The Italian Path toward SDGs Implementation: a First Mapping Exercise

Article

The Italian Path toward SDGs Implementation: a First Mapping Exercise

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Abstract: Unlike other SDGs, the SDG4 about quality education is not a goal in itself, but rather a tool to achieve different goals. Universities in this respect play a crucial role in the short-term implementation of SDGs for education, including new approaches and contents. Current academic debates explore the best practices via deductive-theoretical or inductive-experiential methods, yet not always considering the geographical, and therefore cultural and infrastructural factors affecting the success and the failure of such practices. In this paper, we systematize the implementation of SDGs in Italian universities from 2016 to 2019. Eighteen experiences have been collected after a national call by the Italian Network of Sustainable Universities (RUS) aimed at mapping the current landscape of SDG related actions. Results have been analyzed according to two criteria: 1- the educational "container" where the SDGs implementation takes place (from random workshops to dedicated courses); 2- the different organizational scales (from the foundation of a new department to the campaigns by local green teams). With this paper, we do not propose a total refunding or "deus-ex-machina" solutions, disregarding the local factors and the local resources in Italian universities. On the contrary, we draw a map to propose the reuse of an existing structure with adjustments, retrofitting and renewal actions towards holistic and coordinated sustainability efforts. Results show that, within the Italian context, SDGs implementation is still primarily understood as a strategic element for branding and promoting the green image of the Athenaeum. Secondarily, it is seen whether as a separate discipline to be inserted into existing curricula and original teachings or as a conceptual tool for remedying specific societal challenges through random workshops or fieldworks. Conclusions highlight the value of this first Country-wide systematization of the Italian Higher Education Institutions toward SDGs implementation. This exercise avoids individual experiences remaining isolated and self-concluded, and, most importantly, provides comparability and transferability criteria to help similar cases. Further works envisage the recognition of same elements in the broader European traditions, as well as the enhancement of stimuli for a personal and societal transformation generated by the partnership of all those people and institutions engaged in the exciting yet urgent defy of today's societal challenges.

Keywords: Societal Challenges; mission-oriented; sustainability education; higher education institutions; partnership for the goals.

1. Introduction

1.1 SDGs and Higher Education Institutions

While the 2030 Agenda represents an excellent opportunity for the change demanded by the entire society, the target 4.7 is specifically related to Education for Sustainable Development (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-

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violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development"[1].

During the last decade, there has been an increase in Sustainable Development (SD) integration into Higher Education Institutions (HEIs) [2,3] where European HEIs have been leaders in this process [4–6], integrating SD into curricula, operational and research strategies. Such actions have been recognised to be instrumental in providing students with sustainability skills [7] and give the companies graduates who are sustainability literate [8].

In the same stream, many other authors are questioning the traditional paradigms. Gasca-Pliego et al. [9], demand professionals with a sense of social responsibility that questions economic rationality, competition without limit, and exacerbated self-interest, instead of promoting values such as solidarity, cooperation, equality, and mutual respect. Eisler et al. [10] propose that universities should become places for the transformation of people and society, enabling young people to acquire the competencies that citizens need to live sustainably, at personal, professional, and community level.

The SDGs framework may help to act in an integrated optic, proceeding with coordinated actions on two tracks: one, implementing sustainability education, stressing the potential it has to orientate the civic sense; the other, for practising what it is preached in the classrooms, profiting of the transition moment of students enrolling or new staff hiring, experiencing concrete sustainable practices taking place in the daily campus operations [11,12].

1.2 Education for SDGs

On the educational side, the Network of the Sustainable Development Solutions Network (SDSN) Australia/Pacific (SDSN, 2018), highlights six different ways in which universities can embed SDGs:

- **Including** SDGs into all undergraduate and graduate courses, as well as graduate research training;
- **Delivering training** on SDGs to all curriculum developers, course coordinators and professors;
- Offering **executive education** and capacity building courses for external stakeholders based on SDGs;
- Defending the implementation of national and public **education policies** that support education for SDGs;
- **Involving students** in the co-creation of learning environments that sustain learning on SDGs;
- Developing courses directed to **real-world collaborative projects** for change.

A world-wide survey analysing 167 answers has been performed by Filho et al. [14] to collect data on the SDGs and Sustainability Teaching at universities mapping on the SDNS categories. Most of the respondents said to have some knowledge about the SDGs, and agree with their integration at higher education institutions beyond institutional commitment or teaching. However, the main issue is the concrete and practical integration of the SDGs, since the results from the survey showed much lower levels of application. Some respondents were using the SDGs as key course content, others as a topic addressed in the broader curriculum, others as part of assessment but application overall is patchy, despite the opportunity for the SDGs to be used to drive further momentum concerning education for sustainable development.

The research by Lozano et al. [15] provides a holistic analysis on how HEIs have engaged in efforts to embed better environmental and SD issues into their system (including institutional framework, education, research, campus operations, outreach and collaboration, on-campus life experiences, and assessment and reporting). A survey answered by 87 respondents from 70 HEIs worldwide reveals that many HEIs have engaged in, and are continuing to participate in, sustainability efforts. However, this research also confirms that, in general, the implementation of SD in HEIs has been compartmentalised and not holistically integrated throughout the institutions. The results indicate that there is a strong relation between SD commitment, implementation, and signing of international declarations but that further research is needed to investigate longitudinal differences

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in the commitment to and implementation of SD and to explore the differences between the lagging and leading HEIs.

To this extent, the papers by Mulder et al. [16,17] crucially analyses the process of changing engineering universities towards SD outlining the types of changes needed, both in respect of approaches, visions, philosophies and cultural change. In its first decade of the XXI century, one could say that the ideas to embed sustainability in engineering education were somewhat naive: developing an add-on course, teaching the other teachers about SD and creating options to become SD specialists are just the first steps, but "instead of adding SD to an unsustainable curriculum, we should rebuild curricula by taking the contribution of a field of expertise to SD as the leading principle for curricula".

1.3 Italian Universities and SDGs

The recent creation of the "Italian Network for Sustainable Universities" (RUS)[1], recognised by the Conference of Italian University Rectors (CRUI) in July 2015, is a symptom of a national awakening on the theme of SDGs, intending to coordinate the actions of all campuses willing to shift the business as usual toward a sustainable future like most of the top tip European and worldwide universities.

At the time of this paper (July 2019), RUS counts 68 Italian universities (74% of all the Italian universities), and it is continuously growing. It has a "Coordination Committee" made by 11 people representing 11 universities. RUS is articulated into six working groups on different topics: Climate Change, Education, Energy, Food, Mobility, Waste. RUS collaborates with other sustainability-related national associations as AIESEC[2] (students' association) moreover, ASviS[3] (Italian Alliance for Sustainable Development).

The paper unfolds as follows: after an introduction on the SDGs framework and the sustainability concept' shift toward a holistic pattern (par. 1.1), we observe (par 1.2) how HEIs are nowadays playing a different societal role, embedding SD in their practical and structured orientation. The methodology (par.2) used in this work leverages on the hermeneutics and grounded theory approaches to analyse the results of 18 experiences of SD implementation in Italian Universities. We filter and read these reported experiences (par.3) according to the educational "container" where the SDGs implementation takes place and to the different organizational scales where it happens. Par.4 presents the results of a first mapping exercise of current SD implementation strategies in Italian HEIs, highlighting the various drivers and challenges between the Italian RUS members. Conclusions (par.5) offer the opportunity to underpin scalable and transferable features of individual projects tested successfully in a small context, eventually laying the foundation for the development of a transdisciplinary educational dimension of university programs towards SDGs embedding.

2. Methods

2.1 Hermeneutics and Grounded Theory

Two methods were used to analyse the degree and the loci of SD embeddedness in Italian HEIs: hermeneutics and grounded theory. The analyses performed for this paper were done via an iterative process, reflecting on the authors' understandings and interpretations of sustainability pedagogical approaches and infrastructural settings.

Hermeneutics is a method that is aimed at analysing, through interpretation, written texts [18–20]. Hermeneutical explorations have the possibility of developing valid interpretations by analysing understanding [21]. It should be noted that the analysis is bound to the experience of the interpreter [22]. An essential characteristic of hermeneutics is the paradox of the hermeneutic circle, wherein the whole has to be understood from its elements and their connections with each other, yet it presupposes that to understand the individual elements the whole has to be understood [23,24].

[1] https://sites.google.com/unive.it/rus/home

[2] https://aiesec.org/

[3] http://asvis.it/

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Grounded Theory (GT) is a method that was developed to close the gap between theory and empirical research [25], the concerns over the predominance of quantitative methods in social sciences, and the tendency to test existing grand theories [26]. GT emphasises developing and building theory from data and observations [27,28]. GT helps the researcher detect if there are causal connections between variables and to generalise from a specific context [29]. We, therefore, used these two methods to set the initial framework for the analyses of (1) actions for SD embedding from literature reviews case studies and (2) the results of an open call for sustainability education best practices in Italian HEIs. The analyses were done on our interpretations of how different approaches and infrastructural settings are related to the level of SD implementation and how they can be scaled and moved into other similar contexts.

2.2 Call design and sample

Following its institutional aims, on the 10th of July 2017, the Italian Network of Sustainable Universities (RUS), organised the first national conference on "Education for sustainable development in Italian universities". The meeting was held at the Ca' Foscari University of Venice, and it was the first occasion to invite the 51 (in that moment) participating universities to present their best practices related to innovative teaching concerning sustainable development. The objective was twofold: on the one hand, to identify the different approaches and activities already existing on the national territory; on the other hand, to seize the many sensitivities and differences in the local contexts putting members in-network with similar cases. 18 University, out of 51, voluntarily answered to this open call.

Therefore, this paper is based on the comparative analysis used in the Grounded Theory (GT) method (par. 2.1), and it unfolds in four stages: (1) comparing incidents applicable to each category, i.e., classifying the data into meaningful categories that may be derived from the data, from the theoretical framework, or from the researchers' readings, life experiences, research, and scholarship [15]; (2) integrating categories and their properties; (3) recognising the relationships between the categories and, if needed, developing new ones for the Italian context; and (4) writing the new or modified hypothesis.

Categories by which data have been organised are:

1- general data from the University website (name, location, n. of students, type)

2- declared data from the call (the title of the experience, n. of students involved in the initiative, n. of faculties involved, start date, end date, goals, funding)

3- interpreted data from the description of the case study (loci of the initiative, type of approach, urban outreach, SDGs involved, driver, mission) (see table 1).

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Table 1- Categories by which data from the first national call on "Education for sustainable development in Italian universities" have been organized.

Category	Meaning
Approach	The pedagogical method applied in the observed case study. i.e., frontal lecture, experiential learning, problem-project based learning, etc..
Urban Outreach	The stakeholders involved in the educational experience, i.e., NGOs, city councils, social welfare associations, etc..
SDGs	The SDGs embedded and touched by that educational practice, even when not elicited. For instance, a leadership training education course aims at a quality of education for all (SDG4) and targets stakeholders of industries and decision-makers in order to take action in the responsible production and consumption patterns, with developed countries taking the lead (SDG12).
Level	Loci of the initiative in the educational management structure in which the educational activity happens. It could be a spot and not a repeated action; it may be a university course explicitly dedicated to sustainable matters, or a program (an entire sequence of classes), or a whole university unit (a department, a green team, UNESCO chair, etc.), or a virtual place where the educational activities are conducted along a network of researchers or practitioners.
Driver	The direction of the process for initiating and developing the educational activity: it could be top-down when decided from the leadership or the university authorities, or bottom-up, when born among students associations or spontaneous university staff gathering towards a sustainability goal.
Mission	The type of task (research, teaching, and service) the case study could belong to. For instance, student's engagement activities on energy conservation projects fall into the research and teaching mission, while the inclusion of citizens in a waste-collection programme around the neighbourhood recap the third mission.

3. Results

We present here the results of a reporting initiative among the Education Working Group (EWG) of the Italian Network of Sustainable Campuses (RUS), in its first year of activity, i.e. 2018. EWG focuses on the various approaches to education for sustainable development, highlighting good practices and proposing new ways to ensure that all university students know about the 2030 Agenda and the principles of sustainable development.

EWG activities so far have focused on the development of the following:

- A "Lesson-Zero" for basic sustainability literacy
- Higher Education Sustainability Courses (Doctorates, Summer School, Business School, Master).
- Training for teaching and administrative staff
- Non-curricular / informal activities for students, with particular focus on the experiential dimension
- Partial mapping of on-going initiatives

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According to the EWG coordinator, further activities will look at:

- complete mapping of Sustainability Education Practices in Italian universities;
- development of recommendations based on good practices and on-going activities at the international level
- collaborating with a ministerial working group at MIUR (the Italian Ministry of University and Research) downstream of the drafting of the "Plan for Sustainability Education" with actions in the four macro-areas wind: School, University, Research and Proceedings for establishing Doctoral Scholarships on the topics of the Sustainability, incentives for girls enrolled in

scientific and technological courses), scholarships for international mobility, train schools' managers by university lecturers experts in

sustainability subjects.

We now present the results of the analysis of 18 case studies self-selected after a "call for best practice in Sustainability Education" in 2017 across all RUS members, as explained in section 2 and table 2. We filtered and described the reported activities according to declared goals and approaches so that we can read the elements of university governance, curricula, contents and methods toward further integration of sustainability aspects.

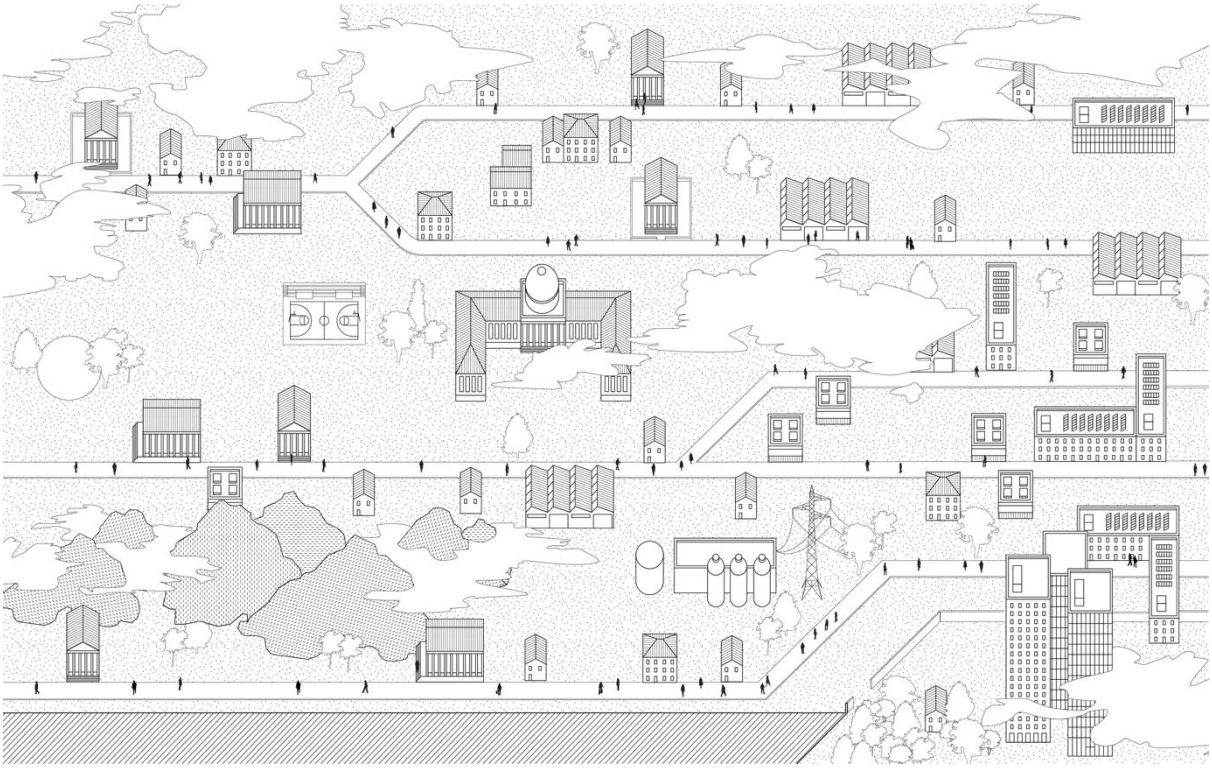

Figure 1 -The map of the current Italian Universities structure

The elements of the map we draw to describe the current Italian Universities structure are the following:

A. the temples: the theoretical foundation of discipline, available to all students (E.g., Physics, Mathematics, History of Architecture, etc.)
B. the temples with fences: the theoretical foundation of discipline, but specifically dedicated to a certain degree (Fluid Dynamic, Compositional principles, Anatomy, etc.)

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C. the houses: a theoretical course inside one or more degree courses (technical physics, structural engineering, interior design, etc.)
D. the factory: a laboratory for experiential learning (wind tunnel, chemistry experiments, architectural model crafting, etc.)
E. the atelier: a course in which the project is the central part (architectural design, electric circuit design, model design) etc.)
F. the building block: the research experience inside a degree course (thesis project, essays, special seminars)
G. the playfield: the limited learning experience around a specific topic (summer school, student challenges, hackathons, etc.)
H. the tends: temporary learning experiences (bottom-up initiatives by students, teamwork around a societal challenge, etc.)
I. the suburbs: outside learning experience from different stakeholders (a stage in companies, in public administrations, in NGOs, etc.).

Given this current map, we understood that sustainability education in Italian Universities is happening and could happen basically in 11 ways. The result is another map (fig.2) drawn partly from the 6 SDSN Australia/Pacific (2017) sustainability education actions highlights (par. 1.2) and adjusted to the Italian sample after the analysis of tab 2.

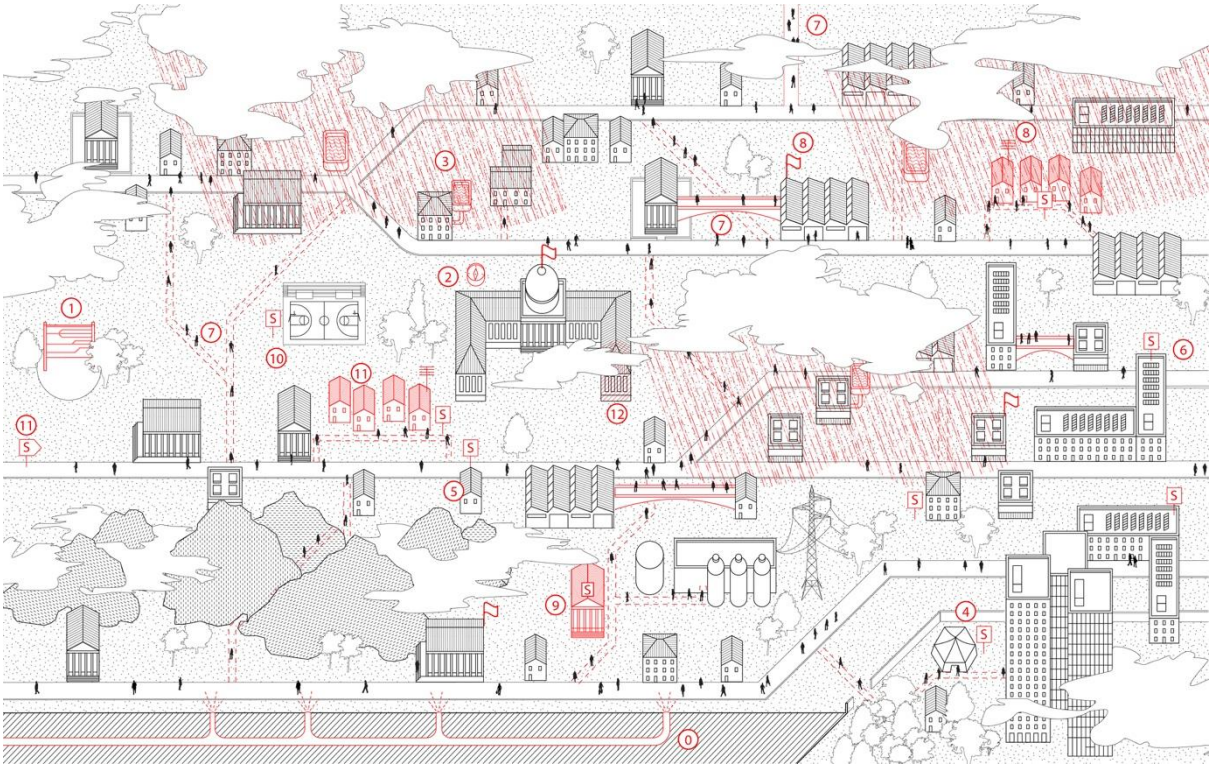

Figure 2 – The map of a potential university structure holding together sustainability education actions and their interaction within the entire system.

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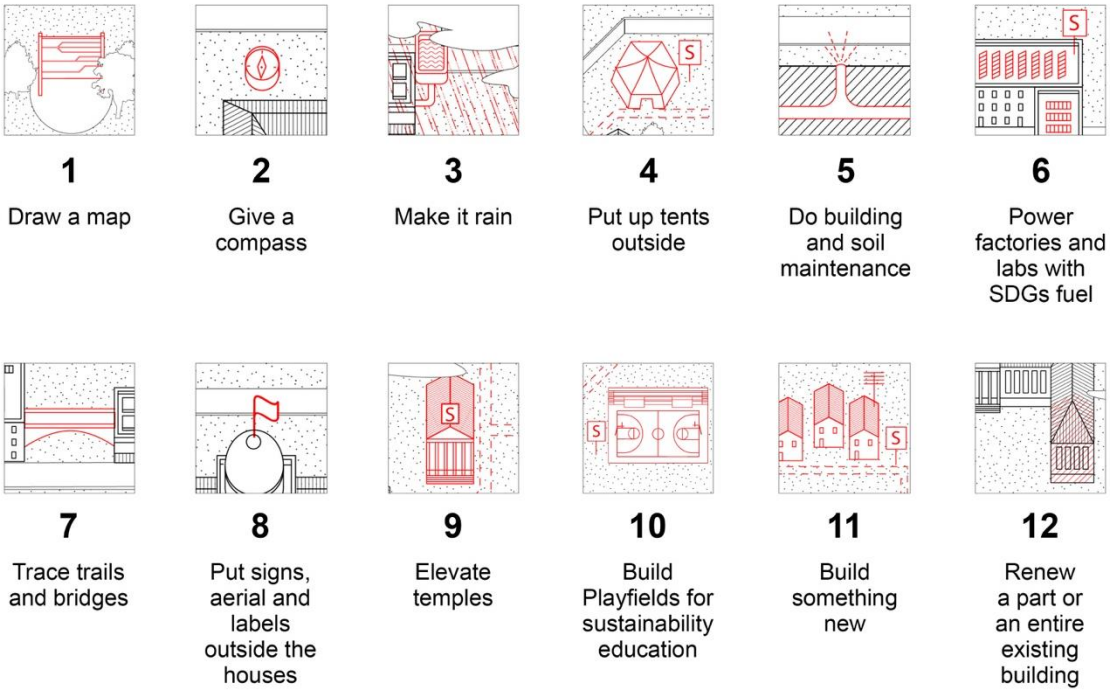

Figure 3 The 'decalogo' of action for restructuring the current Italian University System via the SDGs implementation

Fig.2 is indeed a proper map of a potential university structure holding together sustainability actions and their interaction within the entire system, with the criteria described in table 1 and showing the cases in table 2.

We choose to represent through the "map" metaphor the sustainability education practices in the 18 Italian Universities; we came out with the following *decalogo* for sustainability implementation in the current system:

1- Draw a map: Give a template to each governing body on how to map their current sustainability implementations, ensuring everyone on campus knows what the institutional goals are and why they are essential to them. According to our data set, Bologna University released its first SDGs mapping report in 2018 to have a clue of SDGs implementation in its educational, research and third mission offers. Politecnico di Milano promoted the "Polimi for SGDs" initiative in 2017. The Politecnico di Milano is proceeding with the mapping of its internal competencies about the 17 Sustainable Development Goals. The objective is to gather information on how and where the University is responding to the challenge launched by the UN. The Politecnico di Torino, too, is proceeding on the SDGs mapping of its curricula and research products via a machine-learning algorithm and a human cross-check of results.

2- Give a compass: equip each course director with a possible SDG mapping toolbox, for embedding the SDGs logic in each curriculum. With the project about "sustainable campus", the only two Universities in Italy that declared this kind of action in the RUS call have been the Politecnico di Milano and the Politecnico di Torino. A particular project for SDGs awareness and a dedicated office (the Green Team) have been the strategies for orienteering the university authorities to address environmental and social challenges and building capacity and ownership of the SDGs.

The first two steps are preliminary to all the others since they allow to identify priorities, opportunities and gaps to integrate, implement and embed the SDGs in all of the following steps:

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3- Make it rain: embed SDGs-related questions into every class assignments, discussions, lectures, case studies, practice-based learning, etc.

No Italian examples can be retraced to this extent, while entire education institutions like the Schumacher college[4], the Windesheim honours college[5] alternatively, the ILO / UN training centres[6] In Europe are successfully carrying on for years radical practices on sustainability education, offering ecology-centred masters programmes and short courses. Some "rains" are happening in separate ways with seminars open to everybody enrolled at Universities like the Siena course on Sustainability Literacy.

4- Put up tents outside, open the doors: allow students to explore independently possible SDGs learning occasions through extension projects, and recognise those as European Credit Transfer and Accumulation System (ECTS) accounting for the final degree. Examples of this are found in the Neapolitan University "L'Orientale", where students enrolled in Erasmus Plus cooperation actions in the third world (Migrations and sustainable development), as part of their curriculum. Similarly, in the Politecnico di Milano, a postgraduate course is dedicated to "Coopera(c)tion: knowledge and skills for sustainable cities in the global south". The "Active Learning Lab - Urban Innovation" of the University of Venice, or the executive education course offered to managers and sustainability practitioners by the University of Turin, are examples of university places facing the city and injecting/inglobating expertise coming from outside.

5- Do building and soil maintenance: according to the existing values, goals and needs, work on the operational aspects of SDGs implementations. The creation of universities' green teams like in the ones in Turin, Milan, and Venice cases, demonstrate students the values of practical actions on the campus physical dimension of sustainability. Also, the several courses dedicated to sustainability "sides" of existing subjects, like in Politecnico di Milano, Politecnico di Torino, University of Bari, Parma, Siena and Turin, are relatively easy-to-implement actions to embed SDGs into curricula.

6- Power factories and labs with SDGs fuel: use SDGs to guide research priorities and impact evaluation, to foster the foundation of interdepartmental centres or research groups devoted to the achievements of societal challenges and related SDGs. This happened at Politecnico di Torino and Politecnico di Milano, as an efficient strategy to catalyse existing energies around emergent SD issues. Parma University created an entire department (of Chemical Life Sciences and Environmental Sustainability) under the direction of sustainability goals.

7- Trace trails and bridges: develop partnerships to advance the SDGs awareness, mutual reinforcement, implementation, synergic actions in two different ways. A path connects Universities' plants and facility management offices directly to students' courses or thesis projects. The University of Insubria project on student inclusion in the waste management feasibility plan or the Venice case of the tri-generation plant inside the campus saw students and professors involved in its construction and use. A similar path connects students' internships with living lab offices or green teams, like in the University of Bologna, Venice or Politecnico di Torino. International cooperation actions like the ones undertaken by the University of Turin and the Politecnico di Milano are examples of roads heading outside the map, and that build a precious connection to the real-world educational field, recalling the Reggio Emilia model of the "fourth teacher" (see item n.10 in fig. 3).

[4] https://www.schumachercollege.org.uk/

[5] https://www.windesheim.com/study-programmes/bachelor-degrees/global-project-and-change-management

[6] https://www.itcilo.org/en

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8- Put signs, aerial and labels outside the houses: report on efforts and impacts in relation to SDGs, celebrate success, foster grass-roots initiatives and competitions around SDGs implementation. This can be done methodically at the individual, classroom, teacher, course, curriculum, governance and institutional level, to communicate decision processes, strategic choices, little and significant improvements above all at operational and building levels. MOOCs as the one by the University of Siena or the Politecnico di Milano about SDGs literacy is a precious aerial to disseminate sustainability action also outside the map borders.

9- Elevate temples into existing neighbourhoods: Unesco Chairs for Sustainable Development are based in 20 Italian universities, aiming to promote sustainability direction to different education and research fields (among others: energy, cultural heritage, urban culture, etc.).

10- "All work and no play makes Jack a dull boy": playfields are the main places where sustainability education seeds may be planted. Learners and change-makers must be able to experience and cultivate generative social fields. The Reggio Emilia approach is known for seeing the place as the third teacher (with the learner and the educator being the first two). Building on that foundation, the cultivation of generative social fields, of relationships among learners, educators, parents, community members, and nature, is a powerful gateway to the deeper sources of knowing ("the fourth teacher"). A great university is, first and foremost, a generative social field. The metaphor of the seeds and a fertile field is here essential to stress an aspect of sustainability pedagogy that may detach it from the other kinds of methods: sustainability awareness may happen like a "eureka" moment far away in time and space from the "learning" experience. Our role as educators is to cultivate and protect the field, allowing the condition for a flourishing new University, where the challenges of the world, and societal transformation, are the curriculum.

Existing playfields in the Italian University cases are the Summer Schools like the on sustainable development held in Siena and organised by ASviS in collaboration with the University of Siena - Santa Chiara Lab, Enel Foundation, Leonardo, Italian Network of Universities for the Sustainable Development (RUS), Sustainable Development Solutions Network Italia, Sustainable Development Solutions - Mediterranean Network. The teachings have concerned, among other things, sectoral policies (Public sector, institutions, networks international organizations), science and innovation (Agriculture, New materials, Architects-engineering and engineering), development of the private king (B-corp, sustainable finance, new business models).

Also, the Neapolitan “Open Doors Summer School on MIgration Sea Borders Control and Human Rights (CeMiRiMed)", or the Parma, Torino and Bologna working groups on Sustainability awareness actions, are good examples of sustainability playgrounds.

11 - Build something new: new houses on sustainability individual tracks can be honours programmes, like the ASP (High Polytechnic School) course, made in a joint venture with Politecnico di Torino and Politecnico di Milano, dedicating two years of extra classes on engineering for sustainable development. Other buildings are simply connecting existing and new houses, giving a direction towards sustainability education, like in the Perugia University's course on the circular design.

12- Renew a part/an entire existing public building: the creation of dedicated unit inside the university organizations, like the green teams, assure the institutional visibility of sustainability intentions, both constituting a reference point for students and researchers engaged in SDGs, and for external stakeholders willing to collaborate with academia on sustainability topics.

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Table 2 – The results of the analysis of 18 case studies self-selected after a "call for best practice in Sustainability Education" in 2017 across all RUS members.

Aeteneum					Declared Data			DeductedData							
Name	Location	Region	N. students	Type	Title	EU funding integration	Goals	Level	Approach	Urban Outreach	SDGs	Driver	Mission	On the map	Legend
Università di Bologna	Bologna	NORD	84.720	SSH + STEM	UniBo Green Office	Yes	Students' engagement; network among universities; network among urban stakeholders; Job Market Skills	University unit	Experiantial	City Council	11; 17; 4; 13; 12; 6; 8	Bottom-Up	3rd mission	Part of the central building	12
Politecnico di Milano	Milan	NORD	45.000	STEM	PolimiSDGs	No	Mapping of SDGs related activities; Data collection about Education al Activities referred to Agenda 2030 goals	University unit	/	/	/	Top-Down	3rd mission	Drawing of the map, give a compass	1; 2
Politecnico di Milano	Milan	NORD	45.000	STEM	4 MSc programs	No	Theoretical Framework of environmental engineering, Env. sustainability; Energy for developement and sustainable architechure	Program	Problem/Project-Based; Lectures	/	7;9	Top-Down	Teaching	Houses along the path	5;11
Politecnico di Milano	Milan	NORD	45.000	STEM	Postgraduate courses	No	Theoretical Framework; specialization on specific topics (Energy, Buildings, infrastructures, temporary reuse, renewal energies)	Program	Problem/Project-Based; Lectures	/	7; 11; 9	Top-Down	Teaching	Houses along the path	5;11
Politecnico di Milano	Milan	NORD	45.000	STEM	Honorous Path: engineering for sustainable development	No	Specialization on engineering for sustainable development	Course	Problem/Project-Based; Lectures	/	7; 9	Top-Down	Teaching	New village nearby the main road	11
Politecnico di Milano	Milan	NORD	45.000	STEM	Unesco chair: Energy for sustainable development	Yes [UN]	Specialization on energy for sustainable development	University unit	Problem/Project-Based; Lectures	/	11; 7; 13; 16; 4	Top-Down	Teaching; Research	Temples	9
Politecnico di Milano	Milan	NORD	45.000	STEM	Postgraduate: Cooperal(c)tion: knowledge and skills for sustainable cities in the global South	Yes	Social Impact; Soft Skills; Sustainability awareness	Program	Problem/Project-Based; Lectures	/	10; 4	Top-Down	Teaching; 3rd Mission	Tents in the Wood	4
Politecnico di Milano	Milan	NORD	45.000	STEM	2 EU Pr: LeNSin + SUSTAIN T	Yes	Network among universities; Improve internationalization; Intercultural cross fertilization, Accessibility of higher education on design for sustainability	Network	Experiential; Challenge-based;	NGOs; Local Health Offices; Social Welfare Associations	4,5;16,8;10	Top-Down	Teaching	Roads heading outside the map	7
Politecnico di Milano	Milan	NORD	45.000	STEM	2 MOOCS on sustainability	No	Specialization on sustainable building design; Social entrepreneurship	Course	Online Lectures	/	4; 11; 7; 5	Experiantial	Teaching	Aerial on the roofs	8
Politecnico di Torino	Turin	NORD	31.500	STEM	2 MSc program: Systemic design + Sustainable architecture	No	Specialization in sustainable architecture; sistemic Design.	Program	Problem/Project-Based; Lectures	/	7;9;11	Top-Down	Teaching	Houses along the path	5;11
Politecnico di Torino	Turin	NORD	31.500	STEM	Green Team	No	Resources optimization; integrated environmental education; Partic(ipatio) in university governance; develop strategies fors disseminating environmental responsiveness and sustainability culture	University unit	Olistic	Local experts, Municipal Council; NGOs; Social Welfare Associations	11; 17; 4; 13; 12; 6; 8	Experiantial	Operational aspects; 3rd mission	Public facility / Public building / Rain collector tanks	3
Politecnico di Torino	Turin	NORD	31.500	STEM	Honorous Path: Young Talent Program (16 CFU)	No	System thinking; complexity awareness; Social Impact; local Solution; Soft Skills	Course	Challenge-based; Problem/Project-Based; Experiential; transdisciplinarity	Local Experts; Social Welfare associations, business	11; 7; 4; 7; 9; 10;12; 13	Top-Down	Teaching	New village nearby the main road	11
Politecnico di Torino	Turin	NORD	31.500	STEM	SDGs mapping	No	Mapping of SDGs related activities; Data collection about Education al Activities referred to Agenda 2030 goals	University unit	/	/	/	Top-Down	3rd mission	Drawing of the map, give a compass	1; 2
Università Ca' Foscari	Venice	NORD	21.529	SSH	Active Learning Lab - Urban Innovation (6 CFU)	No	Network among urban stakeholders; Knowledge transfer; Innovation Hub; Job Market Skills; Social Impact	Course	Lectures	Business; City Council; NGOs	8; 4; 1; 11; 12; 17	Top-Down	Teaching; 3rd Mission	Houses along the path	5
Università dell'insubria	Varese	NORD	10.000	SSH	Waste Management Feasibility Project	No	Waste management; environmental awareness	University unit	Experiantial	/	12	Top-Down	Operational aspects	Paths among plants and electrical systems	7
Università di Bari	Bari	SUD	48.000	SSH	Environmental sustainability (8 CFU)	No	Social Impact; Soft Skills; System thinking	Course	Challenge-based; Problem/Project-Based; Experiential	/	4; 12; 17; 13	Top-Down	Teaching	Houses along the path	5
Università di Napoli "L'Orientale"	Naples	SUD	11.685	SSH	Project within "Ethics and Market" course	No	Community needs assesment; local set of solution; sustainability awareness	Spot initiative	Problem/Project-Based; Experiential	/	3;4;10;11; 12	Top-Down	Teaching; Operational aspects	Rain collector tank	3
Università di Napoli "l'Orientale"	Naples	SUD	11.685	SSH	Migrations and sustainable developement	No	Social Impact; Soft Skills; Sustainability awareness; Improve internationalization; Intercultural cross fertilization; Accessibility of higher education	Spot initiative	Challenge-based; Experiential	NGOs; Local Health Offices; Social Welfare Associations	10; 4	Top-Down	Teaching; 3rd Mission	Tents in the wood	4
Università di Napoli "l'Orientale"	Naples	SUD	11.685	SSH	Open Doors Summer School on Migration Sea Borders Control and Human Rights (CeMiRiMed)	Yes	Network among universities; Policies; Knowledge transfer; System thinking	Spot initiative	Challenge-based	NGOs (local and international);	4,5;16,8;10	Top-Down	Teaching; 3rd Mission	Playfields	10
Università di Parma	Parma	NORD	22.500	SSH + STEM	Italian Center for Environmetal Research and Education	/	Transdisciplinary research and education	University unit	Lectures	Schools	4;17	Top-Down	Teaching; Research	Lab buildings overlooking the city	6
Università di Parma	Parma	NORD	22.500	SSH + STEM	Department of Chemical Life Sciences and Environmental Sustainability	/	Transdisciplinary research and education	University unit	Lectures	Business	4;17;12	Top-Down	Teaching; Research	Factories (for research) and/or streets connecting houses (for education)	6
Università di Parma	Parma	NORD	22.500	SSH + STEM	BSc Food System: Sustainability Management and Technology	/	Social Impact; System thinking	Program	Lectures; Experiential	Business	4;17;12;1	Top-Down	Teaching	Houses along the path	5;11
Università di Parma	Parma	NORD	22.500	SSH + STEM	Sustainability in University Teaching Programmes	No	Sustainability Education; SSH integration; network among urban stakeholders	Spot initiative	Interdisciplinarity; staff, professor and student engagement	Local experts	17; 16	Top-Down	Teaching	Rain collector tank	3
Università di Perugia	Perugia	CENTER	23.877	SSH + STEM	MSc in Circular design	No	System thinking; sustainability education; complexity awareness; job market skills orientation	Program	Interdisciplinarity; problem/project based courses; local stakeholder engagement	Business	8;9;12	Top-Down	Teaching; Technological Transfer	Houses along the path	5;11
Università di Siena	Siena	CENTER	16.400	SSH + STEM	Sustainability open course (6 CFU)	No	Sustainability Theoretical Framework; external stakeholders engagement;	Course	Lecture	Local experts	4	Top-Down	Teaching	Aerial on the roofs	8
Università di Siena	Siena	CENTER	16.400	SSH + STEM	Summer school for Sustainable Development	/	Sustainability Theoretical Framework; external stakeholders engagement;	Spot initiative	Interdisciplinarity; problem/project based courses; local stakeholder engagement	Local experts, Municipal Council; NGOs; Social Welfare Associations; business	4;17	Top-Down	Teaching	Playfileds	10
Università di Torino	Turin	NORD	70.500	SSH	Unito Go	/	Students' engagement; network among universities; network among urban stakeholders; Job Market Skills	University unit	Experiantial	City Council	11; 17; 4; 13; 12; 6; 8	Bottom-Up	3rd mission	Part of the central building	12
Università di Torino	Turin	NORD	70.500	SSH	Leadership Training for Education for Sustainable Developemnt	No	Sustainability Theoretical Framework; Soft Skills; local set of solution;	Spot initiative	Problem/project based courses; multidisciplinarity	/	12; 4	Top-Down	Teaching; Operational aspects	Houses along the path	5
Università di Torino	Turin	NORD	70.500	SSH	Postraduate program in Socio-environmental sustainability of Agro-food network	No	Job Market Skills; Sustainability Theoretical Framework; Complexity awareness	Program	Problem/project based courses; multidisciplinarity	Local experts, Municipal Council; NGOs; Social Welfare Associations	4; 2; 12; 15; 17	Top-Down	Teaching	Houses along the path	5
Università di Torino	Turin	NORD	70.500	SSH	Unito for International Cooperation	Yes (?)	Social Impact; Network; Sustainability awareness; Complexity Awareness	University unit	Experiential; Problem/project based courses; multidisciplinarity	NGOs; Local experts; Municipal Council; Businesses;	1; 4; 5; 6; 10; 11; 12; 13; 14; 15; 16; 17	Top-Down	Teaching; 3rd Mission	Roads heading outside	7
Università IUAV	Venice	NORD	4.600	ARTS	No Title - TRigenesation powerplant and organizazion of visits for students	No	Sustainable energy production; sstainability awareness	University unit	Dissemination	Business	7	Top-Down	Operational aspects	Paths among plants and electrical systems	7

4. Discussion

The map we presented tried to depict the degree of the shift toward the global and societal challenges within those Italian Universities self-labelling as sustainable.

Results clearly show the predominance of scattered and individual actions, like single sustainability courses or spot initiatives by individual professors, staff or students moved by an "inner call" toward sustainability issues. The following charts describe at glance the university's profiles of the sample analyzed in the paper (*Figure 4*) and the main objectives and approaches characterizing the loci of the initiatives (*Figure 5*).

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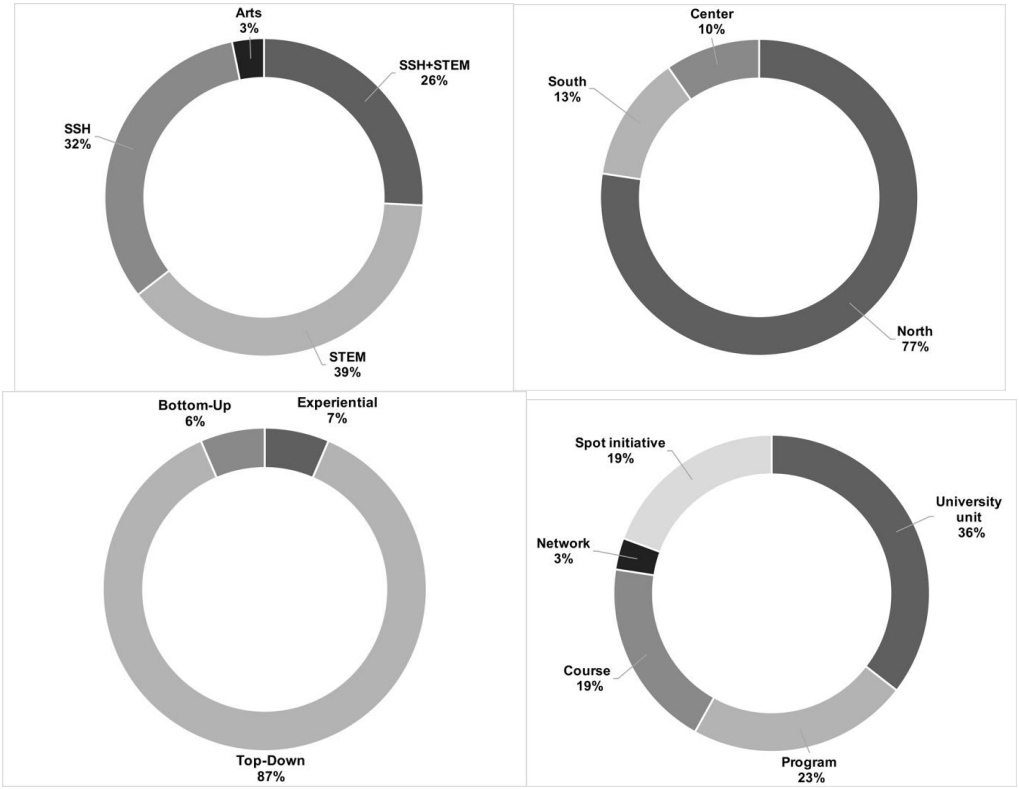

Figure 4: the four charts show the types of Universities analyzed in our sample. Top-left: Social Science and Humanities (SSH) focused, Arts, Science, Technology, Engineering and Mathematics (STEM) and SSH+STEM; Top-right: Italian Geographical distributions; Bottom-left: type of driver for the presented SDGs strategy; Bottom-right: Level at which the initiative took place.

However, in the case of the two polytechnic universities of Turin and Milan, the two preliminary actions of the list in par.3, i.e. 1) draw a map and 2) give a compass to guide further voluntary actions toward SDGs implementation are signals of raising awareness of a renewed role of University in the XXI century. Our map is atypic, looking at the lack of levels of hierarchies, meaning that a holistic effort toward a systemic sustainability shift is far away from its beginning. Nevertheless, the educational working group of the RUS is collaborating with the Italian Ministry for setting the ground infrastructure (level 0 in the map) for cultivating the ground and maybe mandatory actions for fertilising and sprout more and more sustainable seeds, and hopefully, make it rain.

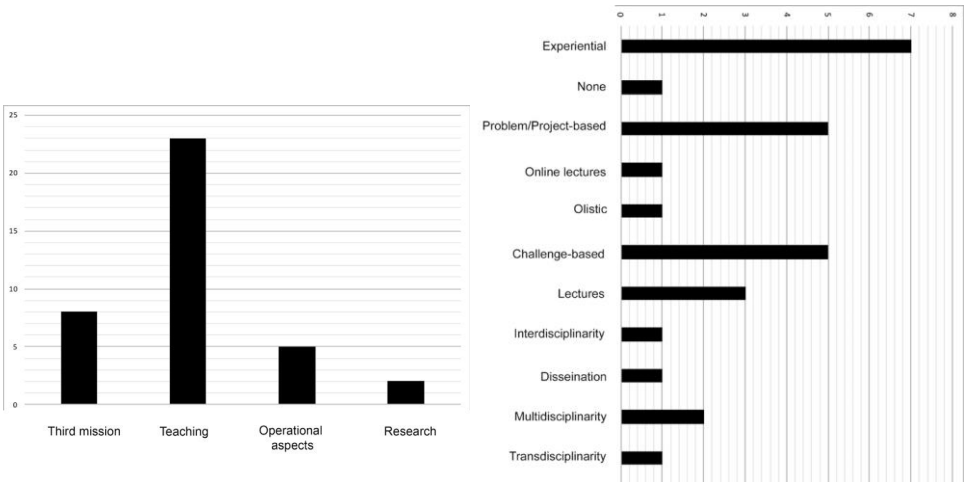

Figure 5 Objectives (left) and approaches (right) as emerged in the analysis of the 18 Universities of the sample.

 doi:10.20944/preprints202001.0355.v1

Results of the call for best practices, although gathering just 18 out of 51 cases, may give some insights referred to a set of aggregated data from the annual RUS survey of 2017. When asked about the presence of a sustainability reminder in the University Statute, just the 29.27% answered affirmatively. A Rector's delegate on sustainability issues is present in the 68.29% of the case, while an organizational unit dedicated to sustainability in the University is found in the 39.02% of the answers. These aggregated data confirm the lack of a national homogeneous and collective strategy for SDGs' embedding in University curricula.

5. Conclusions

Universities play a crucial role in the short-term implementation of SDGs for educating with new ways and contents the leaders of tomorrow. In this paper, we systematize the implementation of SDGs in Italian universities during the last three years, from 2016 to 2019. Eighteen experiences have been collected after a national call by the RUS (the Italian Network of Sustainable Universities) aimed at mapping the current landscape of SDG related actions. Results have been analyzed according to the educational "container" where the SDGs implementation takes place (from random workshops to dedicated courses) and to the different organizational scales (from the foundation of a new department to the campaigns of local green teams), as well as to the kind of issues to be tackled and reported impacts. Within the Italian context, SDGs implementation it is still primarily understood as a strategic element for branding and promoting the green image of the Athenaeum. Secondarily, it is seen whether as a separate discipline to be inserted into existing curricula and original teachings or as a conceptual tool for remedying specific societal challenges through random workshops or fieldworks.

If we consider SD a societal learning process [30], universities should be at the forefront of this, given that universities are supposed to be learning-centred organisations. However, universities should unlearn to be learning organisations themselves and be able to transcend the rigid disciplinary fences. This sounds like a pure utopia, but the "Fridays for Futures" movements are telling to current education institutions that an emerging future is at the door, and that a new global university and school is in the making. That new school is characterized by "institutional inversion", where learners leave the classroom and engage with the significant hotspots of societal innovation in their cities, regions, and ecosystems. Current actions in Italian Universities are, unfortunately, still filling of a vessel, rather than kindling of a flame. Those words of Plutarch about the educational mission are as valid today as they were two thousand years ago. Still, the misconception of education as a vessel-filling activity remains. If the kindling of the flame is the ultimate core of all profound learning, unfortunately, we still tend to leave it to chance, in Italian Universities.

With this paper, however, we do not want to propose a total refunding or "deus-ex-machina" solutions disregarding the local factors and the local resources in Italian universities. On the contrary, we draw a map to propose the reuse of an existing structure with adjustments, retrofitting actions and renewal towards holistic and coordinated sustainability efforts.

The map is the first Country-wide systematization of the Italian Higher Education Institutions toward SDGs implementation, to avoid individual experiences remaining isolated and self-concluded, and most importantly to provide comparability and transferability criteria to help similar cases be networked both within similar governance levels and within methodological practices.

Further works envisage the recognition of same elements in the broader European traditions, as well as the enhancement of stimuli for a personal and societal transformation generated by the partnership of all those people and institutions engaged in the exciting yet urgent defy of today's societal challenges.

Acknowledgments: This research was supported by TrUST - Transdisciplinarity for Urban Sustainability Transition. TrUST is a research project that aims at better understanding how to achieve more efficient and effective inter/trans-disciplinary research and education for urban sustainability transitions. It has been funded

by the Interuniversity Department of Regional & Urban Studies and Planning, Politecnico di Torino and Università di Torino, Viale Mattioli, 39, 10125 Turin.

Author Contributions: The paper structure, contents framing, theoretical introduction and conclusions were put in place by GS, while CB and DC has been in charge of the data elaboration and visualization.

Conflicts of Interest: The authors declare no conflict of interest.

Abbreviations

The following abbreviations are used in this manuscript:
POLITO: Politecnico di Torino
HOKUDAI: Hokkaido University
CSA: Campus Sustainability Assessment
EE: Eco Efficiency
ISCN: International Sustainable Campus Network
PE: Primary Energy

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