Education for Sustainable Development and Its Role in the Promotion of the Sustainable Development Goals

Jéssica Garcia, Sthefanie Aguiar da Silva, Andréia Simas Carvalho and José Baltazar Salgueirinho Osório de Andrade Guerra

Abstract The Sustainable Development Goals emerged as universal goals aiming to promote more inclusive societies, fighting inequalities and recognizing the importance of cooperation. Based on a human rights approach, the idea is to pursue sustainable development along with human development, stressing the importance of each of the 17 goals set by the 2030 Agenda and how interconnected they all are. At the same time, Education for Sustainable Development is pursuing similar goals, including gender equality, health promotion and climate change action. The main purpose of this paper is to understand how Education for Sustainable Development can assist in the achievement of the Sustainable Development Goals. In addition to a literature review, a discussion is conducted from the presentation of each Sustainable Development Goal and how they can be explored through education. As a safe environment, Education Institutions are a platform that should be used for debates, especially the ones related to the challenges society has to face in the future. In this context, Education for Sustainable Development carries important tools to enable the learners not only to be prepared for what their lives and career will require, but also to contribute for a more sustainable development and to take conscious decisions. To address the challenges within the Sustainable Development Goals requires only the willingness of education leaders and stakeholders to adjust their curricula and engage the teaching body towards the change our world demands.

Keywords Sustainable development goals · Education for sustainable development · Sustainability · Climate change

J. Garcia · S.A. da Silva · A.S. Carvalho · J.B.S.O. de Andrade Guerra (✉)
University of Southern Santa Catarina (Unisul), Santa Catarina, Brazil
e-mail: baltazar.guerra@unisul.br

J. Garcia
e-mail: jessica.sgarcia@outlook.com

S.A. da Silva
e-mail: sthefanie.sads@hotmail.com

A.S. Carvalho
e-mail: deia.sccarvalho@gmail.com

1   Introduction

The Sustainable Development Goals (SDGs) were conceived at the Rio +20 Summit, held in Brazil in 2012, to be a continuation of the previous Millennium Development Goals (MDGs) agenda. The Rio +20's "The Future We Want" document highlights the need for the Post 2015 Agenda to have objectives geared towards the economic, social and environmental areas, in a balanced and integrated way, and in need of strong partnerships, with the involvement of all stakeholders (United Nations 2012). According to Sachs (2012, p. 2206), "the idea of the SDGs has quickly gained ground because of the growing urgency of sustainable development for the entire world".

In the context of the outcomes of Rio +20, the SDGs idealization process involved more than three years of negotiation (UNSDSN 2016a, b), involving the Secretary-General of the United Nations, Secretary-General's High-Level Panel of eminent persons on the Post-2015 Development Agenda and the United Nations Sustainable Development Solutions Network, organizations created to designate the implementation of the Sustainable Development Goals, as well as consultations with civil society, academia, private sector and other stakeholders (UNSDSN 2016b; Haslegrave 2014; Post-2015; HLP 2016). After the period of negotiations and consultations, UN Member States met to determine their goals and focus on the post 2015 agenda.

Through the letter "Transforming Our World: The 2030 Agenda for Sustainable Development", signed by the UN Member States in August 2015, the Post 2015 Agenda was determined with an action plan for people, planet and prosperity (United Nations 2015). From this letter, 17 goals were agreed, with 169 subsequent targets, to be met by 2030.

The overall focus of the SDGs was earlier defined in "The Future We Want" document, as stated by government representatives from all participating countries:

> poverty eradication, changing unsustainable and promoting sustainable patterns of consumption and production and protecting and managing the natural resource base of economic and social development are the overarching objectives of and essential requirements for sustainable development. We also reaffirm the need to achieve sustainable development by promoting sustained, inclusive and equitable economic growth, creating greater opportunities for all, reducing inequalities, raising basic standards of living, fostering equitable social development and inclusion, and promoting the integrated and sustainable management of natural resources and ecosystems that supports, inter alia, economic, social and human development while facilitating ecosystem conservation, regeneration and restoration and resilience in the face of new and emerging challenges (United Nations 2012, p. 1).

Following these focal points and taking upon the interests and needs of States previously discussed in "Transforming Our World: The 2030 Agenda for Sustainable Development", the objectives presented in Table 1 were agreed upon.

In order to make a successful transition between the SDGs and the MDGs, a few adjustments were needed. One of the strongest criticisms that the MDGs received

Table 1 Sustainable development goals

Sustainable development goals	
Goal 1	End poverty in all its forms everywhere
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3	Ensure healthy lives and promote well-being for all at all ages
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5	Achieve gender equality and empower all women and girls
Goal 6	Ensure availability and sustainable management of water and sanitation for all
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10	Reduce inequality within and among countries
Goal 11	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12	Ensure sustainable consumption and production patterns
Goal 13	Take urgent action to combat climate change and its impacts
Goal 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17	Strengthen the means of implementation and revitalize the global partnership for sustainable development

Source United Nations (2015)

was their heightened focus on developing countries, which consequently brought extremely dependence on funding from rich countries (Kumar et al. 2016). Thus, the idea behind the SDGs was to become global, presenting a set of goals that are broader and can reach all countries (Ferreira 2013, Osborn et al. 2015). They have revolved around reaching prosperous lives, security, sustainable food and water, universal use of clean energy, healthy and productive ecosystems and global governance (Griggs et al. 2013). According to Osborn et al. (2015, p. 2) "all of the goals and targets contain important messages and challenges for developed and developing countries alike". Despite this, countries have the openness to select specific targets for the national scenario and determine their priorities and level of ambition for each objective (Allen et al. 2016).

Waage et al. (2015) highlight the scope of the Goals within different sectors, stating that they can be divided into areas of social welfare, infrastructure, environment and global governance, with intersectoral relationships and interdependence among all. However, the Goals are integrated, interdependent and achieved together, for instance, efforts to meet the education Goal (4) would contribute to poverty reduction (1) and economic growth (8) (Nilsson et al. 2016).

Also considering their interdependence, one goal achieved in an unsustainable way may prevent the achievement of another, e.g. using strategies to end poverty that promote unsustainable production and consumption, leads to failure in the achievement of goals that address sustainable production and consumption (Stafford-Smith et al. 2016). Stafford-Smith et al. (2016) further state that integration must be done by involving the interaction between sectors, countries, actors and multi-stakeholder partnerships, through what is envisaged in objective 17.

Gupta and Vegelin (2016) consider the SDGs as inclusive, bringing social and environmental issues into all the objectives, in an integrated way. Le Blanc (2015) also highlights the integration of the Goals, stating that they function in the form of a network, with targets that refer to multiple Goals at the same time. Thus, the SDGs becomes a set of integrated objectives, with targets to be met in the period from 2015 to 2030, aiming at ensuring fair and environmentally, economically and socially sustainable states.

This paper aims to discuss the role Education for Sustainable Development (ESD) has in assisting the Goals set by the 2030 Agenda for Sustainable Development. The next session will follow a literature review on ESD, exploring its emergence and definition. Later, session three will present a discussion on all the SDGs and how ESD can approach them. In order to explore the state of the art and scientific productions for ESD under the SDGs spectrum and the connection between them, three main databases were selected: Scopus, Web of Science and Science Direct. The main criteria for selecting the documents were: a time frame of the last eleven years of registration, in records from 2005, when the UN Decade of Education for Sustainable Development was launched, to 2016; to reflect the main ideas regarding ESD, environmental justice, sustainable development and the SDGs. In order to complete the collection of articles selected through the literature review and endorse the theoretical support of the research, an additional bibliographic research was carried out, using also books, UN reports, academic papers and journals cited in the selected publications of the databases.

2 Education for Sustainable Development

The Brundtland Commission Report, "Our Common Future" emphasized the importance of cooperation among the various stakeholders at the regional, national and global level as a precondition towards a sustainable future. The Rio Declaration on Environment and Development presented the goal of "establishing innovative equitable global partnerships through the creation of new levels of cooperation

among States, key sectors of societies, and people" (United Nations 1992). Agenda 21, released at the Rio Summit, addressed the potential of the scientific and the technological community to make an effective contribution to the decision-making (Karatzoglou 2012).

The United Nations' Rio +20 Conference also brought the subject to light. In its final report "The Future We Want", the need to bring skills for advancing sustainable development for students is emphasized (United Nations 2012).

Sustainable Development originates from the three dimensions of the term, namely the environmental, economic, and sociocultural, what increases the need for extensive collaboration among diverse partners to effectively pursue its goals. The holistic approach, necessary to attain this transition to a sustainable society and simultaneously serve all three pillars, calls for a development marked by an increased complexity. Education Institutions have been generally considered significant contributors to the promotion of sustainability (Karatzoglou 2012).

Sustainable development was defined by the Brundtland Commission's report as "[…] development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Commission Report 1987). In addition, sustainable development must be a consequence of actions related to economic, social and environmental development, not only in isolation, but integrated (Dvořáková and Zborková 2014).

Since Environmental Education (EE) was first introduced into the school curricula, it has struggled to establish its own identity. Environmental education started to be considered a concept in its own right up to the 1970s, focusing on the importance to develop environmental awareness to the society, before, it was dispersed in a diversity of disciplines that use the environment as a vehicle for teaching (Huiying 2002; McKeown and Hopkins 2003). The 1980s were important years for environmental education, in that it was a decade in which public environmental concern continued to heighten, giving environmental education a stronger impetus in schools. This decade was also significant since environmental education's holistic philosophy began to take root (Tilbury 1995).

Environmental education has the role of considering the environment in its totality (both social and natural aspects), aiming to build a continuous process through all phases of education, applying an interdisciplinary approach, looking at the local, the regional and the global facets, showing the need of cooperation (Kimaryo 2011). EE also brings the historical vision of the environmental issues to find solutions to prevent and to remedy current and future problems (Najam et al. 2007). The EE approach goes into the roots of symptoms and real reasons of environmental problems, highlighting its complexity and new paths to solve the issues. The methodology is diverse, using different education spaces to communicate and to educate about the environmental (Dias 2010).

Education for sustainable development was established as the central goal of environmental education in the 1990s: Sustainable living must be the new pattern for all levels: individuals, communities, nations and the world (United Nations 1992). To adopt the new pattern will require a significant change in attitudes and

practices of many people. We will need to ensure that education programmes reflect the importance of an ethic for living sustainably (Tilbury 1995).

According to Unesco (2016) "Education for Sustainable Development allows every human being to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future". Education for Sustainable Development means including key sustainable development issues into teaching and learning; for example, climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption (Wiek et al. 2011). It also requires participatory teaching and learning methods that motivate and empower learners to not only acquire knowledge, but also change their behavior and take action for sustainable development (McIntosh 2013; Luppi 2011; Teixeira 2013; Constantinescu 2014).

Education for Sustainable Development consequently promotes competencies like critical thinking, imagining future scenarios and making decisions in a collaborative way (Kibbe et al. 2014; Frantz and Mayer 2014; Zsóka et al. 2013; Carleton-Hug and Hug 2010). According to Unesco (2005, p. 18), ESD features are:

- Interdisciplinary and holistic: learning for sustainable development embedded in the whole curriculum, not as a separate subject;
- Values-driven: it is critical that the assumed norms—the shared values and principles underpinning sustainable development—are made explicit so that can be examined, debated, tested and applied;
- Critical thinking and problem solving: leading to confidence in addressing the dilemmas and challenges of sustainable development;
- Multi-method: word, art, drama, debate, experience, … different pedagogies which model the processes. Teaching that is geared simply to passing on knowledge should be recast into an approach in which teachers and learners work together to acquire knowledge and play a role in shaping the environment of their educational institutions;
- Participatory decision-making: learners participate in decisions on how they are to learn;
- Applicability: the learning experiences offered are integrated in day to day personal and professional life.
- Locally relevant: addressing local as well as global issues, and using the language(s) which learners most commonly use.

This coexistence of EE and ESD has created a concern among international and national communities regarding overlap and duplication of goals and programs in EE and ESD. Pavlova says that,

> The simultaneous existence and development of EE and ESD has resulted in some confusion in policy formulation and implementation. Lack of clarity has sometimes led to inefficiencies in achieving goals and development of initiatives. Some countries call for distinctions, others for convergence between the EE and ESD (Pavlova 2012, p. 333).

An analysis made by Unesco in 2009 concluded that the relationships between EE and ESD depends on "the historic role EE has played in a country (prominent or marginal) and the way EE itself is interpreted (broad or narrow)" (Unesco 2009a, b, p. 28). It identified that EE-ESD relationships can be considered as: equals; EE as a part of ESD; and ESD and EE as distinct, but considers them both important and that they end up overlapping (Unesco 2009a, b; Pavlova 2012). For the purpose of

this paper, the authors will consider Environmental Education as part of Education for Sustainable Development.

With Agenda 21 emphasizing that education will play a major role in achieving sustainable development, ESD has received increasingly political attention. Its importance has been globally recognized with the establishment of the United Nations Decade for Education for Sustainable Development (DESD). Unesco (2013, p. 3), as the Decade's lead agency, defines ESD as "a process of learning how to make decisions that consider the long-term future of the economy, ecology and equity of all communities." For Haigh (2005, p. 31), the DESD "offers academies the best chance to date for making the deep and radical changes that will be necessary if the world's higher education institutions are to enact their responsibilities for creating a better and self-sustainable world."

Universities have often been considered major contributors of regional sustainability initiatives (Karatzoglou 2012; Dlouhá et al. 2011). The composite nature of Sustainable Development has appointed Universities to critical partners to all relevant efforts, always in firm collaboration with other local actors and promoting digital access to information (Dariah-EU 2016).

The study of moral reasoning in relation to sustainable development and environment is an emerging field within EE and ESD. Most environmental issues can be considered to be social dilemmas involving sophisticated moral conceptions, centered on notions of rights, freedoms, justice, equality and respect and this affects the academic, professional and moral formation of populations that are inserted in the paradigm of environmental protection (Unesco 2012; Kopnina 2014). Highlighting the ways in which environment benefits humans, recent articles call for humanizing education (Kopnina 2014; Wals 2012; Bowers 2002).

The integration of ESD in Higher Education implies shifts in current pedagogical strategies moving from: transmissive to discovery learning; teacher-centred to student-centred approaches; and theoretical to practice oriented learning (Lim et al. 2015). ESD is action orientated, based on critical reflection, including critical thinking, participatory approaches, partnerships and systemic thinking as its core. Existing teaching and learning approaches on ESD are based on educators as role models, experiential learning and holistic thinking (Unesco 2010). Besides transformative sustainability learning has been widely discussed in the literature as a suitable pedagogy in ESD (Cebrian 2014).

Action orientated approaches provide staff with the time to critically reflect on the practice of ESD and empower them to make changes in their teaching practice by acquiring new understandings and views on ESD (Wals 2015). Placing action research within the critical theory and emancipatory paradigm can contribute to transform participants' mental models on ESD. Furthermore, to engage academics in ESD it is necessary to develop a clearer rationale for the adoption of ESD pedagogy in Higher Education and conduct further empirical research on the views, practices and visions of those academics not involved in ESD (Cebrian 2014).

3 The Role of Education for Sustainable Development in the Sustainable Development Goals

The 2030 Agenda has presented ambitious goals for our future society. Carrying a strong sense of human development, human rights and seeking equity in all levels, the SDGs are an attempt to guide a more inclusive and just society. That is, sustainable development should be a balance of economic progress and the protection of the environment while also being mindful of social needs (Emas 2015; Dempsey et al. 2011). Umoh (2010, p.81) addresses the importance of education to this process, stating that "In a non quantifiable way, EE improves people's overall quality of life by opening opportunities for participation in development and processes, including the social, economic, political, and cultural spheres of life."

There are a number of authors that agree on the importance of education to change behaviors and promote critical thinking towards a more sustainable future (Kopnina 2015; Figueiró and Raufflet 2015; Kibbe et al. 2014; Frantz and Mayer 2014; Zsóka et al. 2013). Thus, Education for Sustainable Development is key to develop those skills in a transdisciplinary format that can help students realize that the pathways towards sustainability involves economical, political and social aspects. The challenge for educational institutions is precisely to reorganize their approach in a manner to align with the sustainability agenda (Jones et al. 2008). What will be discussed in this session are the SDGs and how is it feasible to approach them through education, particularly through ESD.

Goal 1 of the SDGs correspond to "No poverty", and it requires severe changes in national policies to guarantee fair distribution of resources and equitable development. Nonetheless, education also has an important role in the efforts to reduce poverty, or at least, in its effort to guide vulnerable groups of people on how to make more sustainable decisions. Climate change and its consequences currently has a stronger impact on low income families and ethnic groups, and those individuals are frequently lacking access to information, which makes them unable to seek relief assistance and understand their opportunities (Maantay and Maroko 2009).

Educational institutions must be prepared to deal with the challenges society is facing with climate change, so that it can shape their students to make conscious decisions. According to Power and Maclean (2011, p. 7) "Learning how to live and work in ways that are sustainable includes, but necessarily goes beyond, formal programs for education for sustainable development (ESD): the principles of sustainable development need to be installed in all levels and to cover all types of education."

In addition to the role of ESD to educate and inform the marginalized groups of society regarding climate change, there is also the role of capacity building. The knowledge and skills gained through education leads to more capacitated individuals that will have better chances of being employed or self-employed, consequently adding to the economic growth of their nation (Umoh 2010).

In this regard, the Food and Agriculture Organization of the United Nations (FAO), has published a report that addresses the importance of redefining education for rural people, in order to promote sustainable rural development, poverty reduction and food security. "Enhanced human capital in the rural space can be trained for increased onfarm productivity and for off-farm employment opportunities as well as learning that leads to improved social well-being, social capital formation and satisfactory livelihoods" (FAO 2009, p. 109). ESD is only one of the aspects to reduce poverty, however, its impact has long term effects that may not just benefit low income individuals, but society as a whole, promoting sustainable growth, which is also aimed by Goal 8, regarding Decent Work and Economic Growth.

The second Goal is highly connected with the first, and it concerns "Zero Hunger". In addition to eradicating hunger, the targets set by Goal 2 also aim to achieve food security and sustainable agriculture production. Within this context, target number three seeks to:

> […] double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment (United Nations 2015).

By increasing food productivity and offering equal access to resources to small-scale producers, the SDGs are not only helping those low income groups to enhance their well-being, but also contributing to food security. Hence the connection between Goal 1 and 2 and the role ESD has on both issues. One of the characteristics of ESD is providing participatory learning (Ghilardi-Lopes et al. 2013; Barth et al. 2013; Soykan and Atasoy 2012) and practical activities (Kopnina 2015; Koscielniak 2014; Lozano et al. 2015) as a way to engage students to take what they have learn and put it into practice to understand better how their actions have consequences.

On the matter of food security, the promotion of agroecological practices in educational institutions are strongly supported. Through experimentation and observation of agroecological practices that fit the local environment enables the learners to acquire adaptive management skills which are key in dealing with climate change and its impact in agriculture and food security (Gregory et al. 2015). As presented by Jones (2013), an edible garden in the University of Gloucestershire in the UK counted not only with students, but local residents, staff and local government, which suggest that the impact of these types of practical activities can go beyond the campus if supported by the institution.

By motivating practical activities such as the edible garden, the time spent in nature and the good nutrition habits might be important drivers of good health and well-being, which is Goal 3. Besides, ESD can assist particularly in the achievement of target 3.9, that aims to "substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and

contamination" (United Nations 2015) by creating awareness on the subject and teaching how to prevent those environmental issues.

Still on the matter of well-being, Goal 6, Clean Water and Sanitation can also be promoted through critical thinking, problem-solving skills, and by exercising environmental sensitivity towards the learner's community. Through outreach programs, the students can reach out to their own community, passing on knowledge and contributing to improve the quality of life of the region. According to EETAP (1997), "Students empowered to solve problems in their own neighborhoods will mobilize the communities to negotiate the issues and help them in communicating their opinions to the policy makers and community leaders."

Goal 4, Quality Education, wants to ensure that boys and girls, in every part of the world, can achieve literacy and improve their life by providing the skills necessary for their sustainable living. Target 4.7 especially focuses on ESD:

> By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development (United Nations 2015).

This emphasizes the importance of education for sustainable development to the spread of a series of competences and knowledge that are key to pursue sustainable development. Educational institutions are a rich environment with the right tools to provide an education experience that is more meaningful to students (Wals et al. 1990). For Zenelaj (2013, p. 227) "Only well mannered people, have the power of speech and opinion to make everyone accountable, and to orient them on the path of sustainable development." At the same time, target 3.7, along with other targets from Goal 4 seeks to promote gender equality, which is also one of the SDGs, Goal 5.

Gender equality is one major characteristic of a democratic education process, along with social inclusion and diversity promotion, and education institutions have high potentials to promote those through offering equal opportunities to capacity building and access to knowledge (Gurin et al. 2002; Gómez et al. 2015). Besides, a research held by Unesco (2009a, b, p. 5) stated that "educating girls and women is one of the best ways of strengthening community adaptation to climate change." The premise of social inclusion also embraces Goal 8, "Decent Work and Economic Growth", Goal 9, "Industry, Innovation and Infrastructure", Goal 10, "Reduced Inequalities", Goal 11, "Sustainable cities and Communities", and Goal 16, "Peace, Justice and Strong Institutions."

On this matter, it is worth mentioning Target 10.2 of Goal 10, that aims to "empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status" (United Nations, 2015). A research by Vons et al. (2014) presented, through a case study in the south region of Brazil, a sensory garden as a way to promote social inclusion of deaf students within an environmental education program. The study concluded that the activity was successful, as it enabled the deaf students to

exercise other senses other than their vision, which they are already familiarized with, but also contributed to the construction of scientific knowledge while respecting the students background and their ideas (Vons et al. 2014).

Goal 7 focuses on Affordable and Clean Energy, and has a strong connection with the development of new technologies. Jennings (1997, p. 2), affirms that education plays a major role in the renewable energy industry, because:

1. It promotes greater public awareness of the technology and confidence in using it.
2. The availability of technical advice and support services is essential for industry.
3. Education should be combined with a demonstration program to build confidence and awareness of the technology.
4. Education can provide a pool of trained researchers to continue the development of the technology.
5. Trained technical support staff are essential for installing, repairing and maintaining renewable energy systems.
6. People need to be aware of the technology and have the confidence to use it where appropriate.

Target 7.4 aims, "By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology." ESD has the potential to offer a much broader training in essential issues and to understand the development of new technologies that must be addressed by future professionals of the energy sector, which also results in new employment opportunities for those capacitated individuals (Jennings 2009; Jennings and Lund 2011).

As previously mentioned, one of the characteristics of ESD is behavior change. The education process must assume its role to prepare conscious and responsible citizens that will be capable of embracing what they have learned into their future actions. Thus, when it comes to Goal 12, "Responsible Consumption and Promotion", those Education Institutions who choose to incorporate Education for Sustainable Development into their curriculum will be exercising the learner's skills to "do more with less", which is a valuable tool to future challenges that climate change adaptation will require.

According to Tapia-Fonllem et al. (2013, p. 720) "a person that practices sustainable behavior not only engages in one kind of actions but tends to act in an integrated pro-environmentally manner." Therefore, simulation activities, which are often used in ESD, are a great example to reproduce first-hand experiences to facilitate the students perception on the aftermath of their actions. In addition, it can motivate independent, proactive, logical and creative behavior (Mingazova 2014; Steiner and Posch 2006). According to the Quality Assurance Agency for Higher Education, QAA (2014), simulation activities are also an important tool in developing appropriate professional behaviour given the possibility to use a safe environment to engage with real issues and different contexts.

The following SDGs, "Climate Action" (Goal 13), "Life Below water" (Goal 14), and "Life on Land" (Goal 15) are strongly linked given the impact of climate change on food production and biodiversity loss. Nonetheless, it is worth

mentioning that Goal 13 is directly or indirectly related to the accomplishment of almost all the other goals (Ki-moon 2016). In this context, ESD is not only substantially relevant to awareness building. It has also the potential to introduce regional, national and international issues through a transdisciplinary form, enabling learners to identify different contexts and different point of views to problem-solving.

According to Unesco (2007, p. 6), "ESD prepares people to cope with and find solutions to problems that threaten the sustainability of the planet." At the same time, Steiner and Posch (2006) and Scholz et al. (2006) agree on the use of transdisciplinary practical activities as an effective mutual learning format to exercise problem-solving skills. Addressing climate change cannot be delayed any further and a learning environment is the most sensible place to engage debates, share new ideas and work together for a common goal. In addition, Unesco (2009a, b) believes that the involvement of the educational institution goes beyond the classroom, whereas the access to information on the subject helps to gain public trust on climate change related policies.

The last Goal, "Partnerships for the Goals", clarifies that there are a number of actors that must be involved in order to achieve all of the SDGs, including civil society, governments and the private sector. In this context of partnerships, educational institutions have the opportunity to join forces with the United Nations and use its platform to promote sustainable development. According to Unesco (2016), "Education alone cannot achieve a more sustainable future; however, without education and learning for sustainable development, we will not be able to reach that goal".

The seventeen goals here presented can all be inserted, in one way or another, to an educational context. The role of Education for Sustainable Development and the role of the Sustainable Development Goals has many parallels and that must be exploited to the benefit of society. As highlighted by the last Goal, partnerships are key to this endeavor, thus, they should be promoted. At the same time, Goal 4 explicitly puts ESD as a component to promote sustainable development. What remains is the will of education institution leaders to seize this opportunity to adjust their curricula and prepare the teaching and student body to embrace this challenges.

4 Final Remarks

Agenda 2030 emerges as the journey forward after the Millennium Development Goals final deadline. Learning from the gains and halts of the MDGs, the Sustainable Development Goals made an effort, during the three years of its negotiation, to include diversified views and a greater participation of civil society. From the beginning it became undeniable that partnerships were necessary, not only during the development process of the Goals but primarily for their implementation.

Throughout this paper, Education for Sustainable Development is presented as a possible partner and articulator of the SDGs.

The UN Decade of Education for Sustainable Development was a major step towards a structural change in education systems. The concept, which arose from Environmental Education, was built upon the need of offering a broader definition on the meaning of educating about the environment, also focusing on economic and social issues in order to approach the three pillars of sustainable development. Thus, following the ESD approach means addressing the same issues exposed in the SDGs.

As a platform for debates and knowledge, that shares the same dilemmas such as seeking equity and addressing local and global issues, ESD has a great potential to be a driver of the SDGs albeit following its own methodology. Session three exposed some of the characteristics of ESD such as practical activities, interdisciplinary and transdisciplinary approach, problem-solving skills and environmental sensitivity towards the learner's community. These are just a few of the possible outreach potentials that ESD has to address the goals and targets set by Agenda 2030 through an inclusive and engaging manner.

The quest for sustainable development does not concern only one group of people nor does it concern only one agenda. Preparing people for future challenges like climate change and resource depletion requires a society with the knowledge and skills to act on the issues surrounding their own space and for that, education is the only way. Nonetheless, the pathway towards the accomplishment of the SDGs is still a lengthy one and it depends on many variables. Education for Sustainable Development is only one of the actors of this endeavor, but it is a very important one.

References

Allen, C., Metternicht, G., & Wiedmann, T. (2016). National pathways to the sustainable development goals (SDGs): a comparative review of scenario modelling tools. *Environmental Science and Policy, 66,* 199–207. doi:10.1016/j.envsci.2016.09.008.

Barth, M., Adomßent, M., Fischer, D., Richter, S., & Rieckmann, M. (2013). Learning to change universities from within: a service-learning perspective on promoting sustainable consumption in higher education. *Journal of Cleaner Production, 62,* 72–81. doi:10.1016/j.jclepro.2013.04.006.

Bowers, C. (2002). Toward an eco-justice pedagogy. *Environmental Education Research, 8*(1), 21–34. doi:10.1080/13504620120109628.

Brundtland Commission Report. (1987). Report of the world commission on environment and development: Our common future. http://www.un-documents.net/our-common-future.pdf.

Carleton-Hug, A., & Hug, J. W. (2010). Challenges and opportunities for evaluating environmental education programs. *Evaluation and Program Planning, 33,* 159–164. doi:10.1016/j.evalprogplan.2009.07.005.

Cebrian, G. (2014). *Academic Staff Engagement in Education for Sustainable Development*. doi:10.1016/j.jclepro.2014.12.010.

Constantinescu, C. (2014). Valuing interdependence of education, trade and the environment for the achievement of sustainable development. *Procedia—Social and Behavioral Sciences, 116,* 3340–3344. doi:10.1016/j.sbspro.2014.01.760.

Dariah-EU. (2016). CFP: Digital Editions - Representation, Interoperability, Text Analysis and Infrastructures. Digital Research Infrastructure for the Arts and Humanities. http://dariah.eu/news/articles.html.

Dempsey, N., Bramley, G., Power, S., & Brown, C. (2011). The social dimension of sustainable development: defining urban social sustainability. *Sustainable Development, 19,* 289–300. doi:10.1002/sd.417.

Dias, G. F. (2010). Educacao Ambiental, princípios e práticas, 9ª edicao, Ed Gaia, 2010.

Dlouhá, J., Adomssent, M., Barton, A., & Fadeeva, Z. (2011). Learning for sustainable development in regional networks. *Journal of Cleaner Production, 19,* 1144–1145. doi:10.1016/j.jclepro.2011.02.002.

Dvořáková, L., & Zborková, J. (2014). *Integration of Sustainable Development at Enterprise Level*. doi:10.1016/j.proeng.2014.03.043.

EETAP. (1997). Environmental education for empowerment. EETAP Resource Library, Advancing Education & Environmental Literacy, 13. http://resources.spaces3.com/df7372d0-7e77-4779-9004-4623587bfcf8.pdf.

Emas, R. (2015). The concept of sustainable development: definition and defining principles. Brief for GSDR 2015. https://sustainabledevelopment.un.org/content/documents/5839GSDR%202015_SD_concept_definiton_rev.pdf.

FAO. (2009). Education for rural people. The role of education, training and capacity development in poverty reduction and food security. http://www.fao.org/3/a-i0760e.pdf.

Ferreira, P. M. (2013). A Agenda Pós-2015 para o desenvolvimento:Da redução da pobreza ao desenvolvimento inclusivo? Policy Paper, 1/2013, 2–21. http://www.imvf.org/ficheiros/IMVFPolicyPaper_pos2015.pdf.

Figueiró, P., & Raufflet, E. (2015). Sustainability in higher education: a systematic review with focus on management education. *Journal of Cleaner Production, 106,* 22–33. doi:10.1016/j.jclepro.2015.04.118.

Frantz, C. M. P., & Mayer, F. S. (2014). The importance of connection to nature in assessing environmental education programs. *Studies in Educational Evaluation, 41,* 85–89. doi:10.1016/j.stueduc.2013.10.001.

Ghilardi-Lopes, N. P., Braga, J. C., Freitas, S.R., Silva, R. L. F., Ribeiro, T., Simões, E., Pinhata, E., & Silva, L. (2013). Environmental education through an online game about global environmental changes and their effects on coastal and marine ecosystems. In *Conference proceedings of SBGames* (pp. 468–474). http://dx.doi.org/10.1590/S1679-875920160932064sp2.

Gómez, F. U., Sáez-Navarrete, C., Lioi, S. R., & Marzuca, V. I. (2015). Adaptable model for assessing sustainability in higher education. *Journal of Cleaner Production, 107,* 475–485. doi:10.1016/j.jclepro.2014.07.047.

Gregory, M. M., Leslie, T. W., & Drinkwater, L. E. (2015). Agroecological and social characteristics of New York city community gardens: Contributions to urban food security, ecosystem services, and environmental education. *Urban Ecosystem, 19,* 763–794. doi:10.1007/s11252-015-0505-1.

Griggs, D., Stafford-Smith, M., Gaffney, O., Rockström, J., Öhman, M. C., Shyamsundar, P., et al. (2013). Policy: sustainable development goals for people and planet. *Nature, 495*(7441), 305–307.

Gupta, J., & Vegelin, C. (2016). Sustainable development goals and inclusive development. In *International environmental agreements*: *Politics, law and economics* (pp. 1–16).

Gurin, P., Dey, E., Hurtado, S., & Gurin, G. (2002). Diversity and higher education: Theory and impact on educational outcomes. *Harvard Educational Review, 72,* 330–367. doi:10.17763/haer.72.3.01151786u134n051.

Haigh, M. (2005). Greening the university curriculum: appraising an international movement. *Journal of Geography in Higher Education, 29,* 31–48. doi:10.1080/03098260500030355.

Haslegrave, M. (2014). Sexual and reproductive health and rights in the sustainable development goals and the post-2015 development agenda: Less than a year to go. *Reproductive health matters, 22*(44), 102–108.

Huiying, X. (2002). Interdisciplinary approaches to environmental education: Two case studies in China. http://www.cgie.org/blog/resources/papers-publications/interdisciplinary-approaches-environmental-education-case-studies-china/.

Jennings, P. J. (1997). Renewable energy education: an essential foundation for market development. In *Proceedings of Solar 97—Australian and New Zealand solar energy society*, Paper 33. http://researchrepository.murdoch.edu.au/25033/1/renewable_energy_education.pdf.

Jennings, P. (2009). New directions in renewable energy education. *Renewable Energy, 34,* 435–439. doi:10.1016/j.renene.2008.05.005.

Jennings, P. J., & Lund, C. P. (2011). Renewable energy education for sustainable development. *Renewable Energy, 22,* 113–118. doi:10.1016/S0960-1481(00)00028-8.

Jones, D. R. (2013). 'The Biophilic University': a de-familiarizing organizational metaphor for ecological sustainability? *Journal of Cleaner Production, 48,* 148–165. doi:10.1016/j.jclepro.2013.02.019.

Jones, P., Trier, C. J., & Richards, J. P. (2008). Embedding education for sustainable development in higher education: a case study examining common challenges and opportunities for undergraduate programmes. *International Journal of Educational Research, 47,* 341–350. doi:10.1016/j.ijer.2008.11.001.

Karatzoglou, B. (2012). An in-depth literature review of the evolving roles and contributions of universities to education for sustainable development. doi:10.1016/j.jclepro.2012.07.043.

Kibbe, A., Bogner, F. X., & Kaiser, F. G. (2014). Exploitative vs. appreciative use of nature—Two interpretations of utilization and their relevance for environmental education. *Studies in Educational Evaluation, 41,* 106–112. doi:10.1016/j.stueduc.2013.11.007.

Kimaryo, L. (2011). Integrating environmental education in primary school education in Tanzania teachers' perceptions and teaching practices. http://www.doria.fi/bitstream/handle/10024/67481/kimaryo_lydia.pdf.

Ki-moon, B. (2016) The people's agenda. In *Sustainable development goals: The people's agenda*. UNA-UK.

Kopnina, H. (2014). Education for sustainable development (ESD): Exploring anthropocentric–ecocentric values in children through vignette. doi:10.1016/j.stueduc.2013.12.004.

Kopnina, H. (2015). Neoliberalism, pluralism and environmental education: the call for radical re-orientation. *Environmental Development, 15,* 120–130. doi:10.1016/j.envdev.2015.03.005.

Koscielniak, C. (2014). A consideration of the changing focus on the sustainable development in higher education in Poland. *Journal of Cleaner Production, 62,* 114–119. doi:10.1016/j.jclepro.2013.06.006.

Kumar, S., Kumar, N., & Vivekadhish, S. (2016). Millennium development goals (MDGS) to sustainable development goals (SDGS): Addressing unfinished agenda and strengthening sustainable development and partnership. *Indian Journal of Community Medicine (Editorial Commentary), 41,* 1–4. doi:10.4103/0970-0218.170955.

Le Blanc, D. (2015). Towards integration at last? The sustainable development goals as a network of targets. *Sustainable Development, 23*(3), 176–187.

Lim, Y. S., Xia, B., Skitmore, M., Gray, J., & Brodge, A. (2015). Education for sustainability in construction management curricula. *International Journal of Construction Management, 15,* 321–331. doi:10.1080/15623599.2015.1066569.

Lozano, R., Ceulemans, K., Alonso-Almeida, M., Huisingh, D., Lozano, F., Waas, T., et al. (2015). A review of commitment and implementation of sustainable development in higher education: results from a worldwide survey. *Journal of Cleaner Production, 108,* 1–18. doi:10. 1016/j.jclepro.2014.09.048.

Luppi, E. (2011). Training to education for sustainable development through e-learning. *Procedia Social and Behavioral Sciences, 15,* 3244–3251. doi:10.1016/j.sbspro.2011.04.279.

Maantay, J., & Maroko, A. (2009). Mapping urban risk: Flood hazards, race, & environmental justice in New York. *Applied Geography, 29,* 111–124. doi:10.1016/j.apgeog.2008.08.002.

McIntosh, M. (2013). Creating global citizens and responsible leadership. The Journal of Corporate Citizenship, Griffith University, Issue 49, Australia. Available at https://www. greenleaf-publishing.com/creating-global-citizens-and-responsible-leadership.

McKeown, R., & Hopkins, C. (2003). EE p ESD: Defusing the worry. *Environmental Education Research, 9,* 117–128. doi:10.1080/13504620303469.

Mingazova, N. M. (2014). Modification Of the active learning methods in environmental education in Russian universities. *Procedia—Social and Behavioral Sciences, 131,* 85–89. doi:10.1016/j.sbspro.2014.04.083.

Najam, A., Runnalls, D., Halle, M. (2007). Environment and globalization five propositions. In *International Institute for Sustainable Development.* http://www.unep.org/gc/gc24/docs/ FivePropositions.pdf.

Nilsson, M., Griggs, D., & Visbeck, M. (2016). Policy: map the interactions between sustainable development goals. *Nature, 534,* 320–322.

Osborn, D., Cutter, A., & Ullah, F. (2015). Universal sustainable development goals. Understanding the transformational challenge for developed countries. London: Report of a study Stakeholder Forum.

Pavlova, M. (2012). Environmental education and/or education forsustainable development: what role for technology education? http://www98.griffith.edu.au/dspace/bitstream/handle/10072/ 46566/74769_1.pdf?sequence=1.

Post-2015 HLP. Secretary-General's High-Level Panel of eminent persons on the Post-2015 Development Agenda. About. http://www.post2015hlp.org/about/.

Power, C., Maclean, M. (2011). Lifelong learning for poverty alleviation and sustainable development. In *International symposium on lifelong learning.* https://www.ied.edu.hk/isll/ Download%20Files/Panel2_Prof_Colin_Power.pdf.

QAA. (2014). Education for sustainable development: Guidance for UK higher education providers. http://www.qaa.ac.uk/en/Publications/Documents/Education-sustainable-development-Guidance-June-14.pdf.

Sachs, J. D. (2012). From millennium development goals to sustainable development goals. *The Lancet, 379*(9832), 2206–2211.

Scholz, W. R., Lang, D. J., Wiek, A., Walter, A. I., & Stauffacher, M. (2006). Transdisciplinary case studies as a means of sustainability learning Historical framework and theory. *International Journal of Sustainability in Higher Education, 7,* 226–251. doi:10.1108/ 14676370610677829.

Soykan, A., & Atasoy, E. (2012). Historical development of non-formal environmental education in Turkey. *Procedia—Social and Behavioral Sciences, 46,* 736–743. doi:10.1016/j.sbspro. 2012.05.190.

Stafford-Smith, M., Griggs, D., Gaffney, O., Ullah, F., Reyers, B., Kanie, N., Stigson, B., Shrivastava, P., Leach, M., & O'Connell, D. (2016). Integration: the key to implementing the Sustainable Development Goals. Sustainability Science (pp. 1–9).

Steiner, G., & Posch, A. (2006). Higher education for sustainability by means of transdisciplinar case studies: an innovative approach for solving complex, real-world problems. *Journal of Cleaner Production, 14,* 877–890. doi:10.1016/j.jclepro.2005.11.054.

Tapia-Fonllem, C., Corral-Verdugo, V., Fraijo-Sing, B., & Durón-Ramos, M. F. (2013). Assessing sustainable behavior and its correlates: A measure of pro-ecological, frugal, altruistic and equitable actions. *Sustainability, 5,* 711–723. doi:10.3390/su5020711.

Teixeira, S. R. (2013). The environmental education as a path for a global sustainability. *Procedia—Social and Behavioral Science, 106,* 2769–2774. doi:10.1016/j.sbspro.2013.12.318.

Tilbury, D. (1995). Environmental education for sustainability: Defining the new focus of environmental education in the 1990s. doi:10.1080/1350462950010206.

Umoh, T. U. (2010). Environmental education and poverty reduction in Africa. *Journal of African Business, 11,* 70–86. doi:10.1080/15228911003608561.

Unesco. (2005). UN decade of education for sustainable development 2005–2014: International Implementation Scheme. http://unesdoc.unesco.org/images/0013/001399/139937e.pdf.

Unesco. (2007). The US decade of education for sustainable development, the first two years. http://unesdoc.unesco.org/images/0015/001540/154093e.pdf.

Unesco. (2009a). Climate change and environmental education. In Child-friendly schools manual. https://www.unicef.org/publications/index_49574.html.

Unesco. (2009b). Learning for a sustainable world: Review of contexts and structures for education for sustainable development. Paris: UNESCO Education Sector. http://unesdoc.unesco.org/images/0018/001849/184944e.pdf.

Unesco. (2010). Training guideline on incorporating education for sustainable development (ESD) into the curriculum. http://www.ibe.unesco.org/sites/default/files/ESD_training_guidelines_-3.pdf.

Unesco. (2012). Shaping the education of tomorrow: 2012 full-length report on the UN decade of education for sustainable development. UNESCO Education Center. http://unesdoc.unesco.org/images/0021/002166/216606e.pdf.

Unesco. (2013). Education for sustainable development (ESD) in the UK—Current status, best practice and opportunities for the future. http://www.unesco.org.uk/wp-content/uploads/2015/03/Brief-9-ESD-March-2013.pdf.

Unesco. (2016). UN decade of ESD. http://en.unesco.org/themes/education-sustainable-development/what-is-esd/un-decade-of-esd.

United Nations. (1992). Rio declaration on environment and development. http://www.un.org/documents/ga/conf151/aconf15126-1annex1.htm.

United Nations. (2012). United Nations General Assembly."The Future We Want" Resolution adopted by the General Assembly on 27 July 2012. http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/66/288&Lang=E.

United Nations. (2015). United Nations General Assembly. Transforming Our World: The 2030 agenda for sustainable development. https://sustainabledevelopment.un.org/post2015/transformingourworld.

UNSDSN. (2016a). United Nations Sustainable Development Solutions Network. About the SDGs. http://unsdsn.org/what-we-do/sustainable-development-goals/about-the-sdgs/.

UNSDSN. (2016b). United Nations Sustainable Development Solutions Network. Vision and Organization. http://unsdsn.org/about-us/vision-and-organization/.

Vons, P. C. O., Scopel, J. M., & Scur, L. (2014). The Sensory Garden as an Environmental Education Activity for Social Inclusion in the Natural Science Museum of University of Caxias do Sul. *Scientia Cum Industria, 2,* 43–46. doi:10.18226/23185279.v2iss2p43.

Waage, J., Yap, C., Bell, S., Levy, C., Mace, G., Pegram, T., et al. (2015). Governing the UN sustainable development goals: Interactions, infrastructures, and institutions. *The Lancet Global Health, 3*(5), e251–e252. doi:10.1016/S2214-109X(15)70112-9.

Wals, A. E. J. (2012). Shaping the education of tomorrow: 2012 Full-length Report on the UN decade of education for sustainable development. UNESCO Education Center. http://unesdoc.unesco.org/images/0021/002166/216606e.pdf.

Wals, Arjen. (2015). Vers une éducation plus significative et plus critique et l'apprentissage pour la durabilité - aller au-delà du Décennie de l'éducation pour le développement durable. http://dx.doi.org/10.1080/15623599.2015.1066569.

Wals, A. E., Beringer, A., & Stapp, W. B. (1990). Education in action: A community problem-solving program for schools. *The Journal of Environmental Education, 21,* 13–19. doi:10.1080/00958964.1990.9941933.

Wiek, A., Withycombe, L., Redman, C.L. (2011). Key competencies in sustainability: A reference framework for academic program development. Sustainability Science, 6. doi:10.1007/s11625-011-0132-6.

Zenelaj, E. (2013). Education for sustainable development. European Journal of Sustainable Development, 2, 227–232. http://www.ecsdev.org/images/conference/siICSD2013/zenelaj%20227-232.pdf.

Zsóka, A., Szerényi, Z. M., Széchy, A., & Kocsis, T. (2013). Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday proenvironmental activities of Hungarian high school and university students. *Journal of Cleaner Production, 48,* 126–138. doi:10.1016/j.jclepro.2012.11.030.