sustainability (systems thinking, anticipatory, normative, strategic and interpersonal competences) linked to basic competences such as critical thinking and communication competences. The same year, Rieckmann (2011) published the results of a Delphi study with the participation of experts from Germany, Great Britain, Chile, Ecuador and Mexico, proposing 12 key competences for sustainability. These frameworks were integrated by UNESCO (2017), proposing eight competences: Systems thinking, Anticipatory, Normative, Strategic, Collaboration, Critical thinking, Self-awareness and Integrated problem-solving. Nonetheless, an interesting discussion about an agreed-upon framework of key competences in sustainability continues, as shown by Brundiers et al. (2021).

An influential discussion about ESD competences among educators unfolded in 2012 when the United Nations Economic Commission for Europe (UNECE) released the report Learning for the future: Competences in Education for Sustainable Development. The proposed framework integrated what were considered essential characteristics of ESD, including a holistic approach, envisioning change, and achieving transformation, along with categories that reflect a wide range of learning experiences (Learning to know, Learning to do, Learning to live together, and Learning to be) (UNECE, 2012). On the academic front, Rauch and Steiner (2013) addressed the lack of exploration of competences in teacher education and introduced the KOM-BiNE ESD competence model, categorizing competences into knowing, acting, valuing, and feeling, while Bertschy et al. (2013) presented two sustainability competence models exploring their benefit for teacher education and further education and arguing that "competence models should focus on profession-specific core competencies if they are to be used as a basis for the conception of educational offers in the field of ESD in education and further education of teachers" (p. 5067). In 2017, an additional framework of professional competences in sustainability from a complexity perspective was proposed by Garcia et al. (2017), drawing on the six categories of complexity (connections, dialogue, creativity, innovation, critical thinking and uncertainty), the four domains of UNECE (Learning to know, Learning to live together, Learning to be and Learning to do) and 24 professional competencies in education for sustainability from the perspective of complexity.

As can be seen, different frameworks of competences have been suggested to help educators guide their professional development. Corres et al. (2020) systematically explored different ESD competences frameworks for educators. They found Critical Thinking, Participation in Community, and Connections to be the most included competences in the frameworks, while competences such as Emotions Management, Futures, Achieving Transformation are less frequently covered. Leal Filho et al. (2021) conducted a study across multiple countries to determine the extent to which teaching staff value sustainable development competencies in different higher education institutions that belong to the Inter-University Sustainable Development Research Programme (IUSDRP). Respondents showed a high degree of awareness of, and agreement with, the four categories proposed by UNECE that underlay the ESD competences: learn to know, learn to live together, learn to do, and learn to be (UNECE, 2012). However, it was suggested once again that providing educators with access to training and capacity building programs can enable them to effectively

TABLE 1 RSP competences.

	Thinking holistically	Envisioning change	Achieving transformation
Integration	Systems	Futures	Participation
Involvement	Attentiveness	Empathy	Values
Practice	Transdisciplinarity	Creativity	Action
Reflection	Criticality	Responsibility	Decisiveness

TABLE 2 Action competence with rationale, learning outcomes and underpinning components.

Rationale	Learning outcomes	Underpinning components for the educator
The educator helps the learners to take action in a proactive and considered manner.	11.1. Explore and critically analyze their local natural, social and built environment, including their own institution, as a context for change	UC11.1a Be supportive and encouraging towards students, coaching them in order to enhance their sense of agency UC11.1b Make use of the reflective learning cycle (planning, acting, reflecting, adjusting or the Anticipation-Action-Reflection cycle)
	11.2. Engage in democratic processes of decision making within a context of sustainability	UC11.2a Work in a democratic, open way with students UC11.2b Utilise project-based learning techniques
	11.3. Develop their agency and their awareness of social, political and economic structures	UC11.3 Be able to see meaningful educational opportunities in 'real life' and encourage learners to do the same

address and tackle the challenges associated with teaching sustainable development.

The Rounder Sense of Purpose (RSP) competences framework aims to meet the demand for offering assistance to educators in ESD with regard to content and teaching and learning methods (Rieckmann and Barth, 2022). It suggests 12 competences that correspond to UNECE's areas of thinking holistically, envisioning change, and achieving transformation, as well as actions of integration, involvement, practice, and reflection, as presented in Table 1. The RSP competences share similarities with frameworks of competences for students such as the one proposed by UNESCO (2017). For example, the Systems competence in the RSP emphasizes the educator's role in helping learners develop an understanding of the interconnectedness of the world, exploring connections across socioecological systems, and considering the consequences of actions (Millican, 2022). This aligns directly with UNESCO's Systems thinking competence, described as "the abilities to recognize and understand relationships; to analyze complex systems; to think of how systems are embedded within different domains and different scales; and to deal with uncertainty" (UNESCO, 2017, p. 10). Moreover, direct parallels exist between the Futures and Anticipatory, Values and Normative, and Criticality and Critical thinking competences of the RSP and the respective competences in the UNESCO frameworks. However, it is important to note that the comparison between frameworks should extend beyond a one-to-one assessment of individual competences and focus on the holistic perspective.

Under the RSP framework, the ESD competences are conceived as a mutually supported ensemble (Rieckmann and Barth, 2022). This is consistent with the richness of diversity present in the world (in terms of cultures, species, ecosystems, etc.) and the multitopic spirit of the sustainability discourse. Depending on the circumstances, a problem might require a different mix of concepts, skills and actions to be solved. For this reason, in the RSP framework the educator is seen as "a system with the various competences acting and interacting together in different combinations according to context" (Millican, 2022, p. 40). The importance of pedagogical diversity has also been explored. Lozano et al. (2017, 2019) examined the connection between competences and pedagogical approaches for sustainability in higher education. The authors suggest that utilizing a variety of pedagogical approaches based on the context and discipline of the program or course being taught can enhance the development of these competences (Lozano and Barreiro-Gen, 2022). Thus, the educator must mix and use competences and pedagogical approaches in different combinations and intensities to respond to a specific context (Millican, 2022).

The RSP competences framework is not limited to teacher education, as it is applicable to educators in any sector or educational context (Rieckmann and Barth, 2022). Millican (2022) suggests that this framework provides a feasible set of competences for educators of sustainable development, including those in universities. As there is a need of operationalization of the competence frameworks (Rieckmann and Barth, 2022), another characteristic of the RSP framework is that it seeks concretion via learning outcomes, underpinning components (see Table 2 for an example of the Action Competence) and exemplary activities available for free[1] (for each competence there are also exemplary activities related to the SDGs) (Millican, 2022).

Scherak and Rieckmann (2020) provide insight into how educators in universities may react to the RSP framework (in the German context). They aimed to determine the competences that university teachers require to work with ESD in higher education and how these competences can be developed through staff training workshops. Data was collected from an initiative consisting of eight workshops over 2 years, where the RSP competences model was used as a guiding framework. Results show that the 12 competences are

1 https://aroundersenseofpurpose.eu

considered interconnected and relevant for higher education teaching, suggesting that the framework is sound. Nonetheless, they also draw attention to the barriers to developing the competences in educators: lack of time, limited flexibility in what is taught and attracting new audience (i.e., educators that still need to be involved in ESD) are some of the obstacles to overcome. The team that developed the RSP framework also identified potential limitations associated to their approach. For example, they recognize that this operationalization through activities does not necessarily "favor a social constructivist, critical pedagogy in which knowledge is co-constructed and which is designed to empower and develop agency and independence of thought" (Millican, 2022, p. 40) which, for them, is desired in the process of teaching and in ESD in particular.

As evidenced by existing research, the analysis of higher education for sustainability has been rather centered in European countries (Barth and Rieckmann, 2016). After mapping sustainability initiatives in higher education institutions in Latin America, Filho et al. (2021) argue that many universities in the region aim to implement sustainability through different approaches, following a trend of increasing sustainability initiatives observed by Brandli et al. (2010) a decade ago. In terms of priority, Filho and his colleagues identified that campus operations are receiving particular attention, while sustainability-related research and outreach occupy the second place, and sustainability-focused teaching initiatives the third position. The authors point out that this may be because academic staff do not possess the knowledge and ability to connect their lessons to matters of sustainability, as was the case in Bolivia (Ordóñez and Rieß, 2019). This speaks in favor of the relevance of our study.

2.3 The Latin American context

Our interest in Latin America extends beyond a generic regional comparison (Latin America vs. World) to the controversial dynamics surrounding the region's development and sustainability concepts. Latin America, shaped by its colonial history and grappling with persistent socioeconomic and power inequalities, views sustainable development ('desarrollo sostenible' in Spanish) at times as a hegemonic agenda from the Global North. This is evident in the diverse terminology used; for instance, the adjective sustainable can be translated as 'sostenible' (the official UN term) or 'sustentable' (representing an opposition or alternative to 'sostenible'). The term 'development' (desarrollo in Spanish) is also contentious due to its frequent association with extractive practices. Thus, four terms are commonly used: *Sustentabilidad, Sostenibilidad, Desarrollo sustentable, and Desarrollo sostenible*. The trend suggests that the first two reflect a questioning attitude on the global sustainability agenda, while the latter two indicate greater acceptance.

Colombia and Ecuador face notable challenges related to education access and quality. Colombia's education system has even been criticized for deepening existing inequalities, with limited support from the government leading to a low supply of quality public education. This has resulted in a response from the private sector, which often offers low-quality education (Cárdenas Campo et al., 2021; Wasserman, 2021). Ecuador has also experienced "the establishment of private universities of questionable quality, and the absence of resources to enable public universities to provide appropriate education that met minimum standards" (Rieckmann et al., 2021, p. 552). Nonetheless, Ecuador's education system (notably higher education) has undergone significant changes since 2008 to improve access and quality in all areas, including training professionals who are aware of their potential to contribute to identify sustainable development solutions (Rieckmann et al., 2021). In Colombia, the Ministry of Environment and Sustainable Development promotes sustainable development, conserving natural resources, and restoring ecosystems for future generations by incorporating environmental education in various types of educational settings (Díaz Monsalve et al., 2021). It can be suggested that environmental education and ESD are increasingly relevant concepts in Colombia and Ecuador, but further efforts are required to achieve real progress in this field (Díaz Monsalve et al., 2021; Rieckmann et al., 2021).

Against this background, we pose the following research question: How do educators from various higher education institutions in Latin American countries (mainly Ecuador and Colombia) perceive their knowledge and competences in teaching for sustainability, and what is their position toward the SDGs?

3 Methodology

A survey was designed and distributed among university educators. It consisted of several sections intended to address the questions mentioned above.

An instrument used by Leal Filho et al. (2021) was found helpful to enquire about sustainability knowledge. The instrument covers 52 questions divided into five parts. We used the first two parts, as they deal with knowledge about sustainability and teaching practices. We also analyzed how Latin American educators perform in comparison to the global average reported by the authors. Here it was necessary to adjust our results, as Leal Filho et al. (2021) used a five points Likert-scale and we used it with four points to avert a neutral position, because there was an interest in capturing more clearly if the tendency was of rejection (values 1 and 2) or support (values 3 and 4) to the different statements.

Respondents were also asked about the preferred term among four options: *Sustentabilidad*, *Sostenibilidad*, *Desarrollo sustentable* and *Desarrollo sostenible* to explore the level of criticality toward the mainstream agenda, as explained in the previous section. Moreover, a group of questions was used to explore (i) the importance that they explicitly give to sustainability in their work field, (ii) to what extent they discuss environmental issues in their classes linking them to societal issues, (iii) to what extent they include sustainability criteria in the evaluation, (iv) how interested they are in including learning experiences in which students generate solutions to sustainability problems, and (v) how familiarized they are with key competences for sustainability in students. The survey asked respondents to rank UNESCO's eight sustainability competences by importance in their teaching (UNESCO, 2017) and also enquired about their involvement in research and its relation to sustainability.

We investigated three main areas concerning the SDGs: (i) the level of familiarity with them, (ii) how significant they think the SDGs are in their field of work, and (iii) to what extent they seek to make their courses sensible of the importance of the SDGs in their own context (local, regional, national). The participants were presented with the 17 SDGs and asked to pick the three most relevant to their

TABLE 3 Example of question regarding competences (Responsibility Competence, in this case).

Responsibility Competence – I consider that I help my to students to...	Scale			
	1	2	3	4
Identify the potential social, environmental and economic consequences of their decisions and actions	☐	☐	☐	☐
Accept personal responsibility and accountability, where appropriate, for their own decisions and actions	☐	☐	☐	☐
Reflect critically on their own decisions and actions and those of others, looking for opportunities for improvement and development	☐	☐	☐	☐

TABLE 4 Country of residence.

Country	n	%
Colombia	104	52.8
Ecuador	76	38.6
Other*	17	8.5
Total	197	100
(*)		
Chile	4	2.0
México	3	1.5
Argentina	2	1.0
Perú	2	1.0
Puerto Rico	2	1.0
Brasil	1	0.5
España	1	0.5
Panamá	1	0.5
Venezuela	1	0.5

work. They also had the option to choose if they did not address any of the SDGs.

Each of the 12 competences of the RSP framework was described using the learning outcomes as descriptors. These descriptors also served as the items to which educators could respond based on the extent to which they believed they helped students achieve specific outcomes. A Likert scale ranging from one to four was used, where 1 represented "Totally disagree," 2 represented "Disagree," 3 represented "Agree," and 4 represented "Totally agree." An example of the Responsibility Competence is provided in Table 3 (all the competences and items are shown in the Supplementary material). The RSP competences score was determined by calculating the average of three descriptors (learning outcomes), which were based on the percentage of respondents who agreed or totally agreed with them. If all respondents agreed or totally agreed (or a combination of the two) with the three statements that describe the competence, then the perfect score for a competence would be 100. To establish the consistency of each competence, coefficients of variation were calculated. A lower coefficient indicates that the scores of the items are more similar.

Thirteen experts validated and provided recommendations to improve the survey, which was distributed using Qualtrics software among the authors' networks and the three Latin American universities involved in the project. Recipients were not necessarily involved in sustainability departments. Answers were received for 7 weeks.

Statistical analyses examined the influence of social and academic variables such as gender, country of residence, university where the educators worked, and years of experience in higher education. The Pearson Chi-square or independence test was used, based on the null hypothesis that the responses to the items are independent of the variable analyzed, that is, that there was no association between the responses to the items and the variable studied (gender, country, university and years of experience). A value of $p < 0.05$ indicates the rejection of this null hypothesis.

4 Results

4.1 Sociodemographic characterization

A total of 197 educators fully answered the survey with an almost perfect balance between female (49%) and male (51%) respondents. This is a sample of experienced educators: 71% have more than 10 years of experience in higher education. More than a third (36%) have more than 20 years of experience. Most of the answers were obtained from the Latin American institutions that participate in the project, namely Universidad de Antioquia, Universidad EAFIT (both in Colombia) and UTN (in Ecuador) (see Table 4.).

4.2 Knowledge about and position toward sustainability

Regarding the terminology, most respondents use the UN term '*desarrollo sostenible*'. Both in Colombia and Ecuador this is the most used term, but in Colombia there is a more marked preference than in Ecuador between '*desarrollo sostenible*' and '*desarrollo sustentable*'. (Colombia 59 vs. 19; Ecuador 37 vs. 24) (see Table 5).

As shown in Table 6, most of the respondents (94.4%) agree (26.9%) or strongly agree (67.5%) that sustainability is important in their field of expertise and 89.9% state that, in their job as educators, they open spaces to discuss environmental issues and their impact on society (41.1% agree, 48.7% strongly agree). Likewise, most of them (89.8%) agree (28.9%) and strongly agree (60.9%) that they are interested in implementing didactic strategies to help students develop sustainability competences and, thus, generate concrete solutions to sustainability problems in their surroundings. In terms of evaluation, the percentage of respondents that indicate to include sustainability criteria for assessing students' activities and projects is lower (72.6%; 35% agree and 37.6% strongly agree).

78.2% of the respondents do research. Most of the members of this subgroup (82.5%) agree (40.3%) of fully agree (42.2%) that their research is related to sustainability. In terms of the general population, this means that 64.5% of the respondents consider that their research is to some extent related to sustainability. Statistically speaking, Ecuadorian educators who do research tend to find it more strongly related to sustainability (p-value = 0.047).

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Tables 7, 8 show the results of the two parts of the instrument used by Leal Filho et al. (2021) implemented in this research, namely those addressing the field of *Learning to know—sustainability knowledge* (Table 7) and *Learning to know—teaching practices* (Table 8). Due to an unidentified mistake, one question (item 15 of Table 8) was not present in the questionnaire.

Gender was found to play a role regarding the statements *Development decisions should be based on scientific evidence rather than cultural concerns* (p-value = 0.000) and *Citizens have no power if governments do not promote sustainable practices* (p-value = 0.028) as women disagree more with them. Years of experience also showed statistical influence (p-value = 0.009) in terms of the importance given to *Learning about your students' interests*, with older educators being more interested. Moreover, the country of residence seemed to have an influence on the statement *Science and technology provide all the solutions needed to solve problems caused by unsustainable development* (p-value = 0.028), with Ecuadorian agreeing more strongly with it. The difference between Colombia and Ecuador was also statistically significant (p-value = 0.011) regarding the importance given to *Engagement in place-based learning (like Service-Learning or context-based learning)*, with Ecuador giving it more importance.

4.3 About the Sustainable Development Goals

In general, there has been a positive response toward the SDGs, with 77% of the respondents indicating that they are well familiarized with them, of which 42% agree and 35% totally agree. The years of experience have a statistically significant effect (p-value = 0.035), indicating that younger educators tend to be more familiar with the global agenda. The agreement rate with the statement that SDGs are relevant in their own work field is even higher, with 85% of the respondents agreeing (46% totally agree and 39% agree). Although 74% of the respondents consider their own context when addressing the SDGs in their courses, only 29% fully agree, while 44% agree. The degree of contextualization is also influenced by the country of residence (p-value = 0.043), with Colombian respondents contextualizing less (see Table 9).

As can be seen in Figure 1, SDG4 (Quality Education) appeared as the most addressed by a great difference: 258% more than the one in the second place, SDG13 (Climate Action), i.e., 111 mentions for the first one against 43 mentions for the second one. SDG12 (Responsible Consumption and Production), SDG3 (Good Health and Well-Being) and SDG5 (Gender Equality) also fall into the range of SDG13 with 42, 41, and 40 mentions, respectively.

TABLE 5 Terminology used.

Term	General	Country		
		Colombia	Ecuador	Others
Sustentabilidad	11.7%	7.7%	10.5%	**41.2%**
Sostenibilidad	13.7%	14.4%	9.2%	29.4%
Desarrollo sustentable	22.3%	18.3%	31.6%	5.9%
Desarrollo sostenible	**52.3%**	**59.6%**	**48.7%**	23.5%

Bold numbers refer to the highest value for each region.

4.4 Competences

Regarding the degree of familiarization with the key competences that students could develop in ESD, 32.5% agree and 28.4% strongly agree to be familiarized. There is a statistically relevant difference (p-value = 0.043) between Colombia and Ecuador, with the educators from the latter being more familiar with these competences. When asked to organize in order of importance the key sustainability competences for students declared by UNESCO in 2017, the respondents show a preference for the competences Systems Thinking, Critical Thinking and Self-awareness. The least favored ones are the Normative Thinking, the Integrated problem-solving and the Strategic competencies (see Figure 2).

In terms of the RSP competences (see Figure 3), the one with the highest score was *Responsibility* (score 85.6), which also registered one of the smallest coefficients of variation (2.4%). The Action competence showed the worst performance (66.0). Even though one if the items of the Action competence (*Explore and critically analyze their local natural, social and built environment, including their own institution, as a context for change*) had a moderate value (75.1), the two other items (*Engage in democratic processes of decision making within a*

TABLE 6 Interest in sustainability and teaching for sustainability.

Item	% of respondents			
	1	2	3	4
Sustainability is relevant in the disciplinary field in which I carry out my work as a teacher.	1.5%	4.1%	26.9%	67.5%
	5.6%		*94.4%*	
In my classes I create spaces for socialization with the students about environmental problems (local, regional and global) and their relationship with society.	4.1%	6.1%	41.1%	48.7%
	10.2%		*89.9%*	
When I evaluate the activities and projects of the students in class, I include criteria related to sustainability	7.6%	19.8%	35.0%	37.6%
	27.4%		*72.6%*	
I am interested in structuring learning experiences in which my students can generate tangible solutions to environmental sustainability problems (local, regional)	2.0%	8.1%	28.9%	60.9%
	10.2%		*89.8%*	
I am familiar with the key sustainability competencies that students could develop through Education for Sustainable Development (ESD)	17.8%	21.3%	*32.5%*	28.4%
	39.1%		*60.9%*	

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TABLE 7 Questions for "Learning to know—sustainability knowledge."

Variable	% of respondents				Mean	Adjusted Mean	CV	Leal Filho et al. (2021)		Difference between means (%)
	1	2	3	4				Mean	CV	
1. Ecological systems are a set of interrelationships between various organisms and their physical environment	1.0	3.6	27.4	**68.0**	3.62	4.53	16.75%	4.43	17.86%	2.22%
2. Issues of poverty, hunger and social inclusion should be addressed separately from environmental protection studies	**58.4**	26.4	8.1	7.1	1.64	2.05	55.35%	1.67	39.28%	**18.52%**
3. Limits on growth must be imposed, because the resources on our planet are finite	7.6	14.2	38.6	**39.6**	3.10	3.88	29.49%	4.07	16.54%	-4.98%
4. Excessive consumption in one part of the world is causing poverty in another	7.1	17.3	28.9	**46.7**	3.15	3.94	30.18%	4.16	19.54%	**−5.57%**
5. Development decisions should be based on scientific evidence rather than cultural concerns	11.2	**33.5**	31.5	23.9	2.68	3.35	35.84%	3.09	31.78%	**7.77%**
6. Sustainable development is an evolving concept	6.1	7.6	**43.2**	**43.2**	3.23	4.04	25.88%	4.28	18.55%	**−5.89%**
7. Achieving sustainable development requires political will and investment	1.0	3.6	28.9	**66.5**	3.61	4.51	16.90%	4.63	17.00%	−2.63%
8. Citizens have no power if governments do not promote sustainable practices	29.4	**37.1**	20.3	13.2	2.17	2.72	46.04%	2.73	24.58%	−0.53%
9. Changing unsustainable practices today ensures a better quality of life for the future	5.1	7.6	34.5	**52.8**	3.35	4.19	24.76%	4.42	18.44%	**−5.54%**
10. Science and technology provide all the solutions needed to solve problems caused by unsustainable development	15.2	**43.2**	28.4	13.2	2.40	2.99	37.61%	2.23	36.14%	**25.54%**
11. Social sustainability is achieved by overcoming differences of race, gender, class, generation, skills and beliefs	5.1	19.8	**44.2**	31.0	3.01	3.76	28.07%	3.52	21.96%	**6.45%**
				Average difference between means (Absolute values) →						**7.79%**

Bold numbers refer to the highest value for each category.

context of sustainability and *Develop their agency and their awareness of social, political and economic structures*) were amongst the three lowest of the whole sample, together with one item of the Attentiveness competence (*Recognize and discuss the urgent need to fundamentally change those human-made systems in order to address such flaws*). Respectively, Table 10, 11 show the summary of results for the RSP competences and for the highest and lowest ranked items. All the items and scores for the RSP competences can be found in the Supplementary material.

5 Discussion

Results suggest that ESD has an important place in the vision of university educators in Colombia and Ecuador. Nonetheless, they also indicate that there is an important potential to improve its operationalization. This is reflected in the contrast between the high value that is given to sustainability by educators within their respective fields of expertise, and the limited consideration of sustainability criteria in the evaluation process (coupled with a limited familiarity with ESD competencies). Additionally, there is room for improvement regarding the link between research and sustainability. It is noteworthy that educators express that they already address issues related to sustainability concerning the environment and its impact on society, as shown in the initiatives identified in Latin American universities by Filho et al. (2021). Moreover, they express interest in implementing didactic strategies that promote sustainability competences and lead to transformative actions, as suggested by Tejedor et al. (2019), wherein students generate practical solutions to sustainability problems. This indicates that UNESCO's efforts around building capacities for educators are relevant (UNESCO, 2020).

Concerning the first part of the instrument used by Leal Filho et al. (2021), which addresses the field of Learning to know—sustainability knowledge, the results are in general very similar to what was reported by the authors (see Table 7.: average difference of 7.79%). Significant differences (here considered greater than 10%) were found in the variable 'Issues of poverty, hunger and social inclusion should be addressed separately from environmental protection studies' and 'Science and technology provide all the solutions needed to solve problems caused by unsustainable development' (with Latin America exhibiting a stronger agreement with the statements). Even more similar were the results regarding the second part (focused on Learning to know—teaching practices), with an average difference of 3.88% (see Table 8). A significant difference was found regarding the variable Learning about your students' interests, where Latin American educators also tend to

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TABLE 8 Questions for "Learning to know—teaching practices."

Variable	% of respondents				Mean	Adjusted mean	CV	Leal Filho et al.		Difference between means (%)
	1	2	3	4				Mean	CV	
12. Learning about your students' interests	2.0	2.5	33.0	**62.4**	3.56	4.45	18.24%	3.97	21.26%	**10.75%**
13. Encouraging your students to question what they are being taught	1.0	1.0	30.0	**68.0**	3.65	4.56	15.26%	4.32	17.27%	**5.31%**
14. Promoting problem solving	2.0	3.1	26.4	**68.5**	3.61	4.52	17.97%	4.47	14.77%	1.06%
15. Encouraging students to be creative and seek new ways to resolve issues										
16. Structuring your teaching around your students' experiences	2.0	9.1	39.6	**49.2**	3.36	4.20	21.82%	3.92	21.71%	**6.68%**
17. Changing educational structures to promote more learner autonomy	2.0	6.6	41.1	**50.3**	3.40	4.24	20.73%	4.07	19.93%	4.12%
18. Trying new learner-centered pedagogies that enhance learning (e.g., project-based learning)	2.0	5.6	36.6	**55.8**	3.46	4.33	20.11%	4.25	19.34%	1.79%
19. Prepare students to meet new challenges in the unforeseen future	2.0	7.6	36.6	**53.8**	3.42	4.28	21.09%	4.35	15.13%	−1.72%
20. Applying concepts to real-world problems	2.5	1.5	31.5	**64.5**	3.58	4.47	18.30%	4.70	10.45%	**−5.07%**
21. Engagement in place-based learning (like Service-Learning or context-based learning)	3.6	15.2	34.5	**46.7**	3.24	4.05	25.90%	4.10	21.29%	−1.12%
22. Giving equal learning opportunities for people with disabilities	3.6	8.6	24.9	**62.9**	3.47	4.34	23.01%	4.29	21.00%	1.15%
			Average difference between means (Absolute values) →							**3.52%**

TABLE 9 Results of the SDGs.

Item	% of respondents			
	1	2	3	4
I am well familiarized with the SDGs	9.1%	14.2%	41.6%	35.0%
	23.4%		*76.6%*	
SDGs are relevant in my work field	4.1%	10.7%	39.1%	46.2%
	14.7%		*85.3%*	
I am at making my courses sensitive to the SDGs in my own context (local, regional, national)	7.6%	18.8%	44.2%	29.4%
	26.4%		*73.6%*	

agree more. The high similarities with the global population are interesting considering that the sample of the global study was focused on educators with expertise in sustainability. In general, this indicates that Latin America (at least Colombia and Ecuador) are not lagging far behind. However, there is an evident necessity to enhance efforts in building capacities for educators, as repeatedly reported in the literature and shown in section 2 (Esa, 2010; Borg et al., 2012; Cebrián et al., 2015; Busquets et al., 2021) for different regions of the world.

Among the differences found between Latin America and the global picture, the integrative approach toward the social, economic and environmental dimensions of sustainability is less intense in the former (Question 2 in Table 7), as more educators consider that ecological issues must be addressed separately from matters of social justice. Although the Systems Thinking Competence was declared as the most important competence to be cultivated in students (according to UNESCO's framework shown in Figure 2), this result is inconsistent with the Systems Competence in RSP, which delivered a moderate result (see Table 10 and Figure 3). This might suggest the existence of a gap of knowledge, or between intention and action and also indicates the need to keep on working to build capacities for educators. Also, in Latin America there seems to be more optimism regarding the importance of science and technology (Table 7, Question 10). This even bigger difference could be related to the fact that in Latin America (Colombia and Ecuador included) there are emerging economies in which technology and infrastructure are considered main concerns to overcome problems.

Consistent to the profession of the respondents, SDG4 is the highest ranked. Even in the cases where there is not a high familiarity with the SDGs, there is the recognition of their relevance. Thus, there is an opportunity to fill this gap to increase the degree of familiarity. There seems to be room for improvement to increase the percentage of fully agreeing. As mentioned before, in contrast to the opinion of the SDGs as a shared vision of the most acute problems of humanity, in Latin America there is one strong criticism to the sustainability discourse: the risk of it being a hegemonic agenda from the Global North toward the Global South. It is thus noteworthy that the percentage of educators that strongly agree with the statement of

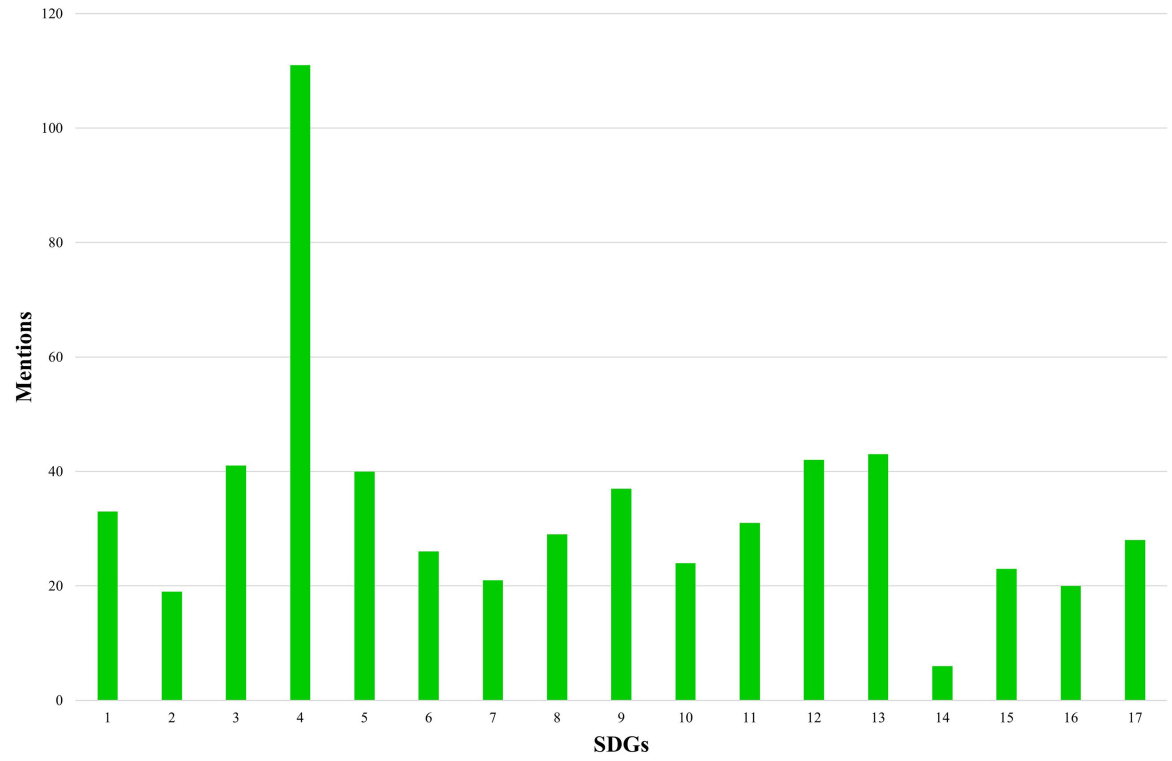

FIGURE 1
Most addressed SDGs.

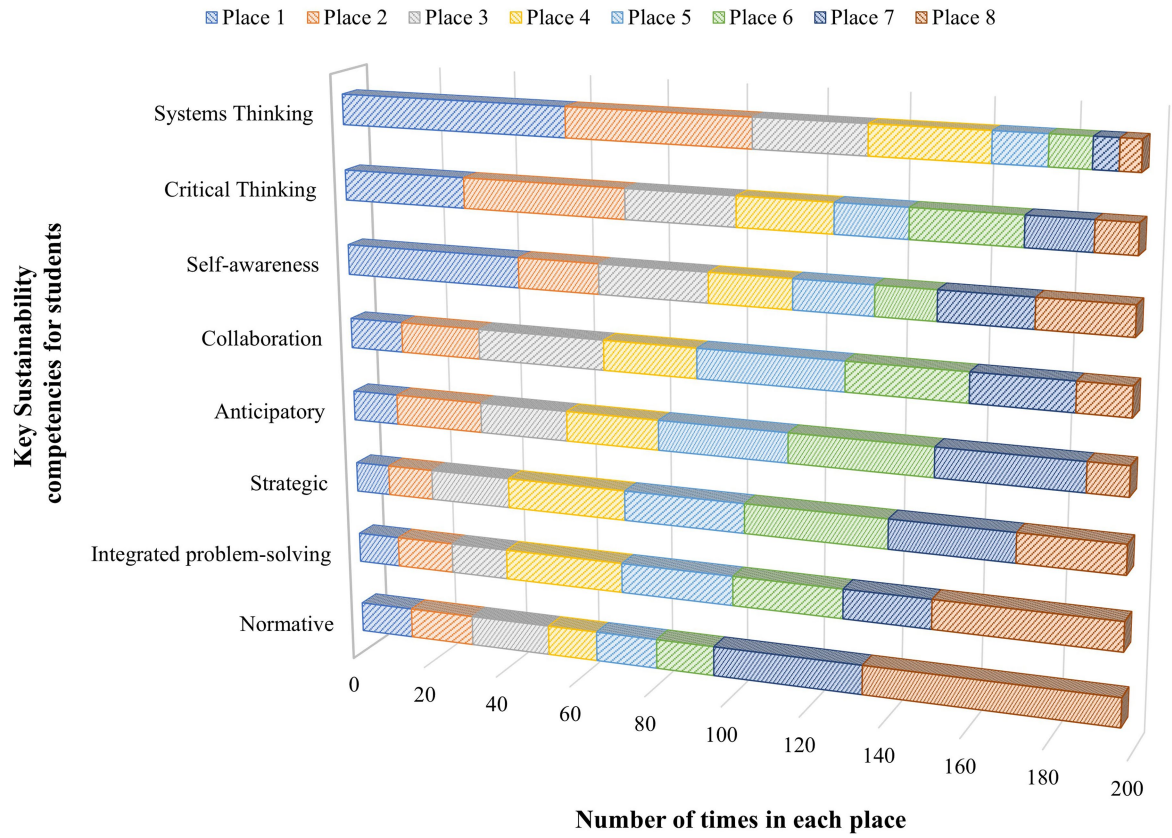

FIGURE 2
Results of key competences for sustainability in students.

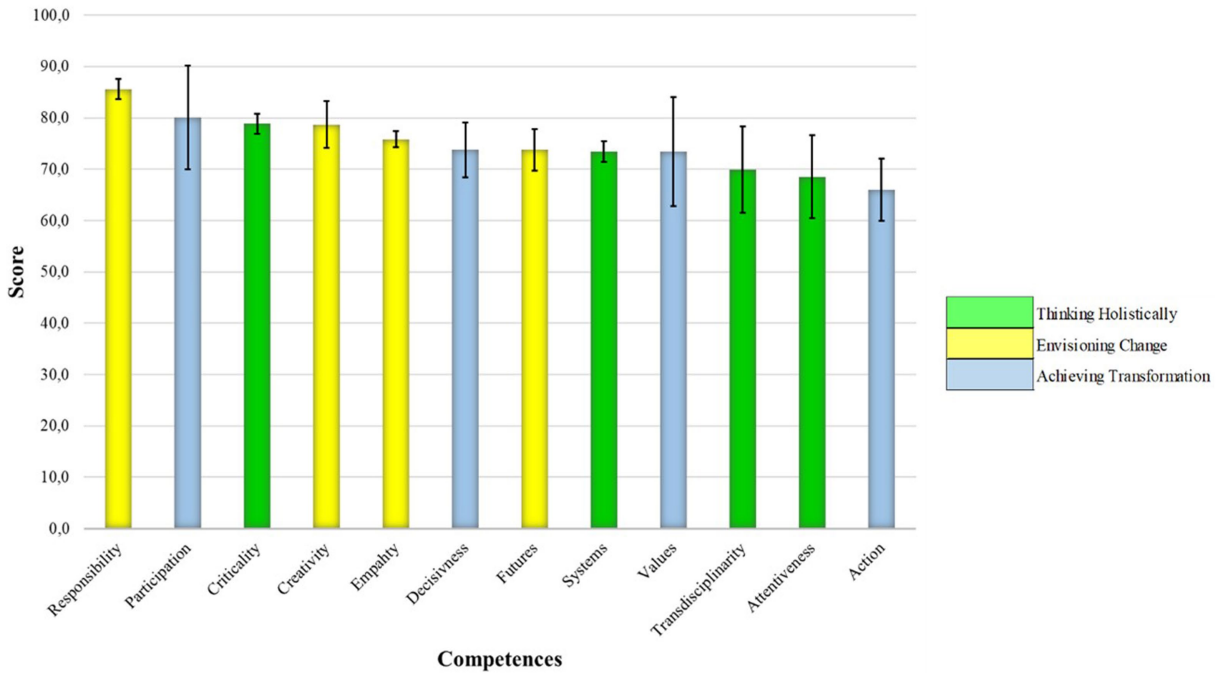

FIGURE 3
Results of the RPS sustainability competences.

making the courses sensitive to the SDGs in their respective context is not higher.

The responses related to the RSP framework show that, like their German counterparts (as discussed in Section 2), educators form Colombia and Ecuador display at least partial interest in the 12 competences. The findings presented in Tables 10, 11 and Figure 3 suggest that competences linked to the ability to envision change are more highly developed, while those associated with holistic thinking exhibit lower values. Meanwhile, competences that pertain to achieving transformation (Participation, Values, Action and Decisiveness) demonstrate a varied distribution across higher and lower values. Although the highest score of an item was one of the participation competence, an analysis of the five highest and five lowest ranked items among all the competences might suggest that educators think help their students to reflect on their role as individuals (accept responsibility and think critically), but they tend to avoid addressing collective processes and rather paradigmatic issues such as engagement in democracy; the agency of students in social, political, and economic structures; the limits and flaws of human-made systems; or the values and beliefs that underpin commitment and action.

Given that the score of each competence is the mean of the score of the three constituent items, it is important to examine the coefficient of variation. A high coefficient of variation might indicate that the competences are not seen in an integrative way. The highest coefficients of variations were found in the competences Attentiveness (14.8%), Participation (13.2%), Action (12.2%) and Values (11.4%). Although it is important to consider that each educator may use a different mix of competences, and therefore an individual analysis may show that they prioritize different items to varying degrees, a collective analysis (like the one done in this study) is expected to show better and more balanced results across all competences.

6 Conclusion

Our findings indicate that educators in Colombia and Ecuador have a good understanding of sustainability and acknowledge the importance of integrating it into Higher Education across different disciplines. When compared to a global perspective, it can be inferred that these countries are keeping up with sustainability knowledge and ESD teaching practices. Although there is a skeptical view on sustainable development in Latin America (reflected in the use of alternative terminologies than those proposed by the United Nations, as explained in section 2.3), the SDGs are familiar and well-received. However, this does not necessarily mean that the discerning view is lost. We believe that dissenting stance is valuable to enrich the sustainability discourse, and our research indicates that it does not impede discussions about ESD.

We have identified a significant potential to improve the educators' ESD competences. While some competences are well-developed, others require substantial enhancement. It is worth questioning whether educators can develop all competences and help their students achieve all related learning outcomes. It could be more realistic to address the necessity of aligning the roles and activities of educators based on their strongest sustainability competences to cover a wide range of competences for students and improve the effectiveness of educating for sustainable development. Either way, the enhancement of sustainability competences for educators could be achieved through capacity-building programs, allowing teachers to explore the general aspects of ESD and the specific connection with their own disciplines. This focus should extend beyond content, encompassing didactic strategies that facilitate the acquisition of sustainability competences.

To enhance our understanding about teaching practices related to ESD, SDGs, and Greening Curriculum development,

TABLE 10 Summary of results regarding RSP Competences.

Competences	Score	Item 1	Item 2	Item 3	%Stddev
Responsibility	85.6	*85.3*	*83.8*	*87.8*	2.4%
Participation	80.0	*91.9*	*76.7*	*71.6*	13.2%
Criticality	78.9	*79.2*	*83.3*	*74.1*	5.8%
Creativity	78.7	*81.7*	*74.1*	*80.2*	5.1%
Empahty	75.8	*80.7*	*76.7*	*70.1*	7.1%
Decisivness	73.8	*69.6*	*71.1*	*80.7*	8.2%
Futures	73.8	*72.1*	*75.1*	*74.1*	2.1%
Systems	73.4	*72.1*	*72.6*	*75.6*	2.6%
Values	73.4	*82.7*	*66.5*	*71.1*	11.4%
Transdisciplinarity	69.9	*68.5*	*72.1*	*69.0*	2.7%
Attentiveness	68.5	*63.0*	*62.4*	*80.2*	14.8%
Action	66.0	*75.1*	*59.9*	*62.9*	12.2%
		Thinking holistically			
		Envisioning change			
		Achieving transformation			

TABLE 11 Five highest and five lowest ranked items among all the competences.

	Competence	Item
Five highest	Participation	Participate actively, giving them opportunities to share ideas and experiences openly
	Responsibility	Reflect critically on their own decisions and actions and those of others, looking for opportunities for improvement and development
	Responsibility	Accept personal responsibility and accountability, where appropriate, for their own decisions and actions
	Responsibility	Identify the potential social, environmental and economic consequences of their decisions and actions
	Criticality	Distinguish between facts, assumptions and opinions, including their own
Five lowest	Action	Engage in democratic processes of decision making within a context of sustainability
	Attentiveness	Recognise and discuss the urgent need to fundamentally change those human-made systems in order to address such flaws
	Action	Develop their agency and their awareness of social, political and economic structures
	Attentiveness	Discuss limits and resilience of natural and human-made systems, and describe structural flaws in human-made systems that exceed limits and cause unsustainability
	Values	Identify and analyze their own values and beliefs in relation to sustainability issues and to recognize how they underpin commitment and action

conducting qualitative research is imperative. In light of the increasingly urgent social-ecological crisis, particular attention should be paid to developing action-oriented competences. Delving into the action-intention gap of educators through psychological theories like Ajzen's theory of planned behavior (Ajzen, 2011) could provide insights into how teachers' behavior in embracing ESD is influenced by their intention to respond to the challenges of such an urgent and values-laden topic as is sustainable development. Overall, examining and determining levels of competence in practice using case studies or action research can yield valuable information about effective teaching practices in this field. Lastly, the effectiveness of capacity-building programs could be analyzed in combination with higher-level strategies, such as incorporating ESD as quality criteria in education policies or incentivizing the integration of ESD content and pedagogies through economic incentives, mirroring practices often seen with academic production.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Author contributions

AA-V led the research as part of his doctoral studies, with all authors contributing to the conceptualization and methodology of the project. AA-V and MLP collaborated under the supervision of MR, and with valuable input from PA, to design the survey instrument. AA-V took the lead in preparing the introduction and literature review, as well as organizing, analyzing and interpreting the data. MLP, MR, and PA provided constructive criticism and insights that enhanced the rigor and quality of the study. All authors contributed to the article and approved the submitted version.

Funding

This research emerges from the international cooperation project Education for the SDGs – Capacity Building for Educators, funded by the German Academic Exchange Service (DAAD). The project aims at moving forward with the SDGs and the ESD for 2030 agendas by supporting the development of sustainability competences among university educators and students. The partners of this project are based in Colombia, Ecuador, and Germany.

Acknowledgments

The authors express their sincere appreciation to the German Academic Exchange Service (DAAD) for their generous support. Additionally, we would like to extend our gratitude to our colleagues who provided valuable assistance in reviewing the Spanish translation of certain sections of the survey, as well as those who carefully scrutinized the initial full draft of the survey and provided insightful feedback.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2023.1205478/full#supplementary-material

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