

Sulitest: A Collaborative Initiative to Support and Assess Sustainability Literacy in Higher Education

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Abstract

This paper highlights the contribution of the Sulitest (the Sustainability Literacy Test) to the global agenda of integrating sustainability into higher education. The Sustainability Literacy Test is an open online training and assessment tool developed as an international collaborative initiative, in the context of Education for Sustainable Development (ESD) and the Principles for Responsible Management Education (PRME). This paper discusses how the tool works and emphasizes two major contributions: firstly, drawing a snapshot in the measurement of Sustainability Literacy worldwide at the present time, and secondly, providing an open tool to raise awareness on sustainability. The Sulitest enables higher education institutions (HEI's) to assess that they are producing sustainability literate graduates and to engage multiple stakeholders in accelerating the integration of sustainability in higher education standards and beyond.

1. Introduction

Building a sustainable future is intertwined with education. A major role of education is to empower individuals and future decision-makers so that they are able to face the complex and key challenges of the 21st century, including enabling change and collectively building a sustainable future. Higher education has a particular role to play in this agenda in educating and creating change agents. While we celebrate the first decade of the UN Global Compact's Principles for Responsible Management Education (PRME) less than a year after the launch of the UN Sustainable Development Goals (SDGs) (setting-up the 2030 agenda for Sustainable Development), the relationship between higher education and sustainability is more crucial than ever. This is highlighted specifically in SDG 4 on Quality Education.

Although, sustainability has impacted higher education in many ways, a major turning point occurred during the Rio+20 Conference on Sustainable Development with the Higher Education Sustainability Initiative (HESI). For the first time in the context of UN initiatives, HEIs (Higher Education Institutions) acknowledged the responsibility that they bear in the pursuit of a sustainable future and agreed to act collectively and share their practices in a major voluntary contribution. Integrating sustainability in higher education refers to a broad scope of initiatives including pedagogy and learning, academic research, campus management, practices and impact as an organization. From this starting point, a key issue quickly emerged: how can the many stakeholders in the field of higher education who are willing to engage and share initiatives promoting sustainability, assess their impact? In order to support, develop or improve these practices, being able to monitor their impact is crucial. One of the major objectives of sustainability integration in higher education is to provide future graduates with sufficient knowledge and skills to face global challenges and conduct change toward a sustainable future. How can higher education institutions be sure that they achieve this objective and produce sustainability literate graduates?

This paper focuses on the Sulitest, an open online tool developed to achieve this objective. The Sulitest is based on a very simple idea: for a sustainable future, we need a world full of people with sustainability awareness and core literacy. Nowadays, a proof of a minimum level of English is required from candidates applying for admission to a university or for a job in international companies with a score on TOEFL, TOEIC or GMAT. Other higher education institutions verify applicants' standardized test scores in key skills areas for entering competitive MBA and Master's programs.

With the growing importance of the sustainability agenda, the best organizations will require that their students, staff and faculty possess a basic understanding of the current global challenges and their responsibility in resolving them. The Sustainability Literacy Test (Sulitest) is a tangible implementation of HESI designed to help HEIs, companies and other organizations ensure that their graduates / employees are aware of and have core knowledge about these critical issues.

Sulitest is presented as a common good for the education community, available for any higher education institution in any field, and for students from all levels (Bachelors, Masters, MBAs, PhD). It is also now being made available to other stakeholders beyond academia. Functioning in a collaborative way, the tool is designed by and for its community with more than 300 volunteers from UN agencies, academic networks and universities from various countries. This community has actively contributed to the development and dissemination of the tool, and is beginning to make it a standard in raising awareness on sustainability issues and assess Sustainability Literacy. After a pilot phase (2014-2016) and allowing for feedback to be collected from the community, a new version of the Sulitest was launched in September 2016 with many improvements. As of February 2017, 553 universities and organizations from 57 countries have registered to use the Sulitest and 55 627 candidates have already taken the test. This makes it a powerful tool to engage individuals and organizations on the path to sustainability and provides an interesting database to map the current state of Sustainability Literacy and monitor progress over time.

This paper is structured in the following way: after this introduction, Section 2 presents the institutional background of sustainability in higher education. This includes the evolution of the UN agenda and the academic background that identifies the key sustainability learning outcomes that supports the idea of assessing impact. Section 3 details the Sulitest as a collaborative open online platform to contribute to this objective by improving and assessing Sustainability Literacy. Section 4 highlights two main contributions of the Sulitest to the global agenda with a first snapshot of current Sustainability Literacy worldwide and two case-studies of implementation in PRME institutions. Section 5 presents the conclusions and limitations of the study.

2. Background : Sustainability in Higher Education

2.1 The UN agenda and the Principles for Responsible Management Education (PRME)

Education has played a central role in UN initiatives since the creation of UNESCO (United Nations Educational, Scientific and Cultural Organization) less than a month after the official launch of the United Nations in October 1945. UNESCO's mission is; to contribute to the building of peace, the eradication of poverty, sustainable development and intercultural dialogue through education, the sciences, culture, communication and information¹.

The Brundtland Commission's report in 1987 reaffirmed the importance of educating young people to build, “a development which meets the needs of current generations without compromising the ability of future generations to meet their own needs” (Brundtland, 1987).

In 2004 the UN Decade of Education for Sustainable Development (DESD) called for action on the critical relationship between education and sustainable development² (ESD). The rationale of the DESD can be summarized as follows;

“The principle of using education – formal, non-formal and informal – as an effective vector to bring about change in values, attitudes and lifestyles to ensure a sustainable future for sustainability and, consequently, for sustainable development. The DESD strives to achieve these results through the following objectives: facilitate networking, linkages, exchange and

¹ <http://www.unesco.org/new/en/unesco/about-us/who-we-are/introducing-unesco/>

² <http://en.unesco.org/themes/education-sustainable-development>

interaction among stakeholders in ESD; foster an increased quality of teaching and learning in education for sustainable development; help countries make progress towards and attain the Millennium Development Goals through ESD efforts; and provide countries with new opportunities to incorporate ESD into education reform efforts” (UNESCO, 2007).

Several member states responded by integrating ESD in the common basis of knowledge and competences³. Whilst many official initiatives and agreements focus on the right to access to primary and secondary education, higher education has less visibility, even if pioneer initiatives such as The Association of University Leaders for a Sustainable Future (ULSF) in 1990 or The University Twinning and Networking Programme (UNITWIN) in 1992 started a dynamic.

The United Nations Conference on Sustainable Development (UNCSD) in 2012, also known as Rio+20, could be considered a major turning point in the perception of the role higher education can, and should, play in the construction of a sustainable world. For the first time in the context of UN initiatives, the focus was put not only on the right to access to education, but also on the responsibility of higher education.

During Rio +20, the Higher Education Sustainable Initiative (HESI) was launched, supported by several UN agencies such as UN-DESA, UNESCO, UNEP, UNU and UN-Habitat (since 2015), together with the Global Compact's Principles for Responsible Management Education (PRME) initiative. With a membership of over 300 universities from around the world, HESI accounts for more than one-third of all the voluntary commitments that came out of Rio +20. Chancellors, Presidents, Rectors, Deans and leaders of Higher Education Institutions (HEIs) and related organizations, acknowledged the responsibility that they bear in the international pursuit of sustainable development. They agreed to teach sustainable development concepts, encourage research on sustainable development issues, green their campuses, support sustainability efforts in their communities and share results through international frameworks with the *Platform for Sustainability Performance in Education*⁴.

Subsequently, the UNESCO World Conference on Education for Sustainable Development (Nagoya, Japan, in November 2014) celebrated the end of the UN Decade of Education for Sustainable Development (DESD) and set the agenda for ESD in the decade to come.

The concept of ESD has now spread and many universities integrate sustainable development in their practices. At the international level, networks are growing. Among these networks, the Global Compact's Principles for Responsible Management Education (PRME) initiative highlights the role of business education as key to create responsible managers: "the academic sector can play a strategic role as change agents, educating the managers of today and tomorrow, incorporating the values of responsible corporate citizenship into their education activities" (Escudero 2006). At the same period, UN Global Compact and EFMD selected 21 companies and business schools to hands-on address the question of how to develop a generation of globally responsible leaders. This resulted in the 2005 founding call of the GRLI (Global Responsible Leadership Initiative).

In September 2015, the UN General Assembly adopted the 2030 Development Agenda entitled *Transforming our World: the 2030 Agenda for Sustainable Development* setting up 17 Sustainable Development Goals (SDGs). The agreed focus over the next fifteen years, for countries, organizations and citizens is to "mobilize efforts to end all forms of poverty, fight inequalities and tackle climate

³ Examples in France <http://eduscol.education.fr/numerique/dossier/archives/education-au-developpement-durable-tice/place-education-au-developpement-durable/textes-de-referance> or Finland http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/ED/pdf/esd2014/HL_round_table_Statement_Finland.pdf or Japan <http://unesdoc.unesco.org/images/0014/001492/149295e.pdf> or UK <http://www.esd.rgs.org/link9.html>

⁴ <http://www.eauc.org.uk/theplatform/home>

change, while ensuring that no one is left behind." This is a new milestone that will impact all the initiatives related to the pursuit of sustainable development in years to come

2.2 Assessing and reporting on sustainability literacy is a critical driver

These UN initiatives are setting-up the agenda of sustainability in higher education, while sharing initiatives from different contexts and aiming to define best practices. The SDGs are now offering a coherent framework and roadmap to coordinate these initiatives and to accelerate the transition toward a sustainable future. In this context, a critical issue for higher education is the ability to assess and report on the impact of their sustainable practices on students' awareness and core sustainability literacy. This will allow graduates to take informed and effective decisions and to take action to achieve the 2030 Agenda set up by the SDGs, and in particular the target 4.7: "*by 2030 ensure all learners acquire knowledge and skills needed to promote sustainable development [...]*".

Sustainability in higher education covers a wide range of issues (Yarime and Tanaka, 2012; Bullock & Wilder, 2016). Alshuwaikhat & Abubakar (2008) state that HEI's face three key challenges: (1) environmental management (biodiversity, waste management, energy consumption...), (2) social impacts of the campus (gender equity, student's health ...) and (3) educational issues (teaching, awareness...). The third issue refers to the concept of ESD.

According to UNESCO, Education for Sustainable Development "*means including key sustainable development issues into teaching and learning [...]. It also requires participatory teaching and learning methods that motivate and empower learners to change their behaviour and take action for sustainable development*"⁵. Wood et al. (2016) state that integrating ESD in HEIs is the result from a long process. As noted by Wals and Blewitt (2010), three stages capture the integration of ESD in higher education. During the 1970s to 1980s, the focus was more environment-oriented (e.g., green chemistry curricula). In the 1990s, ESD integrated progressively students' awareness (good practices, green behaviour). Since the 2000s, a paradigm shift requiring new pedagogical approaches is called.

In this current definition, ESD is therefore not limited to the implementation of new curricula. The field is broad and by nature transversal among disciplines and contexts. The initiatives developed to integrate sustainability in higher education and universities take a diversity of forms: courses and teaching materials, academic research, students' involvement and social impact, campus management... All these initiatives are obviously participating to the core mission of ESD and to the transition toward sustainability. However, to monitor and develop these initiatives and to accelerate this transition, the ability to measure and assess their impact is critical.

Among these potential impacts, what should be the results of integrating sustainability into education and pedagogy? This raises the question of learning outcomes and more broadly the impact of ESD on graduates. Awareness and knowledge are one of these outcomes and may be considered as the first step to engage individuals on the path to build a sustainable future. This first step has to be completed by other dimensions which can be acquired thanks to competence-based education or collective learning. Many contributions in the literature on ESD identify skills and mindsets as ways to empower individuals to initiate and conduct change (Cotsgrave, Kokkarinen, 2011; Missimer, Connell, 2012). This means, in practice, enabling students to develop competencies such as critical, holistic, systemic and interdisciplinary thinking (Kearins & Springett, 2003; Sapos et al., 2008; Thomas, 2009; Ryan et al., 2011, Lourenço, 2013). These dimensions are forming the concept of Sustainability Literacy which can be defined as the knowledge, skills, and mindsets that help compel an individual to become deeply committed to building a sustainable future and allow him or her to make informed and effective decisions to this end.

⁵ <http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/education-for-sustainable-development/>

As Sustainable Development is by nature complex and transversal, achieving sustainability literacy requires multi-disciplinary approaches and exploration not only of various themes (e.g. soil quality, forest health, social inclusion, etc.) within sustainable development but also the interconnectedness of these themes. This statement is supported by several research projects and ESD initiatives, which have tried to identify the main dimensions that one should consider when incorporating sustainability literacy in higher education (Rieckmann, 2012; Svanström et al., 2008; Wiek et al., 2011). Learning about sustainable development should allow graduates to face complexity and to contribute to the debate on global and complex issues (QAA ESD guidance, 2014). Following this, ESD can be a way to support and develop system thinking (Svanström et al., 2008).

Finally, three other key challenges are identified in the literature. Firstly, Cebrian et al. (2014) note that faculty members are not sufficiently engaged in ESD. This is linked to the fact that they don't always perceive ESD as a pedagogical issue (Christie et al., 2013). Secondly, Swaim et al. (2014) note that "*students do not generally place importance on sustainability and sustainability is not necessarily considered legitimate by all*" (p. 467). Thirdly, being able to assess the impact of ESD initiatives is critical (Lozano et al., 2015).

In this context, the role of HEIs to engage their future graduates in a more sustainable path is more crucial than ever.

3. Sulitest, a collaborative open online platform to improve and assess Sustainability Literacy

This paper uses the Sulitest platform as a case-study to investigate the current state of sustainability literacy in higher education and to engage higher education institutions in monitoring the impact of sustainability integration in their pedagogy and/or research on student's sustainability literacy.

As the Sulitest is taken worldwide by diverse cohorts of learners, it can be mined for data to better understand behaviours and identify opportunities for change. After a pilot phase between 2014 and 2016 (see Carteron, Décamps, 2014), more than 550 universities in 57 countries have registered to use the Sulitest and more than 55 000 students have taken the test as of January 2017. This largely contributes to raise awareness on sustainability issues and provides an important database displaying a first snapshot of the current sustainability literacy in higher education worldwide.

3.1 The Sulitest format: how does it works?

The aim of the Sulitest is to provide HEIs, companies and other organizations around the world with an internationally recognized and locally relevant tool to measure and improve sustainability literacy.

To be easy to use, adaptable and deployed worldwide, the Sulitest format is an on-line MCQ (Multiple Choice Questionnaire) displaying at least 30 questions randomly selected out of a question bank which is organized in several modules. Every Sulitest's session is at least composed by 30 questions selected from the *Core International Module* common to every country, covering global issues and allowing organizations and candidates to benchmark at a worldwide level. These 30 questions are usually combined with another set of 20 'local' questions coming from *Specialized Local Modules* addressing issues and challenges specific to local contexts (mainly country-specific or regional context). Finally, an optional anonymous survey is proposed to the respondent at the end of each session to collect data for research purpose on the respondent's socio-demographic characteristics, interest and sensitivity to sustainability issues and experience of ESD.

Questions are based on verified and reputed sources that are subject to a broad consensus in the community of researchers and practitioners in the field (international texts and reports, UN

conventions, specialized national agencies, etc.). A strict review process guarantees the quality and reliability of the assessment tool. A Senior Advisory Board (SAB) with representatives from international organizations and UN agencies validates the questions and the evolutions of the tool and gives a feedback to the general secretariat.

To achieve the objective of measuring and improving sustainability literacy for all, Sulitest answers to key criteria:

- Questions must assess an individual's current knowledge of Sustainable Development but they should also teach and inform; motivate to learn more and act!
- The overall experience of taking the test should help learners, 'understand the big picture', as well as, 'be touched and inspired by specific stories or facts'; while simultaneously avoiding the trap of reproducing or memorizing lists of facts, figures, issues and challenges without making connections between them.
- Create a test that does not overwhelm with the number of questions (30 to 50). The focus is on various perspectives and topics, keeping the balance between alarming news and inspiring actions.

To reach these ambitious objectives, the test is designed with (1) a coherent, pedagogical and systemic framework (2) a list of tags and key words to build a database of questions ensuring balance among all the relevant subjects.

Firstly, the algorithm selecting the questions in the *Core* and *Specialized* Modules relies on a specific matrix ensuring that all subjects are linked in a coherent framework and that they cover 4 dimensions to test knowledge from the broader perspective to the individual perspective:

- Sustainable humanity and ecosystems on planet Earth
- Global and local human-constructed systems to answer people's needs
- Transitions towards sustainability
- We each have roles to play to create and maintain individual & systemic changes

This Matrix also allows the test's extension to complementary aspects such as *knowledge of skills* and *mindsets* (see the detailed matrix in Appendix A) which are currently on development.

The role of the matrix is to make sure that each Sulitest's session covers a comprehensive scope of sustainability challenges while providing a coherent and systemic vision of the relationship between these various challenges.

Secondly, the matrix also improves the way results are displayed to help their interpretation. This aspect is reinforced by the fact that each question is attached to one or up to three tags to allow a thematic interpretation of the results (see Appendix B for the complete list of Tags) and provide a rich set of indicators.

The richness of the tool finally relies on a wide range of possible uses by the community. Designed as a common good available for any organization willing to promote sustainability literacy, these organizations can choose between several options.

The examiners mandated among the staff of each registered organization can firstly customize the sessions by choosing between the Sulitest's Core and Specialized Modules and by defining the duration and language (among the 8 languages available) of the sessions. This allows a flexible integration of the Sulitest into the organization educational experience and curricula.

The test is primarily designed to assess students' knowledge before graduation and has a summative function when evaluating students' learning. The structure allows candidates to see their performance in each topic area and to benchmark themselves against other average scores in their own program, university, country or even worldwide. It also allows examiners and institutions to have a global overview on the sustainability literacy of their student population or staff by topic areas. Institutions

can theoretically use the test as requirement for awarding degrees or as part of a grade in a course or program. In this case, the test's session will be defined with limited duration as an exam.

The test can also be used as a diagnostic evaluation. Institutions can use it at different stages in the curriculum or as an entry/exit exam in order to monitor progress or successful learning. This can help schools and universities to make changes and improvements in their pedagogy and curriculum design based on strengths and weaknesses of their students.

The test can also be used as an assessment tool with a formative function. Universities can choose to organize sessions with longer duration in a "learning mode" where users are given the correct answers with sources and links to take their learning further. Thanks to the comments, sources and references given in the questions, the test can be an excellent tool to raise the sustainability awareness and knowledge of the students.

Finally, organizations using the Sulitest can add their own customized modules (with a premium access) to address topics and challenges specific to their organization / activity sector or to conduct complementary surveys inside their organization.

The various potential uses of the Sulitest combined with the richness of the indicators derived from the Sulitest's results make it a powerful tool to improve and assess sustainability literacy.

3.2 A Collaborative and Evolutionary Initiative to Accelerate Change

In addition to the content of the tool, Sulitest's organization and core values also make it a powerful initiative to engage multiple stakeholders (including companies) in conducting and/or accelerating change toward a sustainable future. Sulitest is driven by several core values influencing its organization and development: designed by and for its users to ensure continuous adaptation and improvement over time; thinking cooperation before competition; stays open to any innovation and complementary initiative as long as it contributes to its core mission.

Built to serve the common good and owned by its international community, Sulitest is piloted by an independent non-profit organization (officially registered as a non-profit association under French law, "Association loi 1901" since December 2014) and is supported by more than forty institutions and international networks.

To engage and maintain its international dynamic and to be rapidly operational, a temporary Board of Directors was appointed to conduct a pilot version and then to coordinate a version 2 built on many feedbacks received from the community during the pilot phase. The first official election of the Sulitest Board is planned in 2017 following the launch of this version 2 late 2016. The aim of this election is to organize the future Sulitest's governance where the diverse stakeholders forming the Sulitest community can be represented. To effectively work as a tool for the "common good", it is essential that the Sulitest relies on the broadest and most transparent governance possible to ensure relevance, independence and credibility.

To achieve this objective, the governance structure should at least be representative of the three key community groups who have contributed to the launch and development of the initiative so far: the Senior Advisory Board (SAB); the contributors especially the RNECs (Regional / National Expert Committees); the academic and non-academic users.

The Senior Advisory Board (SAB) is composed by several UN agencies and international academic and professional networks which have endorsed and supported the initiative from the start. The SAB composition comes from HESI founders (Global Compact's PRME, together with UN-DESA, UNESCO, UNEP, UNU and more recently UN-Habitat) associated with several academic and professional networks such as GRLI, GUPES, CEEMAN, Copernicus Alliance, ARIUSA, MEDIES, HEASC, IDDRI, ULSF and WFCP (detailed composition of the SAB can be found on the Sulitest

website [here](#)). The role of the SAB is to validate the consistency and coherence of the test; to guarantee the independence, intent and spirit of the project; to support the development of the Sulitest mission; and to capitalize and leverage the strength of their diverse networks and expertise.

The Sulitest community also relies on a second important group: the contributors. More than 300 volunteers from UN agencies, academic institutions or other organizations have actively contributed to create content, spread the initiative and improve the tool toward the versions 2 launched in September 2016. Among these contributors, the RNECs (Regional / National Expert Committees) play a key role. They lead the development of the Sulitest in their local environment by coordinating diverse stakeholders to develop local questions, translate contents in their own language when needed and to engage local HEIs in using the test. As of November 2016, 25 countries / regions have already developed their own set of local questions: ARGENTINA, BRAZIL, DENMARK, CANADA, CHINA, COSTA RICA, DENMARK, EGYPT, FAROE ISLANDS (DENMARK), FINLAND, FRANCE, HONG KONG (CHINA), INDIA, IRELAND, ITALY, JAPAN, KENYA, NORWAY, PERU, QUEBEC (CANADA), SOUTH AFRICA, SPAIN, SWEDEN, UK and USA. Among those RNECs, PRME chapters have actively contributed to engage and coordinate the dynamic such as PRME Chapters Brazil, UK and Ireland or MENA. If RNECs are crucial for the dissemination and development of the initiative, every individual is encouraged to propose content and to contribute to the question bank and to the future evolutions of the tool. Hundreds of people around the world have at some point in the project already given their time, energy and good will to the community and they continue to do so.

Thirdly, the community of users also plays a key role. Using the Sulitest as an academic institution educating future decision-makers or as a company or any other organization to raise awareness and improve core literacy among your students, staff, executive board, suppliers or even clients or competitors is obviously the first way to contribute to the Sulitest's core mission.

Among the community of users, several organizations have chosen to be Sulitest's partners to support the development of the initiative and to help financing the online platform. Built to serve the common good and owned by its international community, Sulitest is piloted by an independent non-profit organization. However, launching this kind of initiative and especially developing the online platform implies some financial costs which has been covered thanks to donations and financial support from this partners. At the very beginning (2013-2015), Sulitest received major support from KEDGE Business School, notably from the Foundation for Sustainable Leadership and the IT company Degetel. Other partners, like the law firm Savin Martinet Associates and the communications agency Sidièse volunteered time and skills and contribute to the building and deployment of the pilot version. During the second phase, a fund campaign has successfully financed the development of the new platform (2015/2016). Sulitest received financial and moral support from 11 higher education institutions ([EAUC](#), [Ecole des Ponts Paris Tech](#), [EFMD](#), [Institut Mines Telecom](#), [Kedge Business School](#), [Kingston University](#), [PRME Chapter UK & Ireland](#), [School of Business, Economics and Law at the University of Gothenburg](#), [COMUE Université Paris Seine](#), [Grenoble EM](#), [Conférence des Grandes Ecoles](#)) and 8 corporate or professional organizations ([Edf](#), [C3d](#), [La Banque Postale](#), [L'Occitane en Provence](#), [LVMH](#), [Onet](#), [Orange](#), [Pernod Ricard](#)). These donations have allowed the development of the new platform by a new IT partner, [Aleaur](#). The UX Design agency, Welcome Max, also volunteered time and skills during this second phase.

Thanks to this new platform, the NGO will be able to build its financial independency towards a sustainable economic model by:

- Offering services and products to other stakeholders and organizations beyond academics (i.e. corporations, recruitment agencies, institutions, governments) and individuals.
- Receiving public grants/funds
- Receiving donation from corporations, institutions (foundations) and even individuals

To ensure credibility and free academic inquiry, a clear separation is established between supporting partners and their influence on the content of the test. As the community regularly renews all sets of

questions, partners are invited, like any citizen, to propose questions. But they can in no way directly impact the content of the test to serve their interests. The diverse Sulitest community alone chooses and validates the content of this collaborative tool.

In the end, it is important to keep in mind that the Sulitest will always have limitations. Its mission and content are to evolve and improve regularly to remain relevant. One major strength is the diversity of the community and its active contribution with the help of a small team working daily to coordinate the initiative. The Sulitest is created by and for an open community of users. This collaborative and iterative process mobilizes local / regional communities and transnational communities of academics, professionals and students. It doesn't make it a tool without limitations, but a collaborative initiative that keeps on improving and adapting to the community's challenges and expectations.

4. Results: Sulitest's contributions to the global agenda

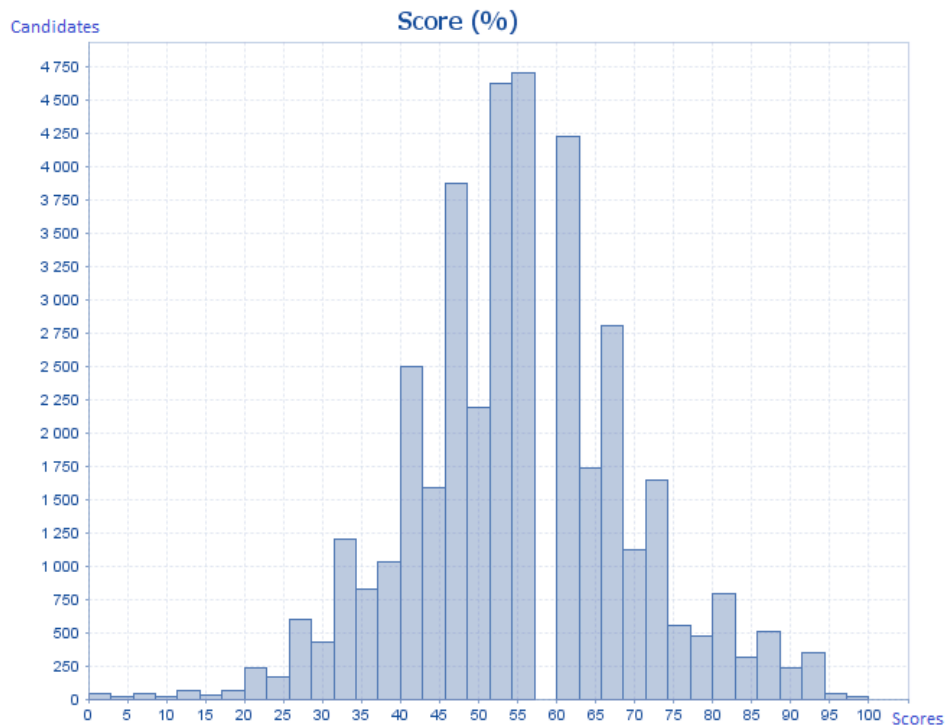
Sulitest is actively contributing to the global agenda, including its role for the UN 2030 agenda as a featured initiative of the SDGs' Partnership Exchange. Two main contributions are highlighted in this paper: a first snapshot of the current state of sustainability literacy worldwide from the pilot version database; cases of implementation in the context of responsible management education with PRME institutions.

4.1 The first snapshot of Sustainability Literacy worldwide

The results displayed in this section come from an extract of the Sulitest's database at the end of the pilot phase when the new version was launched in September 2016. The pilot phase was primarily focused on academic institutions (other types of organizations are using Sulitest since September 2016). These data represent the 'active universities' among the whole Sulitest community, meaning universities that have organized sessions for large cohorts of students during the pilot phase. Thus, this first snapshot of Sustainability Literacy in higher education is dated September 2016 with 260 active universities in 35 countries which have organized 1589 sessions allowing 42683 students to take the test. This first snapshot will, of course be added to over time with the growing use of the new platform.

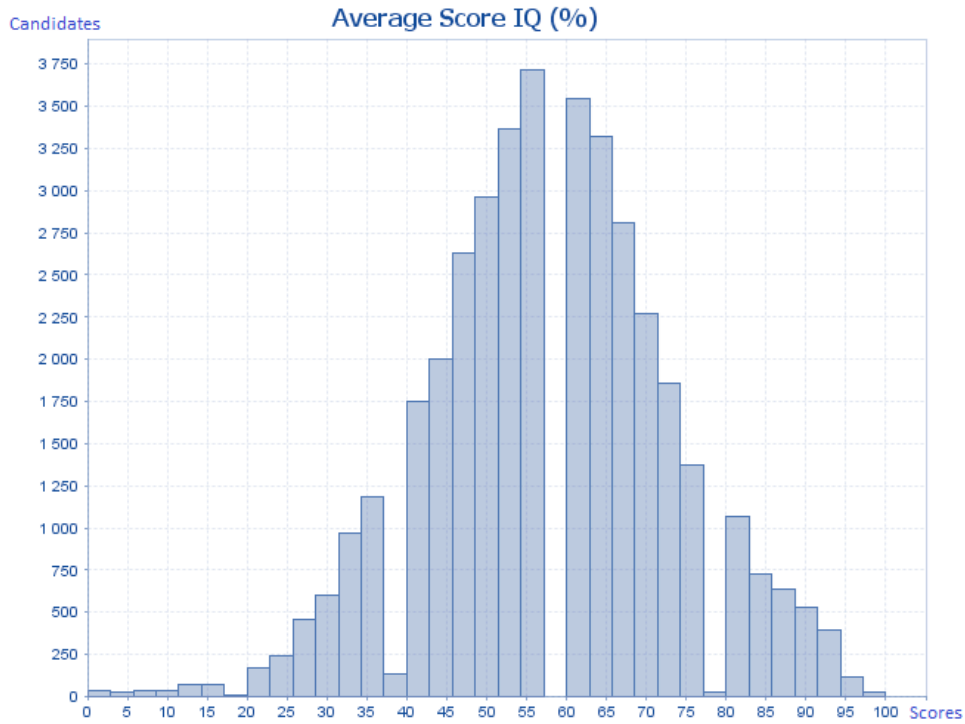
As a first landmark, the average global score of the Sustainability Literacy Test is 55% of correct answers worldwide with a balanced distribution around this average score showing the global level of sustainability literacy in a large sample from higher education. Figure 1 displays the number of candidates related to the different score obtained (from 0 to 100% of correct answers, with a classification of Yule). The results demonstrate a balanced distribution of scores with a peak around the average score (55%) and two "secondary" peaks between 40 and 50% and between 60 and 70%.

Figure 1 : Global Score (International + Local Questions, Average Score 55%)



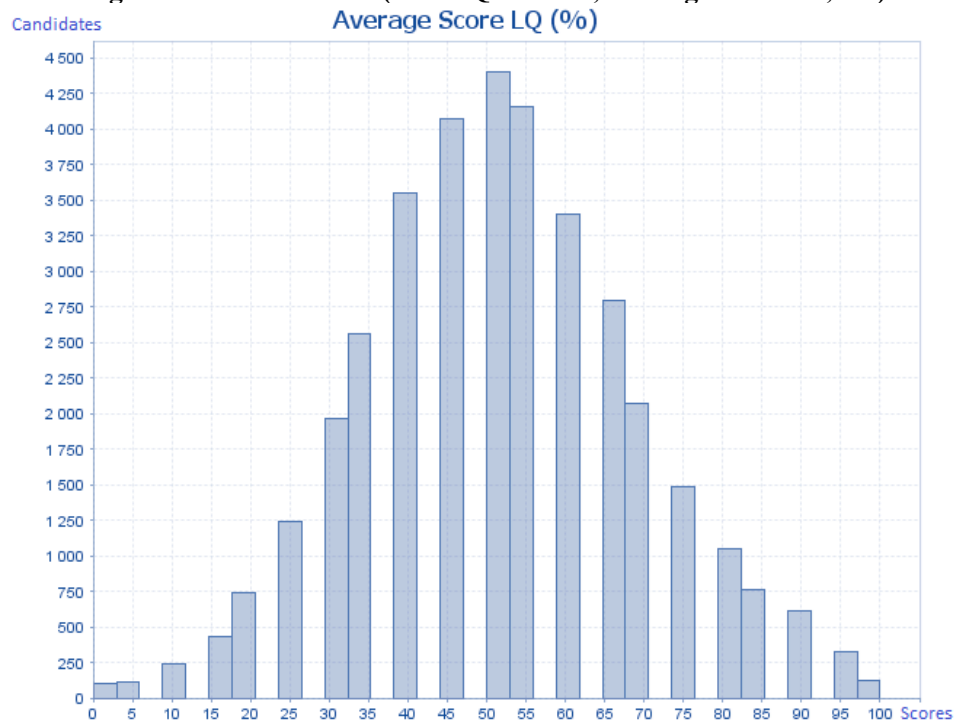
However, this global result must be interpreted with caution for several reasons. Firstly, some countries have already a customized version of the test (international + local questions) whereas others are using international questions only. This is why a focus is made on international questions below as they come from the same question bank for every country. Secondly, the score obtained might not be interpreted the same way depending on the context. As a result, different universities and/or different countries might not expect the same thresholds for the results of their students. For example, what is considered as a "high score" might be different depending on the university culture. As universities are free to use the Sustainability Literacy Test in their own way, the interpretation of the scores belongs to them. Figures presented here provide a benchmark that may help with the interpretation of the scores. Figure 2 below gives the general trend on International questions (comparable between the different contexts) covering global issues with an average score of 57,2%.

Figure 2 : Global Score (International Questions, Average Score 57,2%)



These international questions are often completed by local questions addressing issues and challenges specific to the local context. The local questions have been developed by each RNECs. Even if they are all based on the same matrix of topics, the formulation of the questions, the level of difficulty and even the balance between topics covered may be heterogeneous. With that caution in mind, Figure 3 displays the global results on local questions with an average score of 51,6%.

Figure 3 : Global Score (Local Questions, Average Score 51,6%)



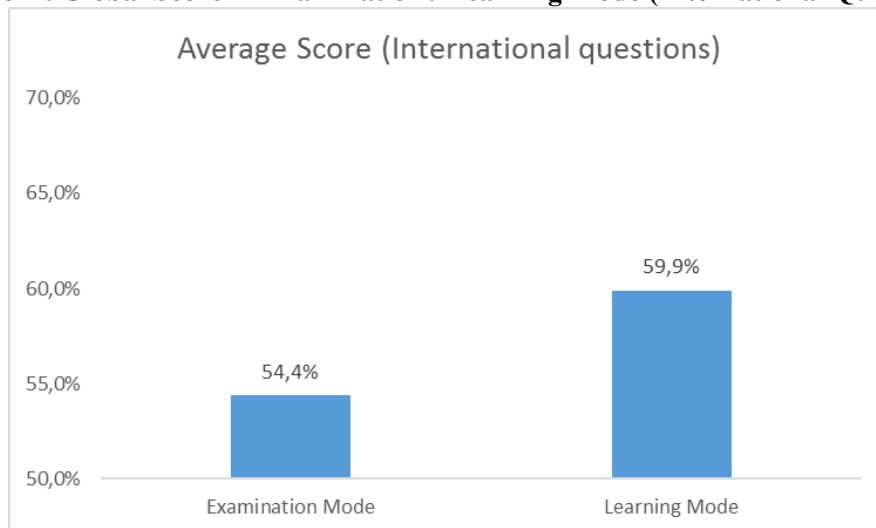
As previously mentioned, the Sustainability Literacy Test is an open tool so Universities are free to use it in different ways. In this pilot phase, Universities could choose to organize sessions in an examination mode or in a learning mode. The conditions under which the test is conducted are different between these two types of sessions.

- Examination mode: Students take the test under standard exam conditions, in a fixed, limited time without access to reading material or other external resources.
- Learning mode: The sessions duration may be longer (up to 2 weeks in the pilot version, longer in the new version) and students may take the test at home, either alone or in a group.

Consequently, the results of these two types of sessions are presented separately, still focused on international questions which allow comparison. 53% of sessions have been taken in learning mode during the pilot phase, whereas 47% have been taken in examination mode. As it might be expected the sessions taken in learning mode have a slightly higher average result examination mode, even if the difference is short (see Figure 4).

Note: the actual condition under which sessions were organized is the responsibility of each university. The choice between the two session modes is declarative by universities.

Figure 4 : Global Score in Examination / Learning Mode (International Questions)



Finally, the examiners inside each university may choose to conduct the Sulitest on different populations of candidates. Some universities have also chosen to propose the Sulitest to their faculty members and staff. These data give a more detailed picture of the global trend of Sustainability Literacy drawn by the Sulitest. To be consistent with the interpretation of the previous statistics, only international questions (same in every country) allowing comparative analysis in different contexts have been used below. The global score gives a general trend per type of candidates in Figure 5 and Figure 6 provides a more detailed picture of sustainability literacy for each core subject covered in the pilot version and each type of candidates.

Figure 5: Global Score per type of candidates (International Questions)

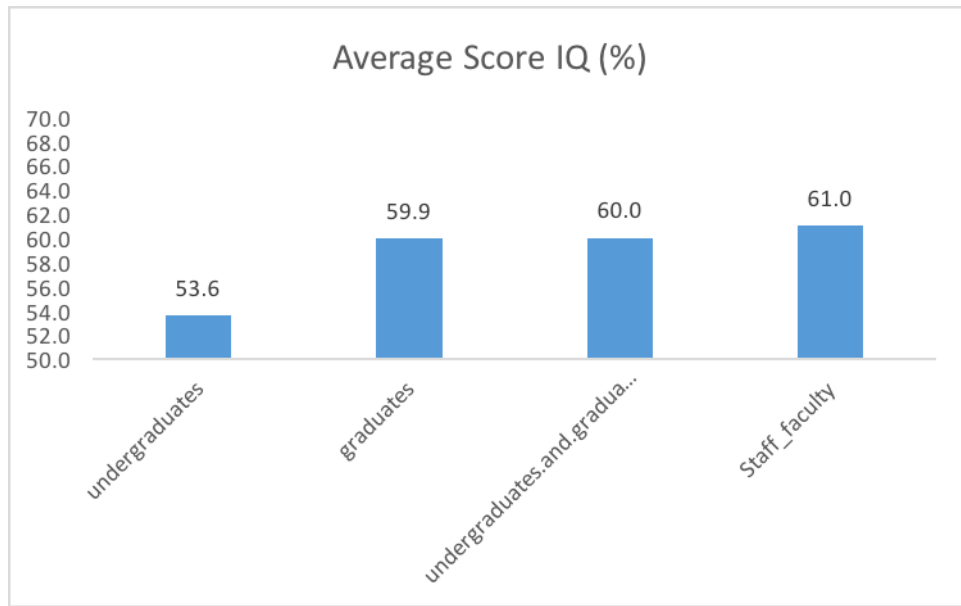
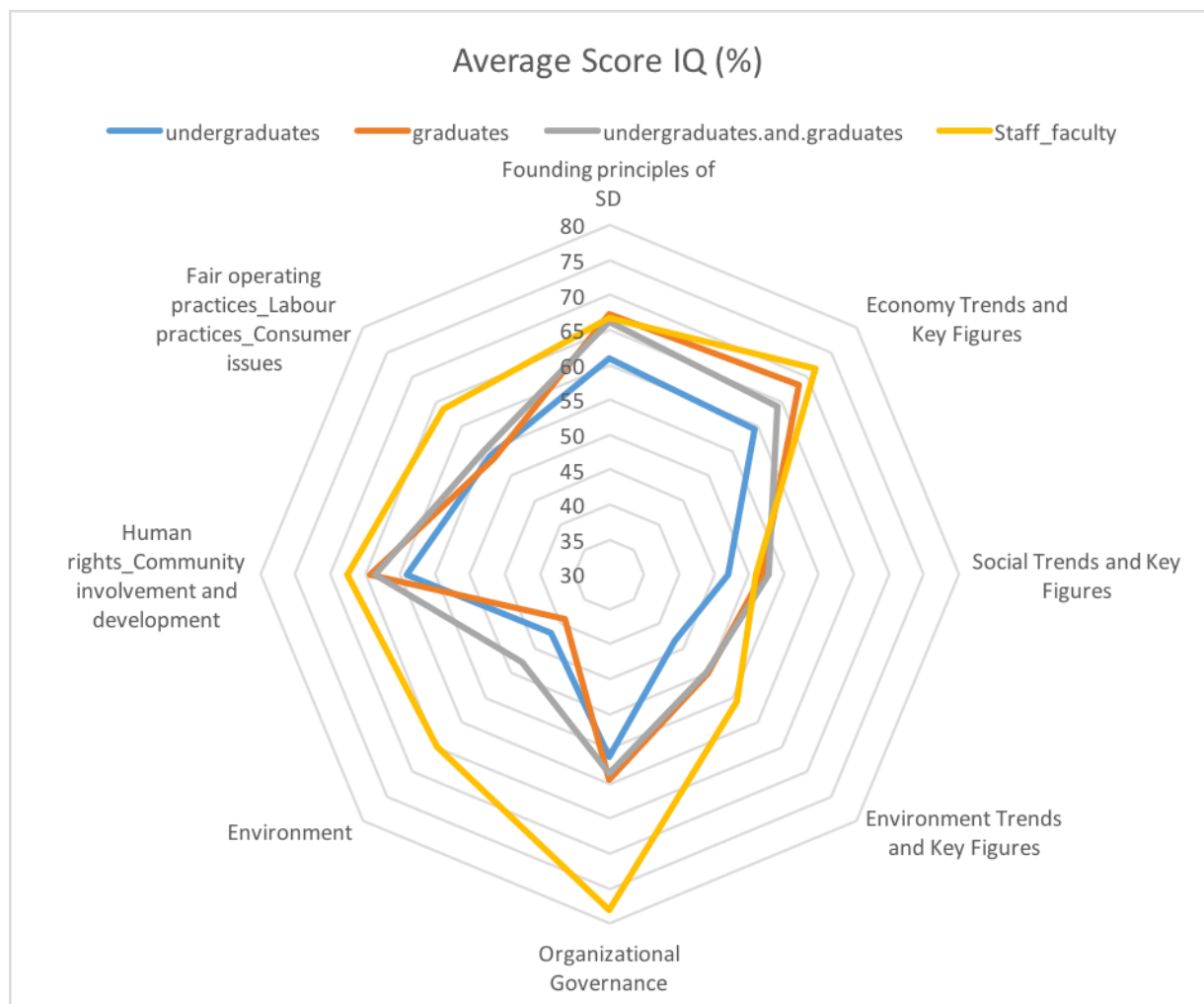


Figure 6: Global Score per Core Subject and per type of candidates (International Questions)



As expected, we can observe that graduate students and staff and faculty members have slightly higher scores than other candidates. However, the difference is not very important and is not similar for the different core subjects covered by the pilot version of the Sulitest. Figure 6 shows that some topics such as founding principles (basic definitions) or social and economic trends and key figures are characterised by quite similar level of sustainability literacy between the different type of candidates; whereas other topics such as organizational governance and environment are characterized by important gaps between the respondents.

This allows to identify topics for which higher education seems to play a pedagogical role because going from undergraduate to graduate and staff / faculty member results in higher scores. For topics characterized by very similar scores for the entire population of the sample, a special attention should be paid when defining or reinforcing pedagogical programs and curricula.

The fact that staff and faculty members scored not so much higher than graduate students would suggest the need for faculty development in order to achieve a more transversal and systemic vision of sustainability. As faculty members in the sample are not necessarily “sustainability specialists”, we could think that they are more focused on their core discipline and that they link the specific issues covered by their own discipline to the scope of sustainability. This could explain why this specific population scores higher for specific topics, but not for all topics, and would call for a more systemic approach of sustainability requiring multi-disciplinarity and transversality for faculty members and educators in general.

Of course these statistics must be interpreted with caution because they are global trends on average scores and the results may be different from one university to another. This is why using the Sulitest data also makes sense at the university level because they allow to have a precise view on the core literacy of this university’s students and staff and thus to improve the pedagogy overtime (see for example the case of KEDGE Business School below).

The data from the pilot version of the Sulitest give a first snapshot of sustainability literacy in higher education with a list of core subject and a first sample of candidates from universities which have been active early in the initiative. The launch of the new platform in September 2016 will extend these results in several directions.

- Firstly, the universities continue to register and they are more and more to be active by organizing sessions for entire cohorts of students and thus to contribute to this growing database.
- Secondly, the new matrix used by Sulitest allow a narrower interpretation of the results with a coherent and systemic framework to choose the questions in each session (see Appendix A) and a more comprehensive list of tags to develop thematic analysis using the Sulitest results (see Appendix B). These improvements may provide tangible and detailed indicators to monitor the progress of Sustainability Literacy over time.
- Thirdly, the new platform opens the Sulitest to other stakeholders beyond academics such as businesses, institutions or NGOs. This may allow for a broader development of Sustainability Literacy in different contexts but also for more indicators and comparative analysis to measure its development.

Last but not least, Sulitest is reinforcing its collaboration with the Partnership Exchange for the UN SDGs. The new platform will attach each question to one or several SDG(s) so that the Sulitest can be used to monitor the progression of core literacy in all field covered by the 17 SDGs. As a featured initiative among the SDGs partnership, Sulitest will be able to provide tangible indicators to help individuals and organizations assessing and improving their awareness and knowledge on the SDGs. These indicators will be communicated on a regular basis (at least during the annual UN High Level Political Forum) to estimate whether citizens are more equipped to face the challenges covered by the SDGs and to achieve the 2030 agenda.

Moreover, Sulitest and UN DESA have agreed to develop complementary modules to be used for training and assessment in the critical areas of the different SDGs. These complementary modules will be available for the community in addition to the *Core International* and *Local* modules. This means that each Sulitest user will be able to go further in the specific topics addressed by each SDG during

their learning process. A first *SDGs' Module* focused on the 6 SDGs highlighted during the 2017 edition of the High Level Political Forum (HLPF) will be offered to the Sulitest community in early 2017 so that the results can be displayed on the occasion of the HLPF. This will be repeated for each edition of the HLPF in order to obtain a comprehensive set of questions on the 17 SDGs.

4.2 Cases of implementation in PRME Institutions

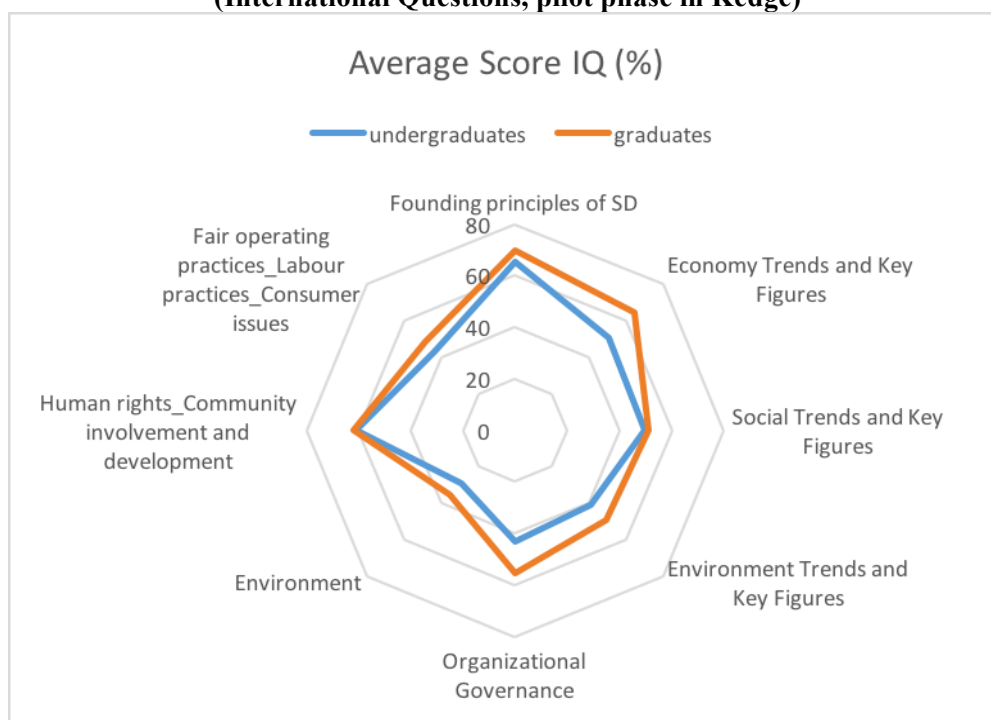
In the context of management and business education, Sulitest has been widely used and supported. The UN Global Compact's PRME initiative has endorsed Sulitest since the beginning and is an active member of the Senior Advisory Board. PRME chapters Brazil, UK and Ireland and MENA have also played a leading role in the coordination of Sulitest's RNECs in their own country / region. Sulitest can be used in many ways and provides several contributions to promote and assess Sustainability Literacy as mentioned in the previous sections. Two case-studies from PRME Institutions which have implemented the Sulitest are presented in this section.

KEDGE Business School

KEDGE Business School, a French PRME member, has played a major role as founding member of the Sulitest by incubating the initiative with time and competences from its staff and faculty, financial support from its Foundation for Sustainable Leadership, and by hosting the Sulitest General Secretariat.

A first draft session has been tested on 6002 students in KEDGE prior to the launch of the international pilot phase (2014-2016). 5534 additional students have taken the Sulitest in KEDGE during this pilot phase with an average global score of 57% (60% for international questions and 51% for the French local questions). Figure 7 is mapping the Sustainability Literacy of KEDGE's students during this pilot phase (2014-2016), still focused on the international questions in order to be coherent with the global statistics displayed in the previous section. Since the launch of the new platform in September 2016, 2652 additional students and/or staff have already taken the new version of the Sulitest.

Figure 7: Global Score per Core Subject and per type of candidates (International Questions, pilot phase in Kedge)



KEDGE uses the Sulitest firstly as a learning tool to raise students' awareness and core literacy on sustainability issues. This tool is complementary with other pedagogic and learning resources. As a PRME member, KEDGE has developed several courses and masters with a strong focus on sustainability and CSR to deliver graduates who are able to implement responsible management principles. The Sulitest is acting as a complementary tool to this learning experiment by ensuring that 100% of the graduates have at least basic sustainability literacy, even those who have not chosen to follow the courses focused on sustainability and CSR allowing to go further into the principles of responsible management.

The Sulitest's results are also used to provide tangible indicators on the students' Sustainability Literacy for accreditation bodies and for an internal use to calibrate the pedagogy. KEDGE is implementing an entry/exit use of the Sulitest to estimate the impact of its pedagogy and collect data to adapt the curricula. The students are required to take the test a first time when they enter any program of the school (before the first course), and at least a second time when they graduate and leave the school. The data collected will serve to improve the pedagogy and learning experience linked to sustainability over time. For example, the results of the first sessions conducted during the pilot phase (displayed in Figure 7) suggest that some topics such as environment (with an organizational perspective) and fair operating practices need to be reinforced. Whereas other topics such as funding principles, trends and key figures, human rights or organizational governance are well addressed with higher scores or a progression from undergraduates to graduates.

The results are also collected to provide tangible data on the integration of sustainability for accreditation bodies: for example, number of students taking the test and average scores are integrated in the reports for accreditations such as AACSB and EFMD's EQUIS.

The Sulitest is also progressively integrated in the pedagogy through the courses. As the new platform offers the possibility to add customized modules to the general version of the Sulitest, faculty members are developing specific modules to address specific topics and expertise. Modules are already created in entrepreneurship, socially responsible investment, sustainable supply chain, wine and spirits management and many others are currently developed (consumer theory, innovation and design, cross-cultural management, sustainable procurement, creative industries...). As the students are required to take at least the Core Module when they enter the school, they can add one or several complementary module(s) depending on their specialization choices and thus complete their learning experience.

The Sulitest is also used to produce advanced knowledge on ESD. The Sustainability and CSR department has created a customized survey administered with the entry / exit Sulitest sessions and several faculty members are starting to use the Sulitest data to produce academic research.

Finally, the Sulitest happens to be a useful tool to develop collaborations between KEDGE and the business sector. KEDGE has purchased an « Authorized Agent » membership to use its experience with the Sulitest to build research and/or executive education projects with corporations or other organizations in the business sector. For example, a first collaboration has started with the firm LVMH to build a customized module on Wine and Spirits Management.

As a founding member and a « full player » in the Sulitest community, KEDGE is conducting the Sulitest for a high number of students and is exploring a broad scope of potential uses of the tool to maximize its impact on students' Sustainability Literacy, on pedagogy improvement and learning experiment, for academic research on ESD and to conduct change management in businesses and other organizations.

Sulitest Steering Group - UK and Ireland members

The development of regional questions to complement and contextualise the international questions of the Sulitest has been a key part of the test development. This case study provides insights into the approach and mechanism used by the UK and Ireland Sulitest community in order to develop regional questions. In the UK, the first set of questions (version one) were developed by members of the UK and Ireland PRME Steering Committee. The questions were entirely knowledge based and on reflection quite limited but they did provide a starting point for work that has been undertaken over the last year by the UK & Ireland Sulitest Steering Group. The Sulitest Steering Group (currently chaired by PRME) came together in July 2015 and is drawn from representatives of the EAUC (Environmental Association for Universities and Colleges) PRME (Principles for Responsible Management Education) and the NUS (National Union of Students) and is also regionally representative (i.e. England, Ireland, Scotland and Wales). Variations on the questions were also developed for Ireland and translated into the Welsh language.

A key objective for the UK Steering Group was to work together to develop and improve the knowledge based questions for the Sulitest version 2 launch which took place in September 2016. The stated aims for improvements with version 2 included; to integrate a more systemic approach to sustainability literacy; create questions that work towards revealing desirable sustainability mindsets and provide basic feedback to users taking the test in “learning mode”.

At the first meeting, it was agreed that, in order to fully understand the process of question development, the steering group would undertake the version one test as a group. This proved vital to the approach to version 2 questions and in particular being able to experience the test from the student perspective (also aided by the involvement of a representative of the NUS). In addition, having sustainability professionals and academics together to discuss and formulate questions (and the responses) required considerable investment in time but provided an opportunity to completely revise the regional version one questions.

In addition, colleagues of the steering group undertook to champion the test and lead dissemination and engagement activities. These activities included conference workshops to enable participants to explore the Sulitest (and its role in supporting embedding sustainability across institutions) as well as inputting ideas for questions towards version 2). Conference presentations took place at both the EAUC and PRME annual conferences to generate interest.

The launch of version 2 in the autumn of 2016 was welcomed and steering group members recognised that the version 2 platform was much improved and in particular the nature and use of feedback to students was seen as particularly helpful. However, a few technical issues during the Summer 2016, and some access issues appears to have affected the momentum of take up by Universities at start of academic year. These issues have been resolved and steering group members are reengaged in integrating Sulitest, as appropriate, as a valuable tool in sustainability education.

The UK and Ireland Steering group was formed originally to review version 1 questions and develop questions suitable for version 2. This has now been achieved and in moving forward, the steering group have identified a number of issues to focus on. This includes; helping to promote and share experiences of using the test, keeping the questions under review (as the evolution and development of questions is never ending) - particularly in moving towards going beyond knowledge based questions to the development of skills and attitude/behaviorial questions.

In looking to the future, additional issues that have been identified by the group include; inter-disciplinary co-design to expand its use beyond sustainability colleagues at the local HEI level; professional body input; buy-in and expertise from Academic Registry colleagues (who administer institutional surveys) to explore links with other surveys, for example, the National Student Survey (NSS) and Initial Learner Profiles. There are also ongoing challenges related to improving the SuLiTest user experience; measuring and encouraging critical thinking skills, values, attitudes and behaviours related to sustainability and linking this to academic practice enhancements.

5. Conclusion and discussion

This paper emphasizes the contribution of the Sulitest in the field of ESD and especially to the agenda of sustainability in higher education. By displaying an online training and assessment tool, Sulitest provides HEIs with a powerful tool to raise awareness among their students, staff and other stakeholders and to verify that they are producing sustainability literate graduates as future decision-makers. With a new version released in September 2016, Sulitest is also expanding beyond academia by opening to the business sector and other organizations to maximize its impact. The development of the initiative and its rapid international dissemination (553 organizations in 57 countries) allows Sulitest to become a standard to assess Sustainability Literacy.

This study highlights two main contributions of the Sulitest to the global agenda. Firstly, the dissemination of the initiative feeds a global database to map the current state of Sustainability Literacy worldwide and to monitor its progress over time with tangible indicators and a comprehensive scope of sustainability issues. In particular, Sulitest is a featured initiative among the partnerships for the pursuit of the SDGs. The new version attaches the content of the Sulitest to the 17 SDGs to provide detailed indicators on the progress of core literacy in each area covered by the SDGs. This issue is critical to assess that citizens are empowered to conduct and achieve the 2030 Agenda. Secondly, Sulitest act as an open tool for HEIs with various options and uses to assess graduates' sustainability literacy, to engage learning experiment toward sustainability and calibrate their pedagogy, to encourage academic research in this field or to partner with the business sector to co-create content or learning experiments in these topics. This potential as a tool to create change is illustrated by two cases from the Management Education sector with PRME institutions which are progressively integrating the Sulitest in their practices.

If this paper highlights the potential of the Sulitest to initiate and accelerate change toward a sustainable future, it is also acknowledged that this is only one tool in the toolbox and that there are some limitations. Clearly, no test will ever guarantee that students, professionals and citizens will behave responsibly and make ethical decisions. Anyone can have knowledge about crucial social and environmental issues and choose not to act; or worse, take unethical advantage of the situation. Similarly, "knowledge about the challenges" does not mean "knowledge of possible courses of responsible and ethical action".

The epistemological limits of the tool are acknowledged. At the same time a growing community is also convinced of its potential to further common good and value in education for sustainable development. At the very least, the Sulitest is a potentially powerful tool for raising awareness about these urgent issues and need for action and change in addressing sustainability challenges. Its wide use by a large community of diverse stakeholders is critical to realising this potential.

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Appendix A: Sulitest Matrix selecting the questions to ensure a coherent, pedagogical and systemic framework

		Knowledge
Sustainable humanity and ecosystems on planet Earth	1	Ecosystems: Biosphere, global and local ecosystems, interdependent and diverse community of life, life supporting cycles, system closed (materials) / open (energy), etc.
	2	Humanity: Individual human needs, diversity, social fabric, cultures, local and global world, etc.
	3	Sustainability: Definition of Sustainability / Sustainable development
	4	Ecological perspective : where are we at, and why sustainability is both an urgency and an opportunity
	5	Social perspective : where are we at (demography, (in)equalities, gender equality, education, ...), and sustainability being an urgency and an opportunity
Global and local human-constructed systems to answer people's needs	6	Local and global social structures and governance: paradigms; positive results negative impacts; laws; how organisations work; land use; gender equality; etc.
	7	<i>Within local and global social structures and governance, zooms on :</i> Education, and Culture
	8	Local and global economic systems: paradigms; positive results negative impacts; production, distribution, consumption of goods and services; life cycles; value chains; finances; etc.
	9	<i>Within local and global economic system, zooms on :</i> Water, Energy, and Food
Transitions towards sustainability	10	How to start, reinforce, accelerate systems change
	11	Initiatives towards sustainability ... more from institution / int'l level (like UN MDGs, Global Compact, GIEC, GRI, ISO 26000, ESD, etc.)
	12	Concepts, tools, frameworks ... more from individual NGOs or smaller networks (like Cradle to Cradle, Natural Capitalism, The Natural Step, Ecological Footprint, etc.)
	13	Examples and ideas we can learn from: case studies of successes or failures ; technological, strategic, or social innovations
We each have roles to play to create and maintain individual & systemic changes	14	How does one become aware of his own roles and impacts...? whoever "one "is (individual, organisation, south, north, etc.)
	15	How does one efficiently act to create both individual and system change...? whoever "one "is (individual, organisation, south, north, etc.)

↑ Themes ↑

↑ Subjects ↑

Knowledge of Skills		
Personal Skills	16	Ability to reflect/self-evaluate alone and in a group; Ability to constantly renew energy; Ability to continuously to learn/develop; Creativity; Critical thinking
	17	Capacity for empathy, compassion, solidarity; Futures-oriented and strategic thinking
	18	Dealing with complexity and uncertainty; Practical problem-solving / management / planning skills
Working with others	19	Networking; Communication skills; building effective coalitions for systemic change
	20	Catalysing / managing change; Inspire a shared vision; Enable/Motivating others to act/participate
	21	Teamwork; Work in multi-cultural and interdisciplinary (diverse) settings; Participatory skills, decision-making; Conflict resolution skills/consensus building; Focus on process, dialogue, listening;
Think & act systemically	22	Ability to put in practice systems thinking concepts; identify and use leverage points
	23	Ability to zoom in and out in time and details, and to keep the desired future and global perspective in mind
	24	Ability to understand formal and informal structures, power dynamics, and interactions

↑ Themes ↑

↑ Subjects ↑

Mindset	
25	Respect and care for the community of life, now and in the future
26	Humans as part of nature and not separate from it
27	Holistic versus mechanistic worldview
28	Golden rule (treat others as you would like them to treat you)
29	Belief one can initiate and reinforce personal and systemic changes towards sustainability
30	Active commitment to solve sustainability problems

Appendix B: List of Tags

This tag list has been strongly influenced by the Sustainability Literacy Test's pilot version architecture, the Earth Charter, and the UN SDGs (Sustainable Development Goals).

<ol style="list-style-type: none"> 1. Basic definitions 2. Future generations 3. Innovation, creative leadership, and vision of a sustainable way of life 4. Interconnected challenges 5. Global interdependence and universal responsibility 6. Biodiversity 7. Climate 8. Pollution 9. Energy 10. Material resources 11. Water and sanitation 12. Demography 13. Health and basic needs 14. Human rights 15. Inequality and poverty 16. Discrimination of all sorts 17. Labour practices 18. Wellbeing and social progress 19. Cultural diversity and heritage preservation 	<ol style="list-style-type: none"> 20. Formal education and life-long learning 21. Agriculture and feeding human society 22. Cities and human settlements 23. Transportation and infrastructures 24. Housing 25. Tourism 26. Local and global economic systems 27. Global finance and debt 28. Trade (local, international, fair, etc.) 29. Production and consumption systems 30. Taxation systems 31. Corruption 32. Underground economy 33. International Governance and institutions 34. Democratic institutions at all levels 35. Peace and Justice 	<ol style="list-style-type: none"> 36. Information and role of mass media 37. Data and how it is used 38. Knowledge and technology exchanges 39. Stakeholder/communities involvement 40. Decision making process 41. Indicators 42. Transparency and accountability 43. Reporting 44. Solidarity and cooperation
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