

# PART I

## The big picture



# 1

## STRUGGLES AND SUCCESSES OF TRANSFORMATIVE LEARNING FOR THE SDGS

A case study

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### **Abstract**

The 17 Sustainable Development Goals (SDGs) have shed light on the concept of Education for Sustainable Development (ESD) expressed through the knowledge of targets and indicators. Consequently, UNESCO has invoked the adoption of new pedagogical approaches for SDGs –that is, transdisciplinary and transformative learning, to overcome mere knowledge teaching and to teach, new generations of young leaders, ESD skills such as envisioning, critical thinking and partnership building. This paper discusses the struggles and successes of a pilot project in transformative learning in an institution of higher learning for the advancement of the SDGs. This project has been carried out at the University of Torino (UniTo) and focuses on merging sustainable development with open innovation. Recognized as one of the best practices regarding sustainable development by the Italian Association of Universities for Sustainability (RUS) in 2017, the case involves students in a transdisciplinary, creative and open learning environment. With this approach, students learn about SDGs, the complexities of sustainability and the use of valuable tools to contribute to their local communities and organizations.

### **Introduction**

This chapter refers to the Education for Sustainable Development Goals (ESDGs) as a specific subset of the traditional and vast Education for Sustainable Development (ESD). Due to their intrinsic nature, a theoretical training on SDGs might be ineffective (Spangenberg, 2017), as the scope of the ESDGs goes beyond the formal knowledge and should stimulate leadership skills in learners (Efthimiou, 2017). By 2030, SDG #4 seeks to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. Its Target 4.7 explicitly explains

the importance of cognitive and noncognitive aspects of learning, to boost such a leadership approach (UNESCO, 2017).

The ESDGs are defined as a “holistic and transformational education that addresses learning content and outcomes, pedagogy and the learning environment” (UNESCO, 2015, 2017). At its core, it has an interdisciplinary nature (Annan-Diab and Molinari, 2017) and a transdisciplinary approach (Sipos et al., 2008). Consequently, innovative pedagogies connecting the learners to the external environment are needed. Of particular relevance, transformative learning (Mezirow, 2000) seems to demonstrate its effectiveness in considering the importance of the physical place (Bergvall-Kareborn and Stahlbrost, 2009; Romero Herrera, 2017) where the training happens as well as the relevance of the training provider. The coherence between what is practiced and what is preached becomes relevant in transformative learning (Lozano et al., 2017; Molderez and Fonseca, 2018; Scheyvens et al., 2016).

Besides, UNESCO calls universities to provide students with the knowledge, skills and motivation to understand and address the challenges of the SDGs. According to a recent report of Sustainable Development Solution Network Australia, universities can provide training especially aimed at improving cross-cutting skills and “key competencies.” These would include systems thinking, critical thinking, self-awareness and integrated problem-solving as well as anticipatory, normative, strategic and collaboration competencies. They could also address creativity, entrepreneurship, curiosity and learning skills, design thinking, social responsibility, partnership competencies and the ability to be comfortable in interdisciplinary settings (Sustainable Development Solutions Network Australia/Pacific, 2017).

This chapter addresses the range of managerial soft skills for sustainable development. Managerial skills are needed to deal with uncertainty and ambiguity (Parente et al., 2012). They can be identified as soft skills useful to strategize, plan, organize and control (Robbins and Hunsaker, 2000). A pilot project carried out at the University of Turin (UniTo) tested the role of managerial soft skills on transformative learning for the SDGs, highlighting the struggles and successes experienced. Students from different courses and disciplines were involved. The project was recognized as one of the best practices regarding sustainable development by the Italian Association of Universities for Sustainability (RUS) and selected as best practice by the International Sustainable Campus Network (ISCN) for the World Economic Forum 2018.

The chapter is structured as follows: The ESD Training Program section introduces the case study and provides an overview of the design of the ESD Leadership Training. It brings valuable insights to those interested in approaching the concept of ESDGs, to facilitate replication of the described methodology. A detailed description of each module comprising the overall input-output transformative learning experience is provided. The Assessment Methodology section describes the adopted assessment approach based on two participants’ surveys and experts’ evaluation. The Struggles and Successes section presents a SWOT (Strengths, Weaknesses,

Opportunities and Threats) analysis. The SWOT analysis is a managerial framework that helps managers identify their organization's competitive position. It has also been applied to evaluate the learning project's outcome by Cho and Brown (2013). Moreover, a review of some general criticisms of the ESDGs is presented as well as some tips and suggestions on how to overcome these struggles. Finally, in the Conclusion section, further studies and investigation are recommended to enhance the strengths and opportunities for universities and to reduce the threats and weaknesses of the proposed case study.

## **The ESD training program**

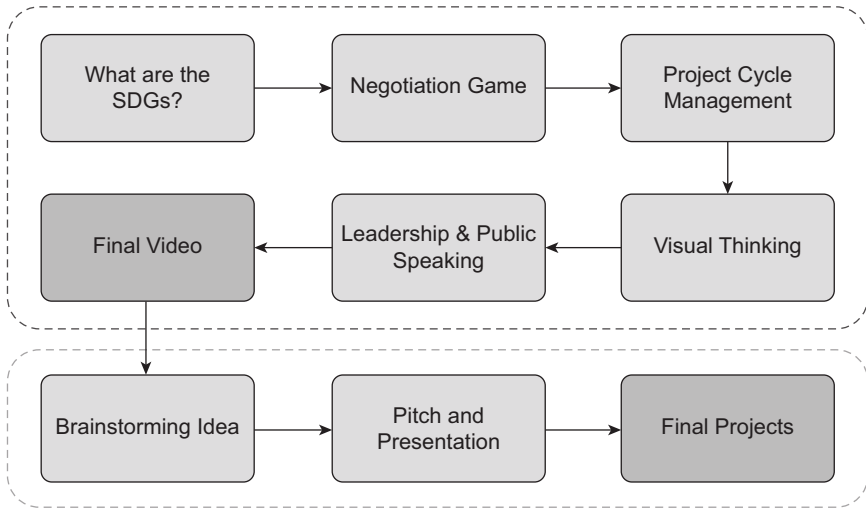
Within the Global Action Programme (GAP) on Education for Sustainable Development of UNESCO (UNESCO Education, 2005), the University of Torino organized a program titled Education for Sustainable Development: Leadership Training. The workshop was designed to teach the basic knowledge of the 17 SDGs and to highlight their interlinkages, two essential features of ESDGs (Weitz et al., 2014). The empowerment of the learners through the development of leadership skills is one of the main planned outcomes of such a workshop (Cottafava et al., 2019).

The training was based on an input-output transformative learning approach – that is, a two-day workshop designed by modular blocks of topics in which each block represents a module. A module output provides the input of the next module. Each block consisted of one to two hours of active learning to acquire a specific managerial skill, facilitated by an expert with a background relevant to the topic for promoting inter- and transdisciplinary learning (Sunley and Leigh, 2017). The workshop was aimed at undergraduate and graduate students of all courses and disciplines with an interest in sustainable development. This workshop was held by experts in active learning and engagement. They took an active part during the whole project, from the conceptualization of the modules to the evaluation phase. They acted as facilitators during the training, offering support to guarantee an effective co-designed process.

Experts were selected from among the available researchers of the Green Office (UniToGo) and the UNESCO Chair in Sustainable Development and Territory Management of the University of Torino. External organizations like the World Water Assessment Programme of UNESCO and the Italian Accenture Foundation were also engaged through one of their representatives. The workshop had the support of Cinedumedia (a multidisciplinary center on Cinema, Education and New Media) and the university's business incubator, namely, 2i3t.

### ***Training overview***

This section provides a discussion of the modules of the case study, while the theoretical underpinning of this new transformative learning approach has been described in detail in Cottafava et al. (2019). The ESD Leadership Training methodology



**FIGURE 1.1** The ESD Leadership Training of the University of Torino

included two main components, each based on a different teaching approach. Thus, the basic structure, critical to this methodology, depends on two main parts, shown in Figure 1.1. The first one focuses on teaching the basic knowledge of the SDGs, their targets' and indicators' interconnectivity. The second part is centered on the plan and the design process for business ideas starting from the SDG challenges. In this way, a design for viable solutions and their implementation is established. Besides, students may imagine and conceive innovative solutions with a preliminary analysis of certain SDGs and a general sight on the complexity of all SDG interactions.

First, a non-formal teaching approach, the Learning of the SDGs, based on the ESD principles, was adopted to support the creation of a uniform learning path for students. Facilitators guided them from the basic understanding of the SDGs ("What Are the SDGs?" module) to the complexity of the stakeholder engagement behind a practical application of the SDGs in the university's context (Negotiation Game module). Other modules were the analysis of SDGs through their targets, indicators and their respective interlinkages (Project Cycle Management and Visual Thinking modules) and the design of workable solutions (Leadership and Public Speaking module) and their evaluation.

The second part of the transformative learning process, the Open Innovation Learning, aimed to encourage participants to conceive, design and plan innovative projects linking as many SDGs as possible. Two modules were provided: a Brainstorming Ideas module, in which participants, working in transdisciplinary teams, define their projects through a "business model canvas" (Osterwalder and Pigneur, 2010), and a Pitch and Presentation module, where the teams deliver five-minute presentations.

## ***The learning of the SDGs***

During the first part of the training, students discovered the complexity of sustainability and acquired basic knowledge about sustainable development by exploring goals, targets and indicators of the SDGs, thanks to an experiential learning approach and the adoption of managerial tools.

- ***What are the SDGs?***

This first module is organized as a “serious game” where a simulation emphasizes the added pedagogical value to fun and competition. Each participant represents one of the 17 goals and must discover information related to all the other SDGs by interacting with the other participants. The participants’ interaction is facilitated by stimulating a debate around three thought-provoking questions: i) Goal name?, ii) Why? (list some data) and iii) What can I do?

- ***Negotiation and conflict management***

This second module is designed to show how to manage a multi-stakeholders’ problem related to the SDGs. The case study focuses on access to education. Each group of participants interprets a stakeholder – for example, the Ministry of Education, students and their families, academic staff and the University Board of Directors. The four groups interact in a public debate according to the needs, aims and constraints of the game.

- ***Project cycle management (PCM)***

The third module introduces SDG targets and indicators. Students have to analyze the SDGs by using a root-cause tree graph (Wilson, 1993) and by identifying common causes among the SDGs. Root-cause analysis refers to any problem-solving method, and it is used to trace an issue from its origin to its present state. The complexity of the interactions among different targets and indicators are at the core of such modules.

- ***Visual thinking***

This module aims to develop a graphical synthesis using the Ishikawa diagram (Ishikawa and Loftus, 1990) – that is, a cause-effect visualization tool used by students to explore more in-depth the specific causes of each SDG.

- ***Leadership and public speaking***

Simulated interviews are at the core of this module. Participants split into three-person groups (one interviewer, with two interviewed experts), simulated to enact the situation of an interview in front of a camera. Students’ interviews are played back and discussed in real time with all other participants with the help of the facilitators. The interviews, subsequently, are publicly shared on social media networks (Facebook, Twitter and Instagram), on the YouTube channel of the Green Office of the University of Torino and the related website.

## ***The open innovation learning***

During the second part of the training, students are encouraged to conceive, design and plan innovative projects linking as many SDGs as possible.

### **Brainstorming ideas**

Within this activity, participant solutions related to real-world challenges, focused on the local territory and community, are presented and explained. Then, the five most promising ideas are selected, and transdisciplinary groups are created. Finally, all groups work on a business model canvas starting from the selected ideas. The entire process is facilitated and guided by business practitioners of the business incubator and SDG experts.

### **Pitch and presentation**

This block aims to wrap up the group ideas into five-minute presentations according to five questions i) What? – idea description, ii) How? – innovation and necessary technology, iii) Scalability and modularity, iv) Environmental and social sustainability and interdependence with the SDGs and v) Economic feasibility.

## ***The assessment methodology***

The assessment methodology was conducted through two surveys, one ex ante and one ex post; the transformative training case study; the expert evaluation of the students' outputs and a final SWOT analysis. The ex ante survey was a questionnaire focused on the students' motivations and interest in the topic, on their attitudes to develop projects and business ideas and finally on their previous experiences in sustainable development. The ex post survey was conducted to understand the outcome of the workshop and to identify any improvement in the participants' knowledge and skills after the training.

## **Struggles and successes**

In this section, struggles and successes, as well as lessons learned and suggestions, are presented for each module of the training. Instead of structuring the narrative by distinguishing between struggles and successes, we consider it appropriate to use a narrative approach based on the SWOT analysis of the entire process. The use of the SWOT analysis allows researchers to highlight strengths and weaknesses within each step, but at the same time, it brings out any opportunities in the sense of factors that can be further emphasized. The so-called threats are also useful to take into account certain areas of risk that may impair the effectiveness of the project itself. All feedback, both from experts and students, has been reviewed and analyzed using a SWOT analysis, shown in Figure 1.2. In particular, the internal strengths (top-left) and weaknesses (top-right) are related to the first part of the training and refer to the positive and negative impacts on the students' and participants' knowledge. The external opportunities (bottom-left) and threats (bottom-right), instead, refer to the second part of the transformative learning process and to the envisaged and produced impacts on the local territory.



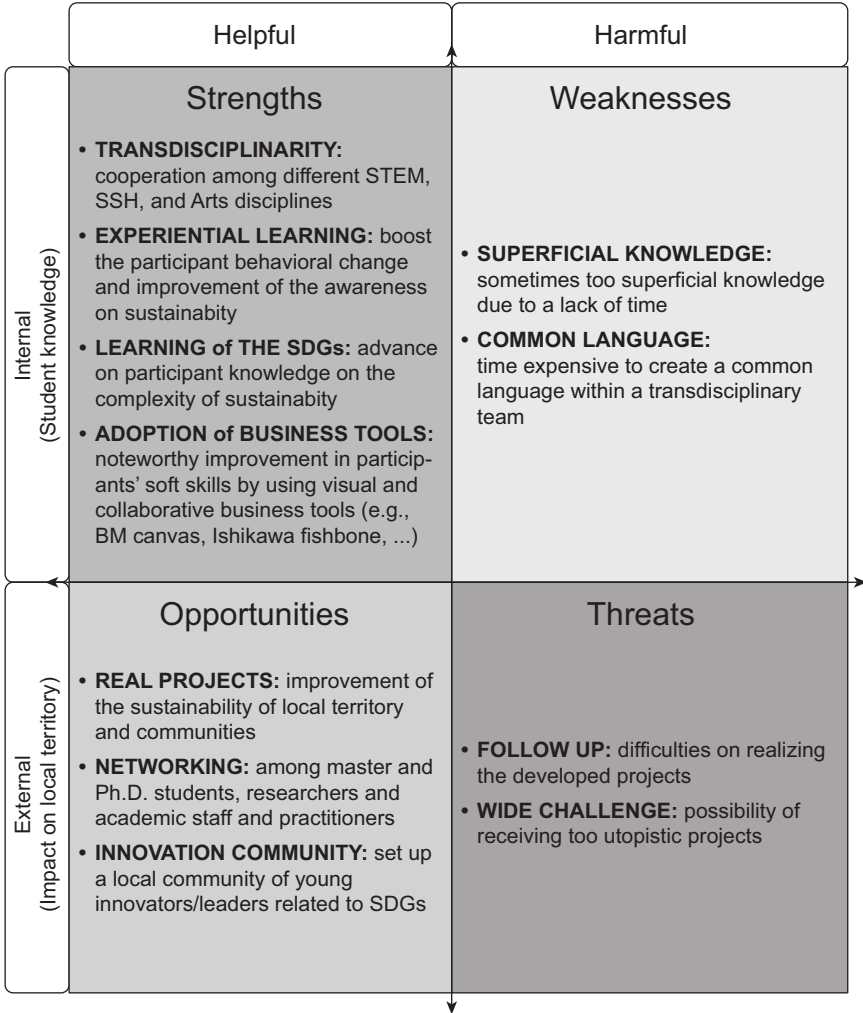


FIGURE 1.2 SWOT Analysis of the ESD Leadership Training Program

### *The training modules*

The What Are the SDGs? Module focuses on the acquisition of basic knowledge related to the SDGs through an experiential learning approach (internal strength) and the networking among participants to set the basis for a future community leader within the local territory (external opportunity). The main weakness of the module was the allotted time given to the participants, which was criticized as too short. Indeed, the experiential learning process – that is, obtained by stimulating the interaction and the debate among participants – could require more time than one to two hours.

The Negotiation and Conflict Management module emphasizes a full experiential and transdisciplinary approach (internal strength), but there is a possibility of ending up with a superficial knowledge of content (internal weakness), given the timing issue. Moreover, as in the first module, this activity encourages networking among participants as well as helps students to understand a real problem and challenge within their local community (external opportunity). According to one participant, the universities must update and renovate their teaching approach to become an “open-air laboratory allowing a dialogue between the various departments and degree courses too often perched behind old baronial models (such Ivory towers) unable to collaborate for the common good, for the knowledge and development of science and humanity.”

The Project Cycle Management (PCM) module strengthens the students’ knowledge on the SDGs (internal strength) by developing a common language across various fields, spanning sociology to economics and ecology. As highlighted above, developing a common language for such a broad field of knowledge and engaging students with diverse backgrounds can be a challenging task. It may need a more protracted process (internal weakness) to avoid superficial and trivial insights and to assure training continuity. All these aspects could be exceedingly improved by designing a learning path fully integrated within the bachelor’s and master’s degree programs, as declared by a student: “The university, first of all, should set up an obligatory course on environmental emergencies, workable solutions, and the role of our generation in the fight against climate change.”

The Visual Thinking module points out how the role of the university is crucial from the perspective of cocreation. One student affirmed, “It affects the generation that is capable of the change. It should start by increasing the awareness through projects and workshops and later by implementing solutions and by letting students participate in finding solutions.” Moreover, both the Visual Thinking and the Project Cycle Management modules are instrumental in teaching professional business analysis tools applied to a real-life challenge.

In one of the videos produced at the end of the Leadership and Public Speaking segment, a participant affirmed: “The purpose of my life is to give my contribution to make the world a better place for future generations than the current scenarios, and my university should be practically committed to letting me become a leader.”

During, the Brainstorming Ideas module, the experts point out that this module is particularly effective in facilitating networking among the participants and in setting up a local innovation community (external opportunity), but that it must be improved in the follow-up process (external threats).

At the end of the Pitch and Presentation module, the experts’ final evaluation of the presented projects was satisfactory even if none of the ideas continued with the business incubator follow-up. This aspect needs to be further discussed. The unsatisfactory results in the follow-up process could be due to several reasons. For instance, the far-reaching challenge based on the SDGs in some groups of students caused them to imagine unachievable solutions, at least in the short to medium term. This process can be further improved by clearly declaring, during

the application process of the participants, specific interests from engaged stakeholders to fund some innovative solutions in order to achieve more SMART ideas (specific, measurable, achievable, realistic and time bound) during the workshop. A reasonable approach could be to identify a real budget for the sponsoring institutions devoted to realizing one or more projects. In this case, ideas presented may have a substantial budget constraint, and participants would be forced to undertake a more achievable project.

Finally, the ESD Leadership Training methodology, according to the engaged experts and stakeholders, proved to be a valid approach to spread the needed ESD skills, such as envisioning, critical thinking, systemic thinking and partnership building. They agree on how students might learn about the SDGs and sustainability complexity and may contribute to the sustainability of the local territory, becoming active citizens of their local communities.

### ***Student knowledge***

Regarding student knowledge, the main strengths declared by the students of the ESD Leadership Training program are the transdisciplinary, experiential learning and the focus on understanding the SDGs complexity. Moreover, some of the engaged stakeholders – for example, the Sustainability Report team and the Business Incubator 2i3t of the University of Torino – were recognized to be valuable assets in the teaching of professional business analysis tools. The Ishikawa diagram, project cycle management and the business model canvas were the managerial tools students appreciated the most.

In the ex post survey, at least half of the participants declared that they increased their acquisition of soft skills. The majority declared to have improved their skills in public speaking, teamwork, systemic thinking and stakeholder governance as well as in the understanding of the open innovation concept.

On the contrary, a few students and practitioners pointed out the main weakness was the lack of time. To be successful, the transdisciplinary approach needs much time to create a common language among students from entirely different disciplines and participants with varied backgrounds. The lack of a common ontology has negatively influenced the amount of new knowledge explicitly acquired on sustainable development as a concept. On the soft skills side, the most challenging skills were identified as public speaking and project idea definition, because they represent the stage where the students' engagement becomes proactive, and consequently, their personal commitment should be different, and it should be finally transformed.

### ***Local territory and communities***

Regarding the impact on the local territory and communities, three main opportunities were identified: the development of real and concrete projects, transdisciplinary networking and the creation of an innovators' community related to SDGs. For a generalist university such as the University of Torino, the creation of a

transdisciplinary innovator community among students, researchers and academic staff is a very crucial challenge. The project methodology revealed that focusing on the fields related to the SDGs and sustainable development in general, was a powerful catalyst for learning by future leaders and innovators. The SDGs act as an excellent challenge to stimulating cooperation and collaboration among students from STEM (science, technology, engineering and mathematics), SSH (social sciences and humanities) and arts disciplines.

Finally, some threats emerged, especially related to the achievability of the developed projects. For example, a few facilitators recognized that the broadness of the content of the SDGs could affect the students' ability to provide attainable projects. The SDGs may be too general, and they may be difficult to operationalize into innovative solutions. A second noteworthy threat was related to the feasibility and implementation of the presented projects. Even if the declared goal of the workshop was to enable participants to “develop a real and achievable project,” a few of the discussed solutions were far from being realistic for implementation.

In particular, the facilitators recognized some critical issues under a managerial perspective. Examples of such issues are technical feasibility, economic viability, intellectual property management and the risk of developing a sort of “SDG-washing” projects. For “SDG-washing” projects, they intend to develop a business idea that instead of matching the SDG, decouples it from the business perspective. For example, some students developed a communication strategy based on an SDG with the risk of creating a project that negatively impacts the same SDG, instead of producing a positive outcome. This is a case of using gamification to incentivize responsible consumer behavior for waste recycling, with the double-edged sword of incentivizing overconsumption of plastic bottles to gain credits, thanks to reverse machines. An intense debate emerged between facilitators on the critical and ethical issues of creating a conscious branding strategy for the SDGs.

## Conclusions

The applied input-output process was conceived to provide a uniform learning path for students to guide them from a basic understanding of the SDGs to the analysis of targets and the interlinkages among the SDGs. It was designed to give all participants a common language with shared meanings and some basic knowledge of the SDGs as well as necessary management tools.

Practitioners, researchers and teachers who want to replicate this case study's approach are free to substitute each module with an alternative one; also, other modules may be added or removed. The input-output learning flow could replace the entire process to improve some specific features and knowledge or to focus more on a precise local challenge.

The SWOT analysis highlighted how the applied teaching methodology is suitable for ESD principles and was able to create a transdisciplinary and experiential learning process. On the contrary, the necessity to develop newer and stronger approaches emerged in order to improve the ESD Leadership Training methodology.

Further in-depth investigations are needed to reveal how to implement SDG #17 “building partnerships” between academia and local stakeholders. A critical issue remains in the follow-up stage of the workshop, that without a regular budget the learners might lose interest.

Finally, the allocation of adequate time is essential for conquering a complete learning process in order to avoid trivial content and to adequately set up a common transdisciplinary language. Designing a fully integrated, transdisciplinary learning path for sustainable development into a bachelor’s or master’s degree program could overcome this weakness.

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