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Teaching sustainability: cross-sectoral and holistic approaches

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Introduction. Five years ago, at the SDGs' inception, the stakes and optimism were high: world leaders thought that the simple adoption of almost perfect sustainable goals and actions would lead to successful national policies. However, as it always happens, the developmental realities appeared to be quite different. The article is aimed at showing some challenges facing education policies as a vital instrument in sustainable transformation.

Higher education institutions in the world have revealed extensive efforts in addressing the UN's sustainable development goals (SDGs) during last five years. A lot of changes have been made at the same time in both the programs and the structures of a new and challenging theme: "teaching sustainability", in spite of all the complex and extremely broad concepts involved. Hence, numerous education facilities in Europe and the world have been urgently integrating SDGs in the national education policies and universities' curricula in spite of some very complicated and challenging circumstances. The education institutions are still facing problems in making necessary changes while trying to embrace all the SDGs and corresponding political-economic-technology issues in practical implementation. During the last decade- until the SDG-2030 deadline- the education community, as well as the national governance, has to visualize a most successful path ahead.

The disruption caused by pandemic lockdowns affected day-to-day university work and research, but COVID-19's impact on all sectors of society has at the same time opened a "window of opportunities" for changes in research towards tackling societal challenges that require a longer perspective and an interdisciplinary approach.
The global sustainable agenda requires the states to take all necessary measures ("what it takes") to implement the UN sustainable development goals by 2030. Generally, these measures involve three spheres of national governance: social, environmental and economic; but none of them shall be effective without adequate reforms in existing national education and training policies.

Pressures have been mounting for changes in most far looking SDG-teaching sector, i.e. engineering education; besides, academic communities worldwide favour radical changes in existing traditional programs' pedagogy to deliver on SDGs with adequate changes across all engineering programs. The aim was to increase integration between disciplines and between the elements that students study as part of their degree programs. As a result, the integrated engineering programs are being launched to streamline SDG-project-based learning and integrated skills. Making widespread change in establishing research-and-learning intensive

universities is in the agenda within the European “universities-consortium” specializing in SDGs issues.

Teaching sustainability (TS): major challenges. To be effective, the TS shall be included into countries’ several educational levels: schools, colleagues and higher education institutions. Teaching and training today’s youth means provide contemporary skills to tomorrow’s policy- and economy- decision makers, providing them with necessary basic and specific knowledge on SDGs components in modernized national structural policies. Hence, the attention to some teaching parameters are needed: e.g. the sustainability as a specific profession (i.e. transforming SDGs into modern curricular); the implications for a “new type of teachers” (as TS needs additional knowledge for the instructors); and the teaching process implying both cross-sectoral approaches and new digital means.
The following is a sketch of some changes inflicted by the SDGs in education and teaching:

= The subject: The success of implementing SDGs depends, first of all, at the ability at states’ education policies to accommodate the SDGs and 169 targets within the existing educational processes. As a rule, the TS is partially divided among several education levels: schools, colleagues, higher education institutions (general and special). Teaching and training today’s youth means provide contemporary skills to tomorrow’s policy- and economy- decision makers, giving them necessary basic knowledge on modern technological revolution with a critical as well as system-thinking approach to complex socio-economic problems.
Both existing education institutions and teaching methods shall be re-assessed fundamentally: higher education institutions shall teach the necessary skills for a sustainable growth; the teaching methods shall be adapted to the needed general and professional skills to practically implementing SDGs, and governance bodies shall know the ways to transform existing socio-economic policies.
Mentioned challenges require specific approaches to subject of TS: it could be, for example courses on a) sustainable and circular economy; b) on sectoral SDGs (like e.g. clean energy and transport, responsible consumption and production, sustainable cities and communities; sustainable industry and infrastructure, etc.), and c) on so-called “quasi-SDGs” directions, like reduced inequality, zero-hunger and gender equality.
Long-term professional and vocational education/training shall be additionally available through people’s life span. All national middle- and high- education institutions shall provide valuable examples for teaching future decision-makers providing them with the necessary skills.

= The teachers: known as the most important resource in modern education processes, teachers can improve effectiveness, efficiency and equity of delivering knowledge; however, institutions have to ensure that very competent people want to work as teachers and that their teaching is of high quality. Suffice it to say that in most countries, teachers’ salaries and expenses represent the greatest share of expenditures on education.
Therefore “investment in teachers” is having significant returns: research shows that being taught by the best teachers can make a real difference in the learning systems and in the life’s outcomes compared to otherwise similar occasions.
According to global Teaching and Learning International Survey (TALIS), teachers are not “interchangeable workers” in a kind of industrial assembly line; individual teachers can change lives – and better teachers are crucial to improving the education that schools provide.
According to TALIS and PISA (Program for International Student Assessment), the “teacher-policy issues” in the states are dealing with: a) selecting, evaluate and compensating teachers; b) education system’s equity, and c) attracting and retaining talented people in teaching.
Academic professionals see the network “*Higher Education Sustainability Initiative, HESI*” as an important step in global cooperation around the “teaching SDGs” idea. The three educational

organisations representing the Anglo-Saxon, Francophone and international universities' association are seeking to consolidate higher education's role in implementing SDGs, in creating new sustainable knowledge and innovation, in developing a generations of new leaders and skilled professionals who will implement SDGs ideas and concepts for the benefit of progressive socio-economic development in countries around the world.

= The process: the TS is a challenging "subject" because of the interdisciplinary nature of the SDG's issues: by the "nature of sustainability", the teaching process requires both cross-sectoral and holistic knowledge; both are quite rear in most universities. The initial SDG's idea in 2015 has been a sort of the "Earth's salvation" paradigm including all its elements, both natural and social, which has become a tremendously complicated task to perform. Thus in the TS's process, instructors are often facing the need to dwell into uncharted waters of other scientific fields - natural, technical and social. Hence, any TS's qualification needs interdisciplinary approach.

As soon as sustainable growth becomes a critically urgent concept in the states' governance theories, on the win-win situation shall be economically feasible approaches and solutions. However, most of the educators/teachers are still in the linear market economy practice, which do not allow for revolutionary approaches to modern SDGs.

Presently, some *new forms of teaching and learning are necessary* that can help students deal better with the SDGs complexity, ambiguity and uncertainty, with the new values and moral dilemmas. For example, in line with the breaking the "business-as-usual" approaches, the SDGs are already challenging the "education-as-usual" concept.

Therefore, new approaches to SDGs-learning/teaching parameters are becoming a must reflecting a new type of a "journey together", generally, through the so-called new "social contract". The latter implies that in making living places healthy (which is "sustainable" in modern meaning) the growth perspectives can be achieved only through circular, green and bio-economies with the political guidance on the global climate goals. The task is difficult but not impossible: all that could be done using most advanced science, technology and innovation with a due regard to welfare conditions for present and future generations.

It is obvious that present development sectors in most states are not sustainable: hence, each region, country and community has to make their own SDG-strategies. However, teaching SDGs shall have some common denominators: e.g. in *energy sector* -on renewable energy and energy efficiency, in *transport sector* – on non-polluting transportation means, in *economics* –on sustainable development and circular economy, etc. while adding some other parameters, like welfare and learning by good examples, etc.

Presently, the TS is entering universities in various ways: as a rule, through already existing departments and faculties, i.e. often by just adding "sustainability" to their titles with introduction of general-type SDG courses for B.Sc. and M.Sc. levels geared for the faculty's business and social studies. For example, so far, in most EU states the B.Sc. is awarded in the areas of natural sciences, humanities, business and engineering sciences, mathematics and informatics. Thus, Denmark seems to be in the TS' forefront: Southern Danish University (SDU) expected to start in 2020 M.Sc. studies in all 17 SDGs, the process that "represents the SDU's fundamental transformation".

More important is that high- education institutions shall provide the graduates (i.e. the future national decision-makers) with valuable tools and necessary skills to "govern and manage SDGs".

The UNESCO, as a global education organisation, has already included TS in its priorities by assisting teachers worldwide both in understanding the SDG's concepts and in learning to cope with the SDGs interdisciplinary inclusion into established curricula.

The UNESCO's program on *Teaching and Learning for a Sustainable Future* is a timely response to global TS challenges; the program is presently available to reach many teachers in

the world. However, the current curricula are already exhausted and packed; hence several questions remain: how can higher education institutions make the necessary changes, to what extent do SDGs need to be addressed in the curricula, etc.?
World Sustainable Development Teach-In Day 2020 is an example of the *Global Movement on Sustainable Development Action.* This online event aims at accelerating progress towards achieving the SDGs at the grassroots level by focusing on sustainable education ***to*** *infuse sustainability thinking* into current education systems and inspiring students by both reorienting educational practices and equipping teachers with solid, hands-on knowledge about the SDGs so that they can integrate this into their curriculum and teaching processes.

= Existing controversies. The famous UN Declaration "Transforming our world: the 2030 Agenda for Sustainable Development" (adopted in September 2015 just after two years of public consultations) is "targeting and stimulating" actions in the "next fifteen years" in the following "areas of critical importance" (with the following sequence of "priorities"): *people, planet, prosperity, peace* and *partnership*.
However, in the Declaration's text the priorities slightly changed: the SDGs actions to achieve sustainable development were concentrated in the "three dimensions" – *economic, social and environmental, "*in a balanced and integrated manner" (Declaration, point 2). Important to note that the 2030-deadline is not actually final: only "*conditions*" for "sustainable economic growth, shared prosperity and decent work for all" shall be created during that period. Hence, the SDGs shall be regarded as the lasting process rather than "the end in itself".
Thus, SDGs serve as a means in shaping a general picture of a sustainable "world": so many have been already "in action" since "Our Common Future" in 1987! But, as is seen in the Declaration, the socio-economic needs of modern society are more important being followed by the environmental. That makes the whole concept of SDGs anthropogenic-centered, instead of evidently more methodologically correct nature-environmental-centered approach… This paradigm makes us all think about "cautious and responsible" attitude to nature (which is a primary substance) from all the transformative anthropogenic activities (which are secondary), which consequently depend on corporate profits and peoples' wellbeing: the latter is a non-stop development, as we all know.

SDGs look like a great "chain of survival": to make it happen, all of us –workers and businesses, governments and politicians – shall be unanimous in safeguarding both a healthy society and environment, which is hardly possible in a modern "destructive world". At the same time, the SDGs are not to be seen as a simply new "social invention": it is rather an urgent necessity for mankind to survive on Earth; the educators can use all possible TS's instruments to move in that direction.
All that said, educators have to think about three main "sectors" that define –presumed- cross-sectoral education facilities: a) for the workers, their skills and the labour market in general; b) for all corporate sectors and business communities, and c) for the governance, including such issues as political economy, nationalism, religion, values, etc.

The education community (global and European) is quite aware that the SDGs implementation schemes work differently in specific socio-economic sectors; the "uniting factor" in the process is education: only through its different levels (e.g. primary and secondary schools, colleges and universities, etc.) the present generation can grasp a comprehensive view of necessary efforts in a sustainable (and resilient) future.
Social and economic structures are rapidly and dramatically transforming (in particular, during and after the present pandemic crisis) and so are most of the peoples' physical and cognitive structures, with an increasing pace of events being based on specific algorithms. Traditional education process from learning to working (with some intermediate vocational training) is at

present rapidly changing by advancements in almost all science and technology sectors. That makes a “final permanent education” obsolete, followed by huge uncertainties in the new skills at the same time.
Hence, two main models may appear in TS: a “general” one, including resilience’s theories and approaches; and a “special” one, including practical implementation of sectoral SDGs alongside the Agenda-2030 priorities. Bottom line: the TS-sector is apparently entering the uncharted waters, while forming an integral part of a new “resilient political economy” in all countries!
Most educators assume that specifics in TS are in technologies; this sounds true as most of the SDG-17 are really grounded in the achievements in modern technologies.

The EU initiatives. The European Commission proposed recently three initiatives:
1. **Recommendation on Key Competences for Lifelong Learning** was adopted already in 2006 and since then was numerously updated reflecting rapid evolution of teaching and learning. In essence, it aims to improve the development of peoples’ key competences through their lives and to provide guidance to the states on how to achieve this objective.
A particular focus is placed on promoting entrepreneurial drive and innovation-oriented mindsets in order to unlock personal potential, creativity and self-initiative. Moreover, it recommends some steps to foster competences in science, technology, engineering and mathematics (STEM) and motivates more young people to embark on a career in these fields. More generally, the measures will support the EU states in better preparing learners for changing labour markets and for active citizenship in more diverse, mobile, digital and sustainable societies.
2. The EU Digital Education Action Plan, which outlines measures in assisting educational institutions and systems in adapting to life and work in an age of rapid digital change by: a) making better use of digital technology for teaching and learning; b) developing the digital competences and skills needed for living and working in an age of digital transformation; and c) improving education through better data analysis and foresight.
Initiatives include supporting schools with high-speed broadband connections, scaling up a new self-assessment tool for schools on the use of technology for teaching and learning. The plan underlines importance of digital aspects in TS education as well. However, digital skills’ gap is still big in the EU-27: already 90 percent of future jobs would require some level of digital literacy; at the same time 44 percent of Europeans lack basic digital skills. The EU “digital education plan” will help European educational institutions to better adapt to life and work in increasingly digital societies.
3. **European r**e**commendations on common values, inclusive education and the European dimension of teaching:** the initiative proposes ways in which education can help young people understand the importance of adherence to “common European values”. It aims at strengthening social cohesion, green and sustainable transformations, as well as combating rising populism, xenophobia and divisive nationalism. To support these aims, the EU will increase virtual exchanges among schools, notably through the ***e-Twinning network***, and boost students’ mobility through ***the Erasmus+ program***.

However, the EU measures towards increasing TS’ efficiency are quite mild, which is leading to a low level of social and corporate appreciation of implementing SDGs at the state level. Thus, it is no wonder that the so-called “significant and moderate progress” towards achieving SDGs during first five years in the EU-27 member states has been achieved only in three goals: in SDGs-3 (health and wellbeing), SDG-13 (climate actions) and SDG-15 (life on land); all other SDGs are in the ranks of “insufficient progress”.

A model “general” course. As soon as an adequate approach to SDGs’ implementation needs the knowledge from various facets of socio-economic development, a model course provides for

an efficient solution. About a week's course will equip participants with knowledge and skills required to implement both the 2030 Agenda and the SDG-17 in their professional career.
= Modern national strategies need credible and convincing leaders and specialists capable of a successful implementation of most pertinent SDGs in the national socio-economic development. A clear, concise and compelling understanding of perspective sustainable and green growth patterns are at the center of teaching components. Thus, the course provides participants with knowledge and skills need to strengthen national strategies in supporting the 2030 Agenda.
This course will focus on applying the contemporary sciences' achievements in reaching the national strategies for "green and sustainable growth".
Participants will apply their learning in various practical exercises, including a final term paper addressing a specific SDG of personal and/or professional interest. Besides, tailored workshops will enable participants to focus on the specific trends and needs of diverse SDGs implementation with a particular attention to those SDGs that are having primary importance for a country.
= Objectives. Upon successful completion of this course, participants will: = Demonstrate a sound understanding of the 2030 Agenda with a view to better disseminate and use SDG knowledge in their work; = Have acquired a good understanding of means and ways to craft convincing, powerful and strategic sustainable/green growth strategies; = Be equipped with the skills required to credibly support the sustainable development agenda, highlighting results achieved by the state/organization in the context of the 2030 Agenda; = Enhancing implementation skills in traditional and new socio-economic sectors influences by moving to sustainable and circular economy's paths.
= Course methodology. The training program will offer a mix of knowledge and skills to enhance participants' ability to effectively implement sectoral SDGs. In this regard, the course adopts a blended format of instructional sessions, application-oriented activities and peer-to-peer learning.
= Content, which includes: = an overview and evolution of the concept of sustainable development, the 2030 Agenda, the 17 SDGs, as well as the Agenda's vision and principles; = means and ways to create a clear, concise, credible and issue-oriented strategies for introducing sustainable development agenda with a view of defending interests of workers, businesses and the general welfare. = knowledge of latest tools, techniques and skills required to credibly convey and deliver on transition to sustainable and green growth; = employing new approaches and innovative tools to highlight necessary changes on a state-region-company levels reflecting sustainable transition.

Conclusion. At the European level, the EU's authorities have elaborated three possible scenarios to stimulate the member states' actions in the SDGs implementation: a) an overarching EU SDGs strategy guiding the actions of the EU institutions and those of the member states; b) a continued mainstreaming of the SDGs in all relevant EU policies by the Commission, sometimes through enforcing the member states' actions; and c) an enhanced focus on external action while consolidating current sustainability ambition at the EU and the states' levels.