Sulitest.org

BRIDGING THE GAP: Equipping Educators for Sustainability

2024 REPORT

Produced by the Sulitest movement,
a tangible implementation of the HESI &
a contributor to the review of the 2030 Agenda

HIGH-LEVEL POLITICAL FORUM
ON SUSTAINABLE DEVELOPMENT

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Advancing Sustainability in Higher Education: Sulitest's Contribution and Impact

Since the launch of the Sulitest movement in 2014, we at Sulitest have been a leading advocate for sustainability in Higher Education, notably at the United Nations. Recognized as one of the first 17 featured initiatives of the United Nations Partnerships for the SDGs, Sulitest is co-chairing the Higher Education Sustainability Initiative (HESI) in cooperation with UNDESA, UNESCO, and UNU. Sulitest has contributed to numerous initiatives to better understand the motivations of both the enablers and the barriers to integrating sustainability into the ethos and outcomes of higher education. Our newly released survey on faculty engagement vis-à-vis sustainability and the SDGs is but the most recent example (see pages 47-52).

Whether through our research in aligning assessment to competency-based knowledge frameworks (e.g., UNESCO, GreenComp, etc.), or the tools we design and distribute to engage in such assessment, we strive every day to mainstream sustainability in higher education and beyond.

When we presented our 2023 report at the High-Level Political Forum a year ago, we were enthusiastically aglow following the successful launch of the first standardized and reliable instrument for assessing sustainability knowledge. TASK™—The Assessment of Sustainability Knowledge, had been born.

One year later, we are delighted to see TASK™ being deployed within the sixty universities that have adopted it. The robust data generated by TASK™ empowers these pioneering institutions to measure and monitor the progression of knowledge on major SDG issues within student cohorts, thereby providing a deeper understanding of the impact of their educational programming and pedagogy. Major networks, rankings, ratings, and accreditation bodies now recognize the value of our tools and data for quality assurance and the larger transformation toward sustainability.

With each passing year, current trends and political events unfortunately remind us that the SDGs are not just an abstract concept but they are addressing a harsh reality for a large part of humanity. As such, they can not be just numbers to tally on a spreadsheet; they are critical indicators of human welfare and biosphere integrity to monitor for urgent and meaningful progress.

In this effort, the tools we create at Sulitest will never measure whether gender equality, biodiversity, or poverty are improving or not. But they do measure precisely what people know and understand about each of these 17 goals and challenges as well as the knowledge and appreciation of the complex links between and among them. Having such information is critical to our collective goal of making progress on the 2030 Agenda.

It is our conviction that all decision-makers—and not just experts—now need to know and understand these basic concepts. It is up to each of us to co-construct a desirable and sustainable future together.

This is our contribution, and we are proud of it.

Aurélien Decamps

Co-founder of the Sulitest Movement

Jean-Christophe Carteron

Co-founder of the Sulitest Movement

Sulitest, a featured initiative of HESI

The Higher Education Sustainability Initiative (HESI) is an open partnership among several United Nations entities* and the higher education community which was launched in the lead-up to the United Nations Conference on Sustainable Development in Rio. HESI accounted for more than one-third of all voluntary commitments launched at Rio+20 and each year in the margins of the HLPF, a global HESI event is organized to showcase how the 2030 Agenda for Sustainable Development is progressing.

Through its strong association with the United Nations, HESI aims to provide higher education with an interface between higher education, science, and policy making by raising the profile of higher education's sector in supporting sustainable development, convening multi-stakeholder discussions and action, and sharing good practice.

Higher Education Institutions (HEIs) joining HESI commit to:

1. Teach sustainable development across all disciplines of study;
2. Encourage research and dissemination of sustainable development knowledge;
3. Create green campuses and support local sustainability efforts; and
4. Engage and share information with international networks.

HEIs can register at: https://sdgs.un.org/HESI

Recognized as one of the first 17 featured initiatives of the United Nations Partnerships for Sustainable Development Goals, Sulitest has, since its launch, been considered a flagship project of HESI. Today, Sulitest co-chairs HESI, alongside UNDESA, UNU and UNESCO.

**United Nations Department of Economic and Social Affairs, UNESCO, UN Environment Programme, UN Global Compact's Principles for Responsible Management Education initiative, UN University, UN-HABITAT, UNCTAD, UNITAR, UN Office for Partnerships, and UN Academic Impact.*

HESI Higher Education Sustainability Initiative

UNITED NATIONS NATIONS UNIES

Division for Sustainable Development
Department of Economic and Social Affairs (DESA)
United Nations, New York, N.Y. 10017

Reference: DESA-2024-01125 10 June 2024

Dear Mr.Carteron,

The High-level Political Forum on Sustainable Development (HLPF) serves as the central platform within the United Nations for the review and follow-up of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs) on a global scale.

The Higher Education Sustainability Initiative (HESI) is an inclusive partnership initiated in the run-up to the 2012 Rio+20 Conference, bringing together multiple United Nations entities and the higher education community. Currently chaired by the Sulitest Association, United Nations Department of Economic and Social Affairs (UN DESA), UN University, and the UNESCO International Institute for Higher Education in Latin America and the Caribbean (IESALC), HESI fosters collaboration between UN entities, higher education institutions, scientific communities, and policy-making bodies.

In accordance with SDG 4, particularly target 4.7, it is essential to ensure that all learners acquire the necessary knowledge, skills, and mindset to promote sustainable development. This encompasses education for sustainable development and sustainable lifestyles, as well as topics like human rights, gender equality, the promotion of peace and non-violence, global citizenship, and the appreciation of cultural diversity and its contribution to sustainable development. This comprehensive approach plays a vital role in expediting the overall achievement of the 2030 Agenda. Consequently, monitoring this target and the outcomes of education for sustainability is crucial for fully realizing its potential.

Over the past decade, the Sulitest movement has contributed to raising awareness about the SDGs, with its tools being widely employed by universities, companies, and NGOs worldwide. More recently, its assessment has provided a valuable mapping of the level of sustainability knowledge worldwide.

I extend an invitation to all higher education institutions to actively engage with HESI and the Sulitest platform. Furthermore, I encourage all stakeholders to deepen their understanding of the prominent challenges of our time, to enhance their training and capacity to address them effectively, and to measure the impact of their endeavours.

Sincerely,

Lotta Tähtinen
Chief, Outreach and Partnership Branch
Division for Sustainable Development Goals
Department of Economic and Social Affairs

Introduction to the Sulitest movement

The role of education

With its 17 Sustainable Development Goals (SDGs) and 169 targets, the 2030 Agenda provides a coherent framework and roadmap to coordinate stakeholder initiatives and to accelerate the transition towards a sustainable future. It is a "plan of action for people, planet and prosperity," aimed at nothing less than "transforming our world."

By training current and future decision-makers, Higher Education Institutions (HEIs) have a crucial role to play in this transition. On a day-to-day basis, and like any organization, HEIs have an immediate impact on the environment and local community. But as providers of education, they also—and probably above all—have **a societal impact through the knowledge they create and transmit**, the skills they equip students with, the mindsets they nurture, and the behaviors and actions they encourage.

The role of HEIs is specifically highlighted in SDG-4 on Quality Education. Goal 4.7 states that by 2030 "all learners (should) acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non- violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development."

SDSN

"Kudos to Sulitest for spurring global knowledge and competency in sustainable development. Achieving the Sustainable Development Goals and the Paris Climate Agreement requires awareness, focus, knowledge and commitment. Sulitest makes an important contribution on all of these dimensions of engagement."

– Jeffrey D. Sachs, President of the UN Sustainable Development Solutions Network

The Sulitest mission

To build a sustainable world, we need everyone (and not just experts) to have a sufficient understanding of the challenges and opportunities faced in the 21st century, as well as an understanding of how to drive change.

So, **how, then, can HEIs systematically improve sustainability literacy? How can they monitor, measure, and demonstrate their impact**

GLOBALLY RESPONSIBLE LEADERSHIP INITIATIVE

"Sulitest's work to improve sustainability literacy is a crucial part of helping accelerate the planetary movement and aligned with the call held by the Globally Responsible Leadership Initiative (GRLI)."

– John North, Executive Director at GRLI

vis-à-vis promoting sustainability education? Helping HEIs answer these questions is the "raison d'être" of the Sulitest movement. We strive to be one of the **key enablers of education for sustainability** by **equipping educators with tools and insightful data** to drive such transformational change, and by **redefining the ethos and outcomes of Higher Education for a sustainable future**.

Over the past 10 years, Sulitest has developed and provided easy access to **three online tools designed to raise awareness about sustainability**, namely the Awareness Test; an engaging and interactive Quiz, and the reverse pedagogy platform called Looping (more on pages 14-15). Over 350,000 people worldwide have used these tools over the past decade—a notable contribution to the achievement of SDG Goal 4.7.

However, in the run-up to the coming decade of the 2030s, it was clear that beyond tools to raise awareness, HEIs needed **a more robust instrument to both build and monitor actual sustainability learning**. Therefore, in March of 2023, Sulitest launched **TASK™ – The Assessment of Sustainability Knowledge**, the first online, 112-item, multiple choice, psychometric assessment and certification of sustainability knowledge. Today, TASK™ is used by HEIs in pre- and post-assessment, generating relevant data for adapting, monitoring, and improving the dissemination of sustainability as a common language. In just over a year since its launch, TASK™ has been taken by over 17,000 students and extended stakeholders across higher education.

With these four tools, **Sulitest is accelerating the sustainability literacy movement worldwide** and contributing to a planetary ambition to empower everyone to understand and engage in the collective building of a sustainable future!

aashe
The Association for the Advancement of Sustainability in Higher Education

"TASK™ is an exciting initiative for measuring sustainability knowledge across the globe. At AASHE, we believe that sustainability should be incorporated throughout the curriculum so that all graduating students, no matter what career path they chose, are equipped with the knowledge and solutions they need to address sustainability challenges. TASK™, through its evaluation of students and their skills, will help realize this goal throughout the world."

– Meghan Fay Zahniser, Executive Director at AASHE

EFMD GLOBAL

"Sulitest is an innovative pedagogical tool that can be deployed in various ways to advance educational objectives in sustainability and global responsibility. Sulitest has proved its relevance in promoting action toward addressing urgent global challenges and fostering transformation in sustainability education and beyond."

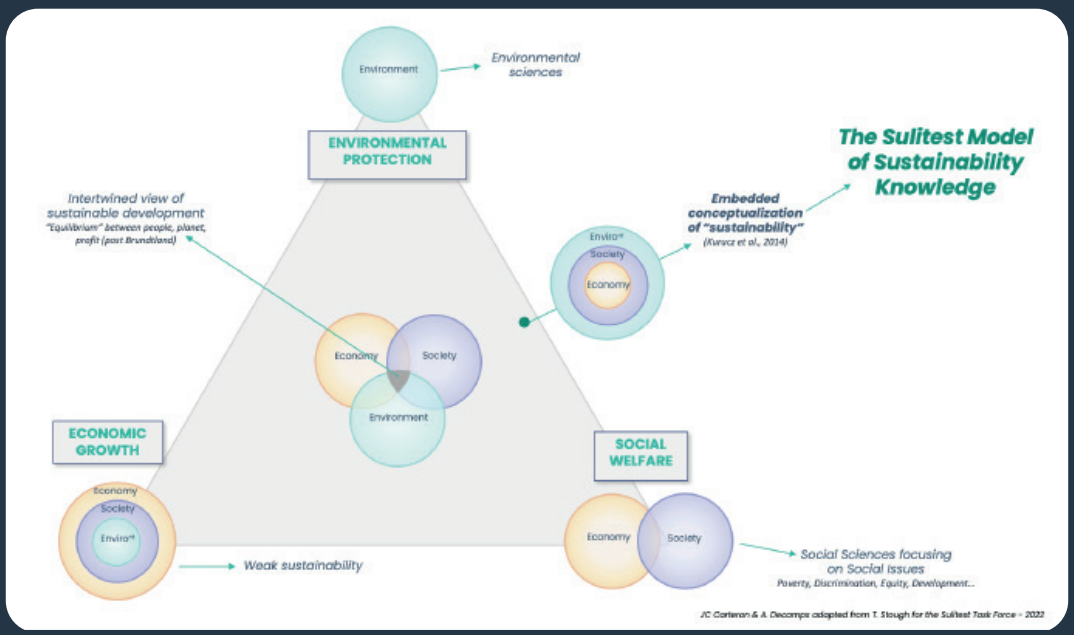
– Eric Cornuel, President at EFMD

Our approach to sustainability knowledge

Sustainability is a contested concept that is not yet anchored to a well-defined and consensual body of knowledge. It encompasses diverse and sometimes conflicting notions and approaches, each reflective of the relative importance assigned to environmental protection, social welfare, or economic growth.

Establishing what should be included in the domain of sustainability knowledge required engaging with recent and relevant science-based literature and existing approaches, methodologies, and frameworks for sustainability. To this end, Sulitest created a **"TASK™ Force" of academics and sustainability professionals**. Sulitest also created and mobilized the **"Fellows", an assembly of relevant stakeholders** (about 70 representatives from academic and corporate networks, accreditation and rankings bodies, student organizations, NGOs, and public institutions) charged with providing counsel and feedback for **ensuring the relevance of the domain of sustainability knowledge** as articulated by the Sulitest TASK™ Force.

Throughout the process, Sulitest made conscious decisions and intentional choices that **situated its concepts, tools, and actions at specific locations within the pre-existing field**, as indicated below, **of sustainability knowledge and education for sustainability**.



As pictured in the graphic above, the **Sulitest model of sustainability** is situated mid-point between the environmental and social sciences in what is considered an **"embedded conceptualization" of sustainability**. The model of sustainability knowledge that Sulitest built projects both its own vision of sustainability and the multiple pathways to building that specific sustainable future.

The model of sustainability knowledge that emerged builds upon the embeddedness of Earth systems, upon a solid foundation of human welfare, and upon multiple levers of action and opportunity that make sustainability possible, although, alas, still uncertain. It requires that humans know and understand the multiple frameworks, domains, and subjects that constitute sustainability, as well as their **systemic interlinkages** of causality and impact.

Having combined the sources of inspiration with the existing literature in the fields of sustainability and education for sustainability, the TASK™ force thus articulated the Sulitest model of Sustainability Knowledge as one not specific to a discipline or sector, but one **following the thematic, integrated, embedded, and systemic** nature of sustainability literacy.

As such, Sulitest provides both a grounded and synthetic definition of sustainability knowledge:

> *All individuals should know and understand Earth systems, the social foundations of human welfare, and the levers of action and opportunity that inform and influence our ability to build a sustainable future; and identify and appreciate the systemic interlinkages existing between and across them.*

The Sulitest articulation of sustainability knowledge is a **call for radical systemic change in what we need to know and understand to empower ourselves for the building of the sustainable future we all want and need**.

Main sources of conceptual inspiration

Having completed an extensive literature review of the many existing reports, tools, and frameworks on sustainability literacy, Education for Sustainability (EfS), Education for Sustainable Development (ESD), sustainability assessment, and related research on the topic, the building of the Sulitest model was informed by **four main institutional and academic approaches to sustainability**.

I. The **UN 2030 Agenda for Sustainable Development**, which provides a common roadmap embracing the systemic nature of sustainability with 17 Sustainable Development Goals (SDGs) and 169 related targets. Holistic and integrated by design, the 17 SDGs reveal a systemic approach to sustainability via their multiple interlinkages, synergies, co-benefits, trickledown effects, feedback loops, but also potential conflicts, trade-offs, and zero-sum gains.

II. The **Planetary Boundaries Framework** by the Stockholm Resilience Centre, which identifies nine planetary boundaries that regulate the stability and resilience of the Earth system and provide a safe operating space for humanity to thrive. Acknowledging that there is ongoing scientific debate around the concept of planetary boundaries, and that the quantification of these boundaries is continuously evolving and in a process of further scrutiny, this approach nevertheless provides a solid framework for articulating the different domains of Earth Systems and their systemic interactions. Climate change and biosphere integrity are the core domains of Earth systems, and they continuously interact with all other regulating planetary boundaries

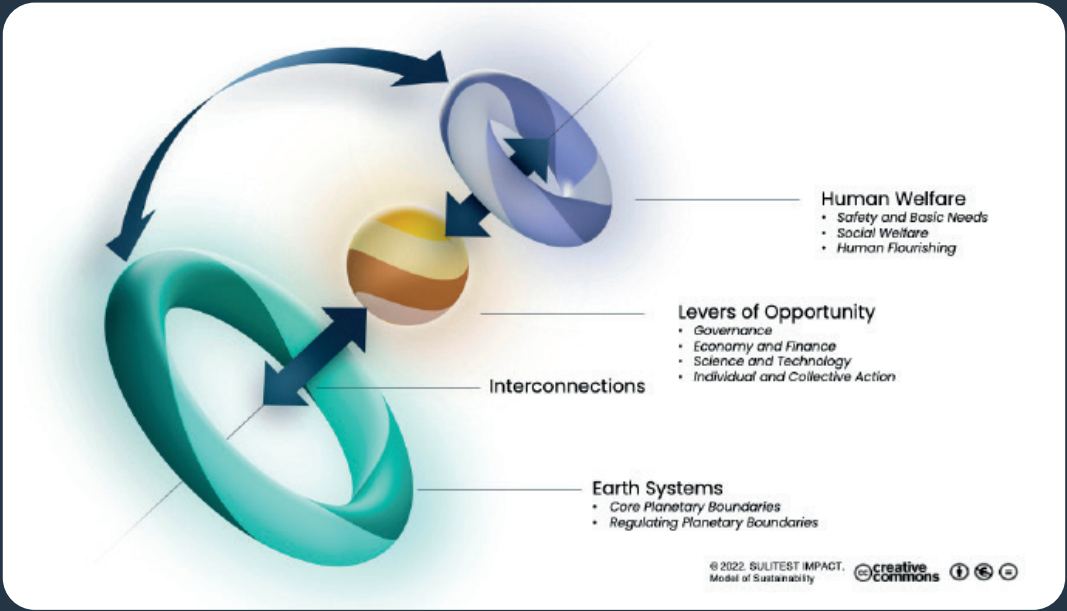
This framework inspires an embedded conceptualization of sustainability, where the SDGs are viewed as a "wedding cake" where the Economy is embedded in Society, which is itself embedded in the Biosphere.

III. The Kate Raworth Model of "**Doughnut Economics**" provides a third framework the Sulitest TASK™ Force used to delineate sustainability knowledge. This model of sustainability holds that humanity might thrive beyond the 21st century, but only by requiring that meeting human needs (the social foundation) remains subject to the ability of the living planet to provide for such needs (the ecological ceiling). This model allows us to "rethink" the economy as a system that ethically should, and ecologically must, operate between these two boundaries—i.e., the doughnut-shaped space that is both ecologically safe and socially just.

IV. The **UN's 2019 Global Sustainable Development Report—The Future Is Now: Science for Achieving Sustainable Development**—provides the conceptual foundation for the third type of sustainability knowledge assessed by TASK™—what Sulitest calls Levers of Opportunity—i.e., the principles, strategies, and techniques available to humans for implementing impactful solutions and effecting transformative societal change. Specifically, the Global Sustainable Development Report (GSDR) identifies four levers of action that support deep transformation for the global goals, which we have adapted and integrated into our model: Governance; Economy and Finance; Science and Technology; and Individual and Collective Action.

Structuring and operationalizing a Foundational Matrix of Sustainability Knowledge

The Sulitest knowledge model is structured and operationalized via a **Foundational Matrix of Sustainability Knowledge** organized into three Frameworks: Earth Systems (our environmental ceiling), Human Welfare (our social foundation), and Levers of Opportunity (which make sustainability possible, although, alas, still uncertain). Each Framework (i.e., first-order) is further structured into second-order "Domains" and third-order "Subjects".



In the model, **Earth Systems** is schematically presented as the largest because the other two frameworks—Human Welfare, and Levers of Opportunity—depend upon, and are embedded within it. Without a stable and sustainable Earth system, there can be no meaningful human welfare nor levers of opportunity to seize.

The second framework—**Human Welfare**—is conceptually embedded in Earth Systems, given that humans are but one species in the community of life, and that the pursuit of such human welfare cannot exceed the capacity of the Earth to provide for the welfare of all life-forms. The framework of Human Welfare builds upon the framework of the SDGs.

The "sphere" in yellow in the middle represents the **Levers of Opportunity** that act upon both Earth Systems and Human Welfare. These levers are the many individual and collective public policies and processes, as well as cognitive capacities, at humanity's disposal for making decisions and taking actions that either advance or, alas, impede progress towards sustainability.

The arrows in the schematic indicate the many direct and indirect **relationships, interconnections, causal relationships, systemic impacts, and feedback loops** both within and across the three frameworks.

Beyond identifying the key frameworks and sub-themes within each, the Sulitest TASK™ Force also identified **four discrete types of sustainability knowledge** that constitute a holistic understanding of each subject:

- **Descriptive knowledge:** What are we talking about? How does this work?
- **Contextualized knowledge:** Where are we now? How are things changing?
- **Causal knowledge:** Why is this happening? Who is doing what and why?
- **Integrated knowledge:** What are the related effects? How is this affecting the larger system?

The resulting Matrix, which can be found in Appendix B, expresses our systemic vision of sustainability knowledge and guides us in creating and structuring the content of our tools.

THE SHIFT PROJECT

"Understanding ecological issues in all their complexity and systemic dimension must become the norm. Initiatives such as Sulitest and TASK™ help to ensure that the subject is taken seriously, through systematic assessment of learners, which is essential if any approach to teaching about transition issues is to be credible."

– Clémence Vorreux, Higher Education Coordinator at The Shift Project

SOS STUDENTS ORGANISING FOR SUSTAINABILITY UNITED KINGDOM

"The Sulitest serves as a useful tool to advance the knowledge and skills required for a more just and sustainable future. Future graduates will have deeper understanding and appreciation for how sustainability relates to all disciplines and careers thanks to the work of the Sulitest community. We've been really delighted to support the latest pilot of the Sulitest and see it as a complementary tool to our whole institution change programmes like Responsible Futures and wider systems-change campaigns like Teach the Future. It's exciting to see the Sulitest continue to develop and align with our mission to see all students learning and leading for sustainability."

– Quinn Runkle, Director of Education at SOS UK

Alignment with other sustainability competency frameworks

By design, TASK™ was both **inspired by and built to align with existing pedagogical approaches to education for sustainability**, sustainable development, and ecological transition such as *Education for Sustainable Development Goals: Learning Objectives* (UNESCO, 2017), the *GreenComp — European Sustainability Competence Framework*, (European Union, 2022), the Jean Jouzel report: *"Sensibiliser et former aux enjeux de la transition écologique dans l'Enseignement supérieur"* (French Ministry of Higher Education, 2022), and the four-dimensional *Competencies/Sub-competencies Framework* focused on knowledge, skills, character, and meta-learning (Center for Curriculum Redesign, 2019).

When in mid-2023, Sulitest developed its bank of Navigational Charts (i.e., easy-to-read synoptic overviews of each of the 28 subjects listed on the TASK™ Foundational Matrix of Sustainability Knowledge, described on page 11), it became possible to describe and, in some cases quantify, the alignment between the content of TASK™ sustainability knowledge and selected competency frameworks like those just mentioned above but also others. To date, Sulitest has created **a series of comparative "Alignment Referentials"** (available at sulitest.org/2024-reports) for the following competency frameworks:

- Education for Sustainable Development Goals: Learning Objectives. UNESCO, 2017
- GreenComp — European Sustainability Competence Framework. European Union, 2022
- Referential of Sustainable Development and Social Responsibility knowledge and skills ("Référentiel de connaissance et de compétence en DD et RSO"). IAE France, 2023
- Referential of Sustainable Development and Social Responsibility skills ("Référentiel de compétences DD&RS"). CDEFM, 2023
- Common base of cross-disciplinary knowledge and skills on the Anthropocene ("Socle commun de connaissances et de compétences transversales sur l'anthropocène"). Fondation UVED, 2023

IAE FRANCE
Écoles Universitaires de Management

"IAE France, the French association of university business schools, is aware of its responsibility in higher education. Since 2023, it has implemented a strategy to promote sustainable development (SD) among its stakeholders. It has published a handbook of standard guidelines that detail knowledge and competencies in SD and in organisational social responsibility (OSR). Its certification label, Qualicert, has evolved likewise and offers SD backup to its management teams. The association has also signed agreements with external partners to benefit from their expertise. For example, a partnership with TASK™ will help to certify the SD competencies acquired by students."

– Corinne Van der Yeught, Sustainable Development Vice President at IAE France

These sustainability competency frameworks are relatively new but as they and others become more widely known and used, TASK™ will provide an effective and appropriate means of assessing student progress across a wide array of cognitive and knowledge-based domains.

Our Learning Tools

Since its creation, Sulitest has been providing organizations with locally and internationally recognized online tools to increase awareness of sustainability and the UN SGDs.

Awareness Test

Launched 10 years ago, the Awareness Test is designed to i**mprove sustainability awareness through an engaging formative test**. It consists of 28 multiple-choice questions* (the "International Core Module"), which can be complemented with optional country-specific, SDG-specific or even customised modules. **Over 350,000 people** participated in an Awareness Test session in the last decade.

**The content and structure of the Awareness Test and corresponding question bank were reviewed in November 2023 following the new definition of sustainability knowledge adopted by Sulitest (described in the previous chapter).*

SDG SPECIALISED MODULES

Sulitest launched several projects in partnership with UN entities to create modules related to specific SDGs, such as:

SDG FRAMEWORK - To support understanding of the SDG framework, Sulitest and UN DESA developed a module on the SDGs' overall conceptual framework.

SDG-7: AFFORDABLE AND CLEAN ENERGY, IN PARTNERSHIP WITH UN DESA - The Division for Sustainable Development of UN DESA led a process to create a Sulitest SDG-7 module.

SDG-11: SUSTAINABLE CITIES AND COMMUNITY, FOCUSED ON HOLISTIC WASTE MANAGEMENT, IN PARTNERSHIP WITH UNEP - While overlooked by many, waste management affects people around the world. A specific module to address the challenges of SDG-11, focusing on holistic waste management, was developed in 2018 by Sulitest and the UN Environment - International Environmental Technology Centre (IETC) in Osaka, Japan.

SDG-12: SUSTAINABLE CONSUMPTION AND PRODUCTION, FOCUSED ON CIRCULAR ECONOMY, IN PARTNERSHIP WITH UNEP - With the help of UNEP, a group of universities, and NGOs, Sulitest created a specialized module to help participants discover concepts, pathways, and opportunities to embrace the Circular Economy.

SDG-14: LIFE UNDER WATER, FOCUSED ON OCEANS, IN PARTNERSHIP WITH UN DESA AND WITH THE SUPPORT OF MERCATOR OCEAN INTERNATIONAL – Sulitest, Mercator Ocean International and UNDESA, together with an expert multi-stakeholder working group, created module to raise awareness about SDG-14, so that we all become Ocean Citizens, learn about ocean-related issues, and are inspired to take action to protect this valuable ecosystem.

Quiz

The Quiz is a **dynamic activity featuring 6-10 thought-provoking questions**. Players connect on their hand-held devices, have one minute to answer each question, and get instant feedback with live team scores. This 15-minutes activity is perfect for classrooms, meetings, or events, serving as both a fun **icebreaker** and a tool to raise sustainability awareness.

Pedagogy for the SDGs requires critical thinking and the ability to question ourselves, what we know, and the way we learn or teach. It requires that we seek solutions that are broader than simply finding the “right” answer. While the Awareness Test and Quiz are great tools to raise awareness, Looping offers a more profound learning experience.

By **crafting their own sustainability-linked questions in a Looping workshop**, participants solidify subject understanding and actively engage with a given topic. They also learn how to synthesize information and provide peer feedback—all essential skills for any professional.

Intro2TASK is a pathway designed to **help individuals gain a better understanding of the main topics covered by TASK™, and as a result, of sustainability more generally**. It includes resources (mostly short videos or interactive websites) which can be shared directly with TASK™ takers in the structured pathway, or that can be selected by educators for use in their classes.

Navigational Charts

While different tools and resources, like the ones described above, can support the integration of sustainability into current teaching practices, it is undeniable that much of the HEI's curriculum today is anchored to inequitable principles, outdated theories, extractive models, and business-as-usual practices. Therefore, in the endeavor to promote sustainability education, HEIs are being called upon to review course content and the learning objectives they expect graduates to achieve.

Recognizing the challenge and complexity of this work, Sulitest developed a bank of Navigational Charts, i.e., **easy-to-read synoptic overviews of each subject listed on the TASK™ Foundational Matrix of Sustainability Knowledge**, which include:

- the definitions of key concepts
- the current state regarding planetary boundaries or minimum social foundations
- key international regulatory initiatives and legal regimes
- a breakdown of core subject content into "bite-size" themes and bullet-point lists
- ready-to-adapt learning objectives
- a bibliography of key resources.

Their **primary purpose is to inform the ongoing process of reviewing and revising course learning objectives and corresponding curricular content** in line with the Sulitest TASK™ model and definition of sustainability knowledge.

Assessing sustainability knowledge with TASK™

To build a sustainable future, it is imperative that we improve sustainability knowledge, skills, and mindsets across the globe. While the world certainly needs experts able to solve specific and technical problems in their respective fields, it is now essential that all humans acquire at least a minimum of general sustainability knowledge. As such, all educators must ensure that today's growing number of graduates and emerging professionals achieve a sufficient level of knowledge and understanding of the basics of Earth sustainability as well as the ability to integrate such learning into personal and professional practice, social interaction, civic action, and public decision-making.

In early 2023, Sulitest released **TASK™—The Assessment of Sustainability Knowledge**—with the ambition of transforming education by **(re)setting the standard of sustainability knowledge** which, henceforth, must constitute the very foundation of human decision-making and agency. TASK™ is an **online, 112-item, multiple-choice, psychometric test** that measures both the quantity and quality of knowledge about sustainability possessed by test-takers.

TASK™ provides individuals with scores across TASK's 28 subjects, as well as an internationally recognized digital certificate. For higher education institutions offering the assessment, TASK™ provides extensive aggregated and disaggregated data that can be used for measuring, monitoring, and steering both sustainability strategy and education throughout the institution. Ultimately, **TASK™ provides a global diagnostic and benchmark of sustainability knowledge, which can be leveraged for curricular review, strategy design, research, reporting, and more.**

While TASK™ is but one tool in Sulitest's education for sustainability toolbox—focused as it is on core cognitive knowledge—it fills an important gap in the landscape of sustainability assessment by measuring one's level of knowledge revealed through multiple item-responses situated within a holistic, integrated, systemic, and interdisciplinary structure.

"As we face the climate catastrophe, the role of higher education in solving one the greatest challenges ever facing humanity has never been greater. Sulitest provides an important lens on how well we are educating students to respond to this emergency - equipping institutions with vital insight to ensure they can adapt their pedagogical approaches and raise literacy around sustainability. This will drive the transformation of sustainability education for years to come."

– Leigh Kamolins, Director of Analytics & Evaluation at QS Quacquarelli Symonds

While curriculum and pedagogical transformation takes multiple forms across diverse contexts, TASK™ is the "game changer" that makes **sustainability a common language for all**, regardless of the degree, specialization, profession, or business sector. It constitutes a base of common knowledge upon which

engineers, managers, biologists, and public authorities—for example—can communicate and use as a shared language to work together to build a sustainable tomorrow. Of course, knowledge is not enough; sustainability literacy also requires a discrete mix of appropriate attitudes and competency-based skills and behaviors that enable action. However, several studies (including those cited above) provide compelling evidence that the sharing of a common base of knowledge is crucial to enabling transformative action and triggering systemic change.

"Many AACSB members are successfully using the Sulitest assessment to measure student sustainability knowledge. Identifying knowledge gaps and adjusting curriculum to close gaps is increasingly important as businesses move towards sustainable business models."

– Nicholas Igneri, Chief Learning Officer at AACSB

International recognition

TASK™ was developed with the higher education community, for the higher education community. This effort, described in details below, involved collaboration and consultation with multiple academic, corporate and student networks, as well as accreditation and ranking bodies, to ensure that TASK™ would meet their needs. This also built recognition from the start.

Looking at accreditation and ranking bodies in particular, they have increasingly asked for metrics on sustainability education. However, simply asking for the number of sustainability courses or the number of students enrolled in those is not sufficient to measure the quality of sustainability education. TASK™ addresses this gap, by enabling institutions to report true learning outcomes, rather than just inputs.

Today, **TASK™ is recognized as a reliable assessment of sustainability knowledge, and a valuable tool to promote education** in the following rankings and networks: QS, Times Higher Education, AASHE, PRME and IAE France.

Moreover, QS, Times Higher Education, and AASHE especifically ask in their reporting process whether institutions are assessing sustainability knowledge, and if yes, whether they use TASK™.

We are honoured to partner with these leading organizations who are encouraging and rewarding better sustainability practices in higher education.

How TASK™ is structured

The content of TASK™ is **determined by the Foundational Matrix of Sustainability Knowledge** described previously. While questions vary from one test to the next, each TASK™ assessment covers all the 96 items identified in the Matrix, thus guaranteeing its **standardization and comparability**.

How TASK™ was developed

Following the collaborative work of defining "Sustainability Knowledge" (as described in the previous chapter), the TASK™ Force and team of writers contributed to the development of questions based on their areas of expertise. Questions are formulated in a multiple-choice format, with one correct response and three incorrect distractors. Questions are organized according to the structure of the Matrix and tagged for bibliographic reference, author, and additional miscellaneous information (e.g., connection to SDGs, relation to other dimensions in the matrix, expiration date, etc.).

The first step of establishing **face validity** was then organized by an **editorial team** coordinated by Sulitest using the following criteria: format of the questions (including number of words), relevance of the questions (what learning outcome is assessed by this question), relevant metadata (matrix subject, SDGs, etc.), correct answer and distractors (plausibility, similarity in terms of length and wording, etc.), phrasing, source, and expiration date allowing for a continuous updating of content. Once the first process was completed, a **pilot study** was conducted in November 2022. With the support of many student and academic networks, the pilot study was a success with a sample of 1382 respondents who completed the pilot-version of TASK™.

SDSN YOUTH

"TASK™ by Sulitest are pioneering embedding Education for Sustainable Development (ESD) into usable course content that can go into curricula in such a way that can launch an international movement of sustainability worldwide. Sulitest regularly engaged with young people through SDSN Youth from various communities to develop their content, viewing students as stakeholders for ESD in higher education. They also offered our students the first opportunity to earn a TASK™ certificate, which is a fantastic opportunity for developing the skill sets and knowledge of sustainable development for young people in our program. We have been thrilled to work with Sulitest, and celebrate their championing the importance of ESD in higher education for a better world."

– Ellen Dixon, Project Lead at the SDG Students Program at SDSN Youth

A first batch of 288 questions was tested (in English and French) and two types of analysis were conducted. Firstly, an analysis harvesting **qualitative feedback** from the respondents about the relevance of TASK™, the content, and the user experience accessing the online platform and taking the assessment. This qualitative data was collected via a feedback form (optional at the end of completing the TASK™ pilot) and through three focus group sessions conducted at different universities. Secondly, a **quantitative analysis using psychometric techniques from Item Response Theory (IRT)** confirmed the validity and reliability of the assessment. This latter analysis is continuously updated with the latest data from TASK™ (see Appendix C).

Why TASK™ is robust and reliable

To assess this specific model of sustainability knowledge and to provide a robust measure of ability, TASK™ is based on a **psychometric model** developed by Sulitest's Data Scientist Alexander Brewer, in collaboration with Dr Talia Stough (Assistant Professor at Open Universiteit and member of the TASK™ Force) and a group of external researchers.

POSITIONING – WHY PSYCHOMETRICS?

Imagine you are an educator and your primary goal is to foster learning and development in your students. To achieve this, you need to understand your students' strengths and weaknesses, their learning progress, and the effectiveness of your teaching methods. That is a lot to figure out just by observation or casual classroom assessments. This is where psychometrics comes in to play. At its core, **psychometrics** is the field that deals with the **measurement of knowledge, abilities, attitudes**, and personality traits. Its application in education is called educational assessment.

If we consider standardized tests like the SAT, TOEFL, or GMAT, it is through psychometric principles that we come to trust such tests to give us a reliable measure of a student's academic abilities. These exams are carefully designed, tested, and revised to ensure they accurately and fairly evaluate students' knowledge and skills.

In addition to **large standardized tests**, psychometrics can also be applied to classroom quizzes, exams, and other types of assessments. It helps ensure that the questions we ask truly measure what they are intended to. For instance, if a math test question inadvertently requires extensive reading comprehension, it may not accurately reflect a student's math skills. Psychometric analysis can detect and help correct such issues. Moreover, psychometric

Graduate Management Admission Council™

"Sustainability is growing in importance for candidates interested in graduate business education. GMAC's research shows that prospective students expect sustainability to be a part of their graduate management education curriculum. After graduation, business school candidates tell us they want to use their education to make a positive impact on the planet and its people. Sulitest will help empower business students to deliver on their goals of translating sustainability and social good from the classroom to the real world. "

– Joy Jones, CEO at Graduate Management Admission Council (GMAC)

data can provide insights about **learning progress** over time. Teachers can use this to identify students who are excelling or falling behind and then adapt their teaching strategies accordingly.

Psychometrics also plays a crucial role in evaluating educational interventions, For example, psychometric assessments can help determine whether a new teaching method or curriculum is more effective than the previous one.

Finally, these assessments help **uphold standards of fairness and equality**. For example, they can help ensure that assessments are unbiased and do not disadvantage any particular group of students.

Even though the statistical sciences of psychometrics may seem complex or daunting, its value is evident. It allows us to measure, track, and facilitate learning in a systematic, reliable, and fair way, ultimately helping to enhance educational outcomes.

THE TASK™ MODEL

A central limitation of Classical Test Theory (CTT) is that it operates under the assumption of test scores being linear and the same across all test takers. This disregards individual differences in ability levels, item characteristics, and the dynamic interplay between these factors. CTT's reliability statistics, consequently, are sample-dependent and lack generalizability across different groups or conditions. This becomes particularly limiting when analyzing complex constructs, like sustainability knowledge, where individual response behaviors can greatly vary, and different knowledge areas are subjects to systemic interactions.

To provide a **robust psychometric measure of ability, TASK™ is building on Modern Test Theory (MTT), or Item Response Theory (IRT)**. Sulitest attempts to innovate in the field of psychometrics through the development of a **reformulated IRT model which includes hierarchal parameterizations of items allowing to integrate the structure of the matrix of sustainability knowledge and multidimensional assumptions of ability into a geometric representation of ability**. The inclusion of hierarchal item parameters, multidimensional assumptions, and geometric representation of ability aims to provide a system of measurement that can be used to inform curriculum structures with quantitative science. The use of data science techniques, such as **machine learning**, to analyze large amounts of assessment data and the specification of the model support the robustness of TASK™ as a measure of ability and allow for continuous improvement of the validity and reliability of test scores.

The technical specification of the TASK™ model as well as the test reliability analysis are detailed in Appendix C. The detailed granularity of this model is particularly paramount given the systemic nature of sustainability. This multifaceted concept, embracing an extensive range of subjects from environmental science to social justice, necessitates a multidisciplinary understanding. By leveraging the intricate parameterization in our model, we can accurately identify areas where respondents demonstrate proficiency or reveal gaps in knowledge. **This insight not only enhances our understanding**

of an individual's sustainability knowledge but also provides valuable information for educational programming. With this level of detail, we can guide the refinement of education and training programs to ensure they address identified gaps and further strengthen areas of proficiency. In essence, the integration of item family parameters offers a novel and comprehensive method to assess, enhance, and tailor sustainability education.

UNDERSTANDING THE SCORE

In IRT, ability is typically estimated on a latent trait continuum, which is an unobservable, hypothetical construct that represents the test-taker's level of proficiency or mastery of the test content. To provide a more natural interpretation of TASK™ scores, ability is estimated on a geometric latent trait continuum and measures a respondent's ability to assess sustainability knowledge, as defined by the model and content matrix put forth.

As previously described, TASK™ score is calculated by a machine learning IRT algorithm which models a respondent's abilities, dependent on the parameters of items and item groupings. **TASK™ score is presented out of 100** which corresponds to the geometric transformation of the continuum contained within the applied model.

Sulitest's approach to the TASK™ matrix refutes the idea that sustainability knowledge can be precisely measured as a unidimensional construct or trait. Instead, the capacity to assess **sustainability knowledge is treated as a multi-faceted product of multiple abilities.** In essence, this reflects the premise that an individual is not merely the sum of their parts but embodies a more intricate underlying structure. While the overarching structure of MTT and IRT models might seem complex to fully grasp, it's vital for respondents to comprehend how they can influence their TASK™ score.

A respondent **affects their TASK™ score by:**

- Their engagement with items: **the number of items answered by a respondent** plays a crucial role. An unanswered question leads to a decrease in the precision of modelling the respondent's ability related to that item. Therefore, TASK™ incentivizes respondents to answer all questions.

- **The accuracy of responses**: correct answers serve as evidence that the respondent's ability level surpasses the combined level of difficulty of the answered question.

- **The parameters of the answered items, including difficulty**: correctly answering more difficult questions yields higher points for that item. Although Sulitest's assessment forms are calibrated to comprise questions with equivalent average difficulty, variations between item difficulties do exist.

It's important to bear in mind that even with a functional geometric scale in place, the score merely approximates the underlying latent trait score. Moreover, the scale score is susceptible to influences from statistical assumptions and factors such as test-taking strategies, guessing, and measurement error.

Nevertheless, having examined the reliability of the TASK™ test through the lens of Item Response Theory in Appendix C, we can confidently state that our instrument is **well-calibrated to provide accurate and meaningful insights into respondents' abilities**.

INDIVIDUALIZED INSIGHTS AND COMPREHENSIVE COHORT ANALYSIS

TASK™ **provides learners with individual scores** that accurately assess their knowledge on both the **systemic perspective of sustainability and the specific subjects within the model**. These same metrics and data, compiled at the cohort level, **offer instructors a comprehensive view of their class or program's performance**. They can compare their students' scores to those of other cohorts within the institution, the global average, and even track their own students' progress over time. The detailed nature of the scores allows for in-depth analysis, pinpointing which subjects students grasp most readily, where they struggle, and where they show the most improvement.

A growing community of “Change Leaders”

Among the 60 institutions that use TASK™ globally, **36 have joined the TASK™ Change Leader program**, joining our effort to make sustainability a common language for all graduates. These institutions have **committed to the ambitious objective of assessing and certifying the majority of their graduates with TASK™** within three years. As part of the program, they have unlimited access to the assessment, and join a network of like-minded educators.

American University of Cairo (School of Business), Campus XII Avenue, CY Université, ECAM LaSalle, Ecole des Ponts ParisTech, Ecopia, EM Normandie, ENS Lyon, ENSEA, ENSG, ENTPE, EPISEN, ESCP, ESG Act, ESME, ESSEC Business School, ESTA, ESTHUA, Excelia, Grenoble Ecole de Management, HEC Montréal, IESEG, IMT Business School, JUNIA, KAUST, KEDGE Business School, Nantes Université, Sup de Vente Paris/ESSYM, Toulouse Business School, Terra Institute, UniLasalle, Université Paris Saclay, Université Senghor, University of Sussex Business School, YNOV, and Y Schools.

The power of Change Leaders

HEIs play a critical role in fostering sustainability and tackling the global challenges we face. The Change Leader program recognizes the urgency of incorporating sustainability into the curriculum, thus ensuring that graduates from diverse fields are equipped with the tools to implement sustainable solutions. As such, **their shared objective is to assess a majority of their graduates**, and not only students from specific "sustainability" degrees. By integrating sustainability generally into their curricula and by using TASK™ as an well-aligned assessment instrument, these Change Leader institutions are **taking a significant step towards equipping future leaders with the necessary knowledge and skills to address the pressing challenges facing our planet**.

Empowering future leaders

The integration of sustainability into higher education curricula empowers students to become change agents and leaders in their respective fields. By equipping graduates with a deep understanding of sustainability challenges, strategies, and solutions, these institutions are **nurturing a new generation of professionals who will drive the transition towards a sustainable world**. The Change Leader program ensures that sustainability is not confined to a single discipline but becomes an integral part of every student's educational journey!

TASK™ issues a certificate to each participant that details their numerical scores and acts as a sustainability micro-credential. Many participants share their certificates on social media and professional digital networks like LinkedIn, as a complement to their diploma. TASK™ enables them to prove that beyond a traditional degree in business, or law, or engineering, they are also eager and equipped with the knowledge to promote sustainability in their careers.

POUR UN REVEIL ECOLOGIQUE

"As a student activist and member of Pour un Réveil Écologique, I've seen a striking gap between students' sustainability aspirations and the response from higher education institutions. TASK™ is not only a personal assessment tool but also a potential game-changer in sustainability education. It can be used as a real anti-greenwashing test, offering a tangible measure of the efficacy of sustainability teaching, and thereby revealing alignment, or misalignment, between an institution's words and deeds. By providing clear data on student knowledge at different points in their academic journey, TASK™ can help inform and shape sustainability strategies within these institutions. I see TASK™ as an indispensable tool in our lobbying efforts to push for more robust integration of sustainability in education."

– Grégoire Landoyer, Member of Pour un Réveil Écologique

Forming a community of practice

Transforming education, rethinking curricula, and mainstreaming sustainability knowledge—these are tremendous challenges that highlight the crucial role higher education plays in the global 2030 Agenda. Achieving this promise will take multiple forms in various contexts, and we will need collective intelligence, to learn from our peers and to provide relevant pathways toward meeting this challenge. By **forming a vibrant community of practice**, the Change Leaders are building new and innovative processes for embedding sustainability literacy into the student educational journey.

Best practices in sustainability assessment and education

Recommendations for TASK™ deployment

Sustainability education faces a unique challenge: how to integrate complex concepts within and across various disciplines. TASK™ is a powerful tool to address this very challenge, given its transdisciplinary approach and systemic design. While there's no one-size-fits-all approach to using TASK™ effectively, the key lies in tailoring its use to one's unique institutional culture, existing sustainability efforts, and student maturity level. Experience has shown us that **TASK™ is most impactful when students engage with it meaningfully and when educators draw from it its many pedagogical insights.**

One of the biggest hurdles educators face is integrating sustainability concepts across various disciplines without a clear understanding of the existing baseline of aggregate student knowledge of sustainability. TASK™ bridges this gap by **providing a benchmark assessment at the beginning of a course or program**. This allows educators to tailor their teaching content and pedagogy to student levels of understanding, thus ensuring a more effective learning experience.

TASK™ also empowers institutions to **measure the effectiveness of their sustainability education programs**. It provides valuable insights that help graduates develop the ability to discuss sustainability challenges, trends, and interconnections. Plus, the TASK™ assessment can be used to i**nform teaching with comparisons between programs, entry and exit testing**, or to gain richer student learning insights.

Finally, the detailed and aggregated results can be used as **evidence for accreditors, quality assurance agencies, ranking and rating bodies, and other stakeholders** in higher education. TASK™ acts as a **trusted third-party evaluation tool**, providing robust, secure, and comparable data on the impact of your sustainability education programs and larger strategy.

FT FINANCIAL TIMES

"I support seeking to identify key principles and insights around sustainability, track initial awareness and progress in business education and beyond to raise quality and action to tackle global warming. Sulitest is an important initiative to explore ways to meet these goals."

– Andrew Jack, Global Education Editor at Financial Times

THE Times Higher Education

"The power of higher education to change the world exists both in what it is, but also more importantly in how it affects the futures of all students. Nurturing enquiring minds has always been part of that mission – but now it is more important than ever that it also encourages an aware, sustainable mindset in every student. We are delighted that we will be incorporating questions on Sulitest's TASK™ initiative into the largest assessment of university sustainability – THE's Impact Rankings – in 2025."

– Duncan Ross, Chief Data Officer at Times Higher Education

UNIVERSITY OF SUSSEX | BUSINESS SCHOOL

CASE STUDY: INSTITUTIONALIZING TASK™

To enhance its commitment to integrating the values of sustainability, social responsibility, and ethical practice into curricula, teaching, and research, the University of Sussex Business School was the **first British institution to join the TASK™ Change Leader program**. "This is an excellent opportunity for us to enhance our sustainability literacy in pursuing our School's vision and strategy to align our education with the global challenges and opportunities of the 21st century," stated Gabriella Cagliesi, Professor in Economics and former Associate Dean For Education and Students.

Upon joining the community, the school quickly **analysed its programmes and how it could reach the majority of their students with TASK™**. This work was led by Gabriella Cagliesi and Alison Bailey, Senior Lecturer, in collaboration with key teaching and professional services staff. TASK™ was then **officially launched at the School during their "Festival of Sust(AI)nable Education"**, with Sulitest's co-founder contributing through an insightful keynote presentation.

The first year of deployment was focused on raising awareness about TASK™ and setting a foundation for sustainability education. For **undergraduate students**, TASK™ is offered to **first-year**, first semester students through the **core module** "Introduction to Business Management" which incorporates a business simulation through which SDGs must be applied. This enables both the school and the students to establish a baseline of their initial sustainability knowledge level. For their **exit-assessment**, the School will include **assessments based on completion of TASK™** in a range of **core and non-core modules** requiring them to reflect and discuss sustainability in different ways, depending on the programme they are following. By adopting this approach, the vast majority of undergraduate students will take TASK™.

At **postgraduate level**, TASK™ is offered as students **prepare for their dissertation**. TASK™ allows them to reflect and position their research in the context of the global environmental and social challenges.

Students at the School truly embraced TASK™. At first, when only first-year students were taking the assessment, final-year and postgraduate students enquired about it, which encouraged the School to accelerate the roll out of TASK™. Overall, in the 2023/24 academic year, **850 students took TASK™**. Moreover, the Change Leader commitment encouraged the School to discuss and **review the competencies they require their students to achieve**, creating momentum to increase their impact in the years to come.

JUNIA Grande école d'ingénieurs

CASE STUDY: EMBARKING STUDENTS ON A SUSTAINABILITY JOURNEY

JUNIA is an engineering school focused on ecological, digital and technological transitions. A core part of their mission is to educate about how our sustainability challenges are interconnected and, in this context, they use TASK™ as a robust and standardised tool to measure the impact of their programmes.

JUNIA **engaged its staff** during the TASK™ pilot, as well as during the development of a training platform students would use before TASK™, which is described below. As a next step, the sustainability department worked alongside one Head of Programme, to offer TASK™ to the entire cohort of this programme, following their course on sustainable development. This proved to be a success, which supported the roll out of the initiative across the school.

To prepare their students, they created a **gamified learning platform called "Oddyssée,"** a play on the French term for SDGs (ODD) and the concept of journey. Each sustainability theme is represented as an island that students must discover, along with quizzes that they complete before going to the next island. This platform serves as a **comprehensive training tool on sustainability issues** which students from multiple programmes use **before taking TASK™**.

After taking TASK™, **students are encouraged to analyze their individual reports to identify areas for improvement**. Additionally, **JUNIA aims to utilize this data to refine both Oddyssée and their core curriculum on sustainability.**

The integration of TASK™ has had significant benefits for both faculty and students. **Professors** who previously viewed sustainability as a separate subject are now **recognizing connections between sustainability and their own disciplines**. This is **fostering collaboration** across departments. Many professors are also expressing interest in learning how to integrate sustainability concepts more effectively into their courses, potentially leading to a more holistic curriculum. This positively impacts the students, who are gaining a deeper understanding of the interconnectedness of sustainability issues.

CASE STUDY: ENABLING PERSONALIZED AND PEER-TO-PEER LEARNING

With its diverse body of over 10,000 students from 135 nationalities, ESCP is mission-driven to developing transnational business leaders ready to embrace the multifaceted challenges of a globalized market. Sustainability education is, therefore, at the core of this mission.

ESCP integrates **TASK™ within a transversal 30-hour sustainability course**. Deployed to over **1300 students from 24 different Master of Science programs**, TASK™ provides a standardized yet disaggregated assessment of this heterogenous group. As described by Valentina Carbone, Professor of Sustainability and Program Director, "we administered TASK™ to all MSc students **at the start of the course**, so they could assess their initial knowledge. We then offered it at the end of the course, optionally, for them to assess their progress after the course." Following the pre-course assessment, **students** with high scores in specific subjects covered by TASK™ were invited to **lead a roundtable for their peers** and to produce a critical synthesis of their experience.

Peer-to-peer learning flips the script on traditional education, transforming students from passive receivers of information into active contributors. In sustainability education, this is especially impactful. Moreover, by enabling students to quantify and reflect upon their knowledge gaps and strengths, **TASK™ boosted student confidence in contributing to this shared learning experience.** In explaining concepts to one another and tackling challenges together, students not only solidified their own knowledge but gained valuable insights from the diversity of perspectives discussed. This fostered deeper engagement with the complexities of sustainability, thus encouraging ESCP students to become critical thinkers and problem-solvers who become more empowered to make a difference.

KEDGE
BUSINESS SCHOOL

CASE STUDY: BUSINESS MEETS SCIENCE – SUPPORTING CURRICULUM CHANGE FOR SUSTAINABILITY

Kedge Business School is a long-term proponent of sustainability education and active ambassador of Sulitest. While the school uses many Sulitest tools, this case study focuses on the integration of TASK™ within the **MSc Business Transformation for Sustainability Program**.

Reflecting on the "Why" behind integrating TASK™, Fiammetta Cascioli Karivalis, the Program Director, stated that even though incoming students of this sustainability-program are already more interested and arguably more knowledgeable about the subject, they tended to get a lower score than expected. This is likely due to the fact that TASK™ covers a broad range of sustainability knowledge, including environmental subjects (i.e., planetary boundaries), which is not usually covered within Business Schools. As she said, "**TASK™ allowed me to encourage students to gain a new kind of sustainability knowledge** given that companies nowadays look more and more for people who can talk about the different challenges we face, which is not just a carbon problem but also material problem, a biodiversity problem, and all the other aspects covered by the planetary boundaries and TASK™".

At Kedge, TASK™ is offered at the **start of the program and integrated into an Environmental Sustainability module**, in order to get a baseline "snapshot" of student' knowledge. Later, students are invited to join a the Planetary Boundaries Fresco (an interactive workshop) and are engaged in reverse pedagogy activities. Subsequent classes help students deepen their knowledge before taking TASK™ **again at the end of the program, so that an improved score can support their employability and show progress**.

The impact of this initiative extended beyond student learning. "**The characteristically scientific nature of TASK™ is not familiar vocabulary for a Business School [and while this] can be seen as part of the problem, it pushed us to change the curriculum**," stated Fiammetta. This realization prompted faculty discussions about the merits of initiating a more formal and structured process of curricular review in order to better equip students with the knowledge they need to understand and respond effectively to the sustainability challenges they will encounter once out in the business world.

Sustainability Knowledge: Trends and Data Analysis

Trends at a glance

- 17,651 completions of TASK™ between March 2023 and June 2024
  - TASK™ was offered in 59 instituions from 12 different countries. Candidates represent 146 different nationalities.
- Adjusted average score of 52.74 (with a balanced distribution)
- 13.5% of all respondents with high scores of 70 or above
- Balanced distribution between Earth Systems, Human Welfare and Levers of Opportunity, but disparities within these 3 frameworks. Higher level of abilities for:
  - Earth Systems: Climate Change, Ocean Acidification, Novel Entities
  - Human Welfare: Nutrition, Health, Basic Income and Decent Work, Gender Equality and Education and Culture
  - Levers of Opportunity: Infrastructure, Planning, and Natural Resource Management, Macroeconomic & Microeconomic Considerations, Sustainability Science, Transformative Change and Cognitive Capacity for Sustainability
- On average highest ability scores by SDG: SDGs 1 (No Poverty), 2 (Zero Hunger), 3 (Good Health and Well-being), 4 (Quality Education), 5 (Gender Equality) and 13 (Climate Action)
- On average lowest average scores by SDG: SDG 9 (Industry, Innovation, and Infrastructure), SDG 16 (Peace, Justice, and Strong Institutions), SDG 8 (Decent Work and Economic Growth) and SDG 17 (Partnerships for the Goals)
- Modelling interactions between subjects or between SDGs using ability correlations indicates a clear result: EVERYTHING IS CONNECTED. The systemic nature of sustainability is reflected in the correlations between ability levels for the different subjects and SDGs.
- Finally, the key variables significantly affecting the aggregate ability score of sustainability knowledge are:
  - Education attainment and previous education for sustainability have a positive impact
  - Respondents who classified their personal level of sustainability knowledge as “some knowledge” or “moderate knowledge” experienced a higher impact on their score than those who classified their knowledge as “expert knowledge.”

TASK™ Descriptive Statistics

The analysis of TASK™ data outcomes is based on a rich dataset of **17,651 completions** of the assessment logged between its launch on 1 March 2023 and 30 June 2024. These assessments have taken place in 59 institutions from 12 countries. TASK™ takers are on average 27 years old and represent 146 nationalities. The gender balance is as follows: 50% Woman, 48% Man, 0,5% Non-binary, 1,5% Prefer Not to Say.

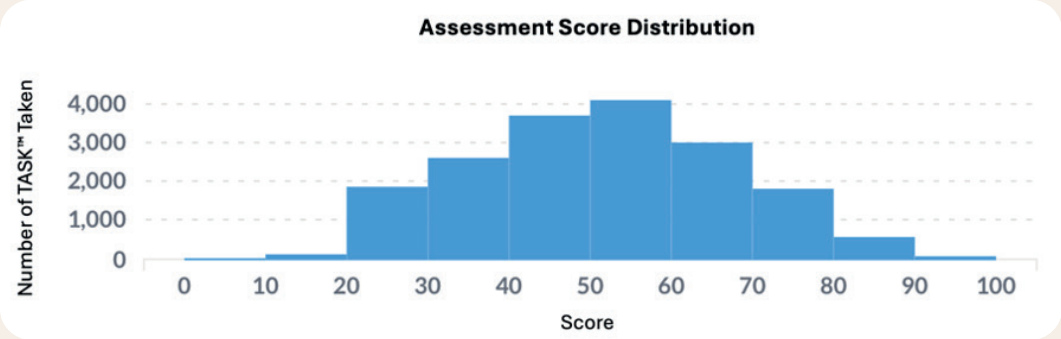
The **average score** among all respondents is **50.81**. The standard deviation, a measure of the spread or dispersion of scores, is calculated to be 16.81. In addition, the Sulitest Data team calculated an adjusted average score by filtering out respondents with a very short completion time, a highly suspicious indicator of guessing. This adjusted score represents more accurately the average level of sustainability knowledge of respondents who have taken the test in good faith. The **adjusted average score** is **52.74** (with a standard deviation of 14.98).

Upon further analysis, the Data team identified a small group of individuals with a high level of sustainability knowledge: 70 respondents achieved scores between 90-100 (0.4%), 535 respondents (3%) scored between 80-90, and 1786 respondents scored between 70-80 (10%).

In total, approximately **13.5% of all respondents demonstrated a high level of sustainability knowledge with scores of 70 or above**. This high-performing cohort of individuals indicates the effectiveness of TASK™ in identifying people who have an advanced understanding of sustainability. This differentiation in understanding emphasizes the efficacy of the TASK™ assessment in the educational landscape of sustainability knowledge.

The findings of this descriptive analysis will be further examined and integrated into the IRT model in subsequent analyses, as the sample of respondents grows over time.

In the following sections, we present a detailed analysis of the respondents' average scores based on both the Matrix Subjects and the SDGs. Through this two-dimensional examination, we provide a wider perspective on the respondents' sustainability knowledge and abilities, which in turn guides our efforts to improve sustainability education and literacy more generally across higher education.



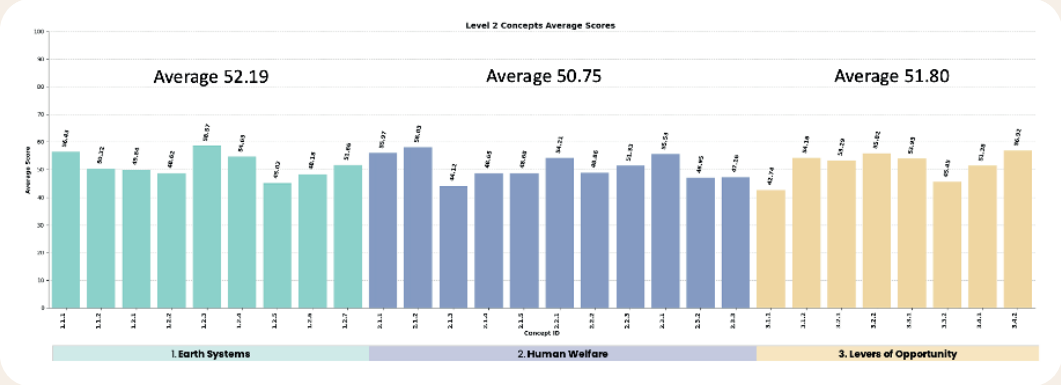
AVERAGE SCORES — SUBJECTS AND SDGS

A critical area of the TASK™ data investigation centers on analyzing the average scores of respondents' abilities. This analysis is organized around two significant dimensions: the 28 subjects of the Foundational Matrix of Sustainability Knowledge defined by Sulitest, and the globally recognized Sustainable Development Goals (SDGs).

The Matrix Subjects provide a **fine-grained view of specific knowledge areas** and competencies that Sulitest has identified as integral to sustainability literacy. By examining the respondent scores according to these Matrix Subjects a more detailed understanding emerges of respondents' relative strengths and weaknesses across a wide range of sustainability-related knowledge areas.

Simultaneously, aligning this investigation with the SDGs allows Sulitest to examine respondents' abilities in the context of the global 2030 sustainability agenda. This alignment presents a unique opportunity to understand to what extent respondents are cognitively equipped to contribute to these universally agreed-upon goals. **Analysing scores in terms of SDGs helps us gauge whether respondents are prepared to tackle real-world challenges and contribute to global efforts towards sustainability**.

In the following sections, we present a detailed analysis of the respondents' average scores based on both the Matrix Subjects and the SDGs. Through this two-dimensional examination, we provide a wider perspective on the respondents' sustainability knowledge and abilities, which in turn guides our efforts to improve sustainability education and literacy more generally across higher education.



The bar chart reveals interesting insights about the average scores of respondent's abilities as linked to each subject of the matrix. The bar chart above provides a comparative view of the average scores of respondent abilities for each of the 28 TASK™ subjects across the three TASK™ frameworks. Several insights can be noted.

If the three frameworks structuring the matrix seem relatively balanced in terms of overall aggregate ability (i.e., very close average scores), **significant differences in abilities appear within each framework**. These differences remain within a reasonable range (above 40 and less than 60), so no single subject reveals an average ability significantly lower or higher than the others. However, the disparities that are observable are meaningful, and provide useful insights for educators seeking to build curricular and pedagogical strategies

that address such knowledge gaps vis-à-vis sustainability education and action.

Within **Earth Systems**, the three subjects of Climate Change (1.1.1), Ocean Acidification (1.2.3) and Novel Entities (1.2.4) have the highest average scores, respectively at 56.43, 55.57 and 54.63. These scores indicate a stronger understanding or ability related to these subjects among the respondents compared to other subjects within Earth Systems.

At the other end of the ability spectrum, the three subjects of Biogeochemical Flows (1.2.5), Atmospheric Aerosols Loading (1.2.6), and Land System Change (1.2.2) have the lowest average scores, respectively at 45.02, 48.18, and 48.62. These scores indicate a weaker understanding or ability related to these subjects among the respondents compared to other subjects within Earth Systems.

Looking at the subjects of the second framework **Human Welfare,** two main groups of ability score can be distinguished.

On one hand, Nutrition (2.1.1), Health (2.1.2), Basic Income and Decent Work (2.2.1), Gender Equality (2.2.3) and Education and Culture (2.3.1) have the highest average scores within the subjects of Human Welfare, ranging from 51.33 to 58.03.

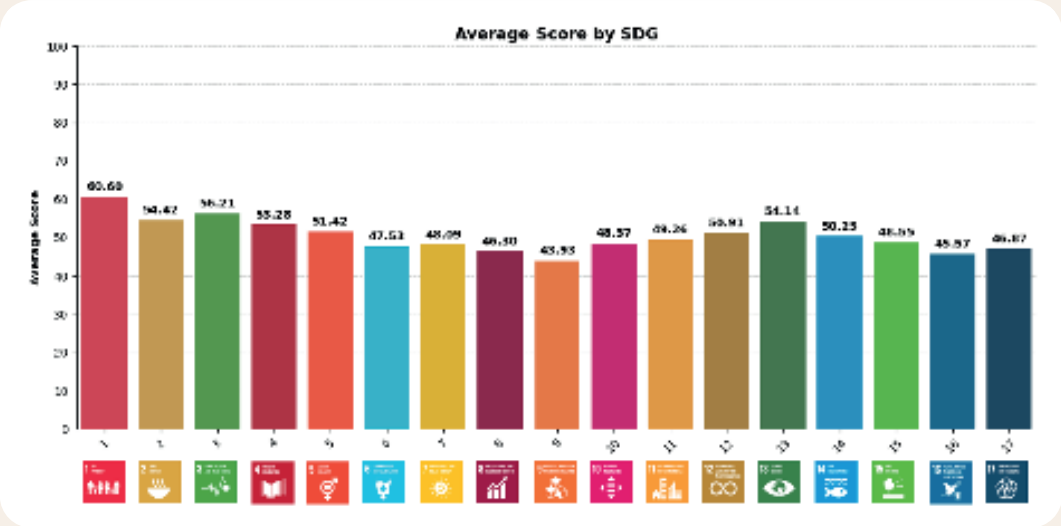
On the other hand, Access to Water and Sanitation (2.1.3), Housing and Human Settlements (2.1.4), Access to Energy (2.1.5), Social Equity (2.2.2), Peace, Justice, and Political Voice (2.3.2) and Access to Networks and Social Interaction (2.3.3) present lower ability scores ranging from 44.12 to 48.86.

Finally, and recalling that this framework assesses knowledge about the **Levers of Opportunity** and solution-based action that make sustainability possible, respondent ability also separates into two main groups.

Within these levers, Infrastructure, Planning, and Natural Resource Management (3.1.2), Macroeconomic Considerations and Finance (3.2.1), Microeconomic Considerations, Business, and Industry (3.2.2), Sustainability Science (3.3.1), Transformative Change (3.4.1) and Cognitive Capacity for Sustainable Development (3.4.2) present higher ability scores ranging from 51.38 to 56.92.

On the contrary, Laws, Policies, and Institutions (3.1.1) and Technology and Innovation (3.3.2) are characterized by lower ability scores from 42.74 to 45.45.

These preliminary results must be taken with caution as they rely on the current sample of 17,651 TASK™ takers over the 16-month period of March 1, 2023, to June 30, 2024. However, a sample of this size is already significant and allows data analysts to draw interesting yet provisional trends and conclusions. As TASK™ continues to be used, the sample size will grow, thus providing additional insights for informing the ongoing process of mapping sustainability knowledge, engaging in curricular review and revision, and educating for sustainability across higher education.



The bar chart per SDGs also provides interesting insights vis-à-vis the average scores of respondents' abilities linked to each of the Sustainable Development Goals (SDGs).

Starting from the lower end of the spectrum, **SDG-9** (Industry, Innovation, and Infrastructure), **SDG-16** (Peace, Justice, and Strong Institutions), **SDG-8** (Decent Work and Economic Growth) and **SDG-17** (Partnerships for the Goals) have the **lowest average scores**, ranging from 43.93 to 46.87. This suggests that respondents on average may find concepts or competencies related to these goals more challenging to comprehend or apply, or it may reflect a lack of knowledge or emphasis on these areas in their educational or professional experiences.

As we progress upwards, **SDG-6** (Clean Water and Sanitation), **SDG-7** (Affordable and Clean Energy), **SDG-10** (Reduced Inequalities), SDG-11 (Sustainable Cities and Communities) and **SDG-15** (Life on Land), exhibit **marginally higher average scores** ranging from about 47.53 to 49.26.

Meanwhile, **SDG-12** (Responsible Consumption and Production) and **SDG-14** (Life Below Water) fall into a **middle range** close to the overall average score (respectively 50.91 and 50.25).

Next, **SDG-2** (Zero Hunger), **SDG-3** (Good Health and Well-being), **SDG-4** (Quality Education), **SDG-5** (Gender Equality) and **SDG-13** (Climate Action), register **even higher average scores** in the range of about 51.42 to 56.21. These scores may indicate a stronger understanding or ability related to these goals among respondents, potentially due to greater exposure, interest, or emphasis on these areas in their education, training, or media environment.

Finally, **SDG-1** (No Poverty) stands out with the **highest average score** of approximately 60.60. This suggests that respondents demonstrate a particularly strong understanding or ability related to this goal, which could reflect the fundamental and cross-cutting nature of poverty reduction in sustainability efforts.

Even if the disparities between SDGs are limited within a reasonable range (between 40 and 60), disparities do exist. Of course, these trends will become more and more precise as the sample of TASK™ takers grows. In summary,

these findings underscore the varied levels of understanding and abilities related to different SDGs among respondents, offering valuable insights to educators, policymakers, and other stakeholders in tailoring strategies to address these disparities and enhance sustainability education and action.

Knowledge ability correlations — TASK™ Subjects and United Nations SDGs

Correlation matrices and their visualization through heatmaps are powerful tools for analyzing relationships between knowledge ability levels across different subjects.

As such, **correlation matrices offer a quantitative measure of the relationships between multiple variables at a time**. Each entry in the correlation matrix represents the correlation coefficient between two variables, giving an indication of the strength of their relationship. In our context, each variable represents an ability subject, and the correlation coefficient is a measure of how closely related the ability levels are between two subjects.

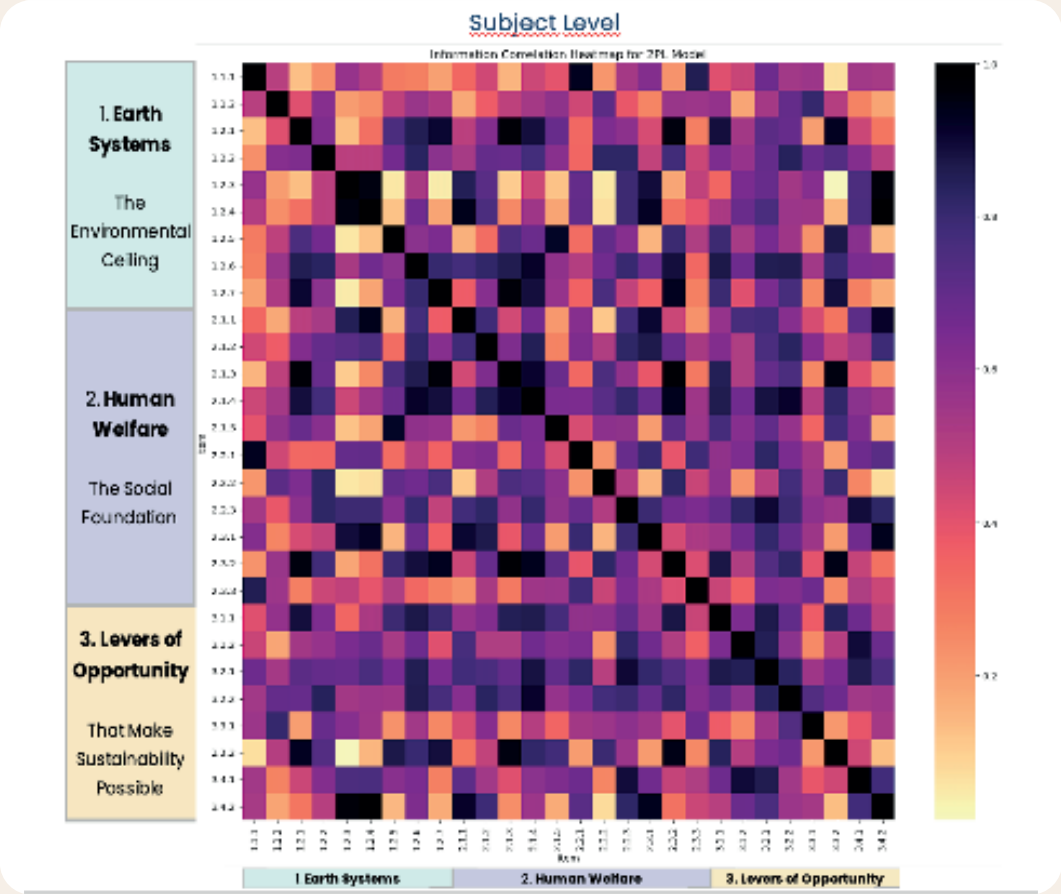
When we calculate correlation matrices of ability level per ability subject, we essentially compare every ability subject with every other ability subject. This allows us to identify which ones are closely related (i.e., have high correlation) and which are not (i.e., have low correlation). It represents an innovative way of mapping interactions between sustainability subjects, based on the actual knowledge of respondents, as measured by the TASK™.

Plotting these correlation matrices as a heatmap provides an intuitive and visual representation of the relationships between ability subjects. In a heatmap, each cell's color represents the strength of the correlation between two variables—in our case, two ability subjects. This visual approach simplifies the process of interpreting the correlation matrix and helps us quickly identify patterns in the relationships between ability subjects. For example, darker or lighter colors indicate stronger positive or negative relationships, while mid-range colors indicate weaker relationships.

Why do we create such correlative heat maps? Essentially, **understanding the relationships between ability subjects provides a deeper understanding of the structure of sustainability knowledge, and thus invaluable insights for education strategies.** For instance, if two ability subjects are highly correlated, it might suggest that teaching strategies or resources could be shared or combined between them. Conversely, if two ability subjects are not closely related, it may indicate that different teaching approaches and materials are needed.

The first heatmap was developed based on the correlation matrix calculated for the 28 TASK™ matrix subjects. Each of these subjects reflects a different area of sustainability knowledge, and the heatmap provides a visual representation of the relationships between these various areas.

To help you understand how to read the heat map and appreciate its value, we highlight a representative and intuitive example from the first chart below on the Subject Level of knowledge.



Look at the third horizontal row of Earth Systems on Freshwater Use (1.2.1) and you will see (by the 1.0 darkness of the color) a very high correlation with the third vertical column of Human Welfare on Access to Water and Sanitation. The dark intersection of these two subjects simply says this: people who score well (or poorly) on Freshwater Use also tend to score well (or poorly) on Access to Water and Sanitation. In short, knowing a lot (or little) about one indicates a high probability that you know a lot (or little) about the other. For educators, of course, knowing in advance that there's a correlation between these two knowledge subjects is very useful—for curricular planning, for content selection, for lectures, and for assessment.

And while this specific example provides a quite intuitive and easy insight, the correlation is less intuitively obvious between Freshwater Use, and say, Peace, Justice, and Political Voice (2.3.2) where the intersection is equally dark and thus also indicates a high correlation; or with Technology and Innovation (3.3.2) which, in addition, is a subject drawn from Levers of Opportunity that is focused on solutions and human action and agency. Why would having a given level of knowledge for one subject indicate a statistically probable correlated level for another, apparently unrelated, subject? Answering a question such as this requires additional research, but it is TASK™ data that empowers instructors to start seeing such correlations and making corrective or responsive educational interventions.

But again, from the perspective of the instructor, **knowing that such correlations exist empowers them to teach accordingly and, importantly, to inform students that they need to learn accordingly**. This is the additional value that TASK™ provides—it not only assesses what knowledge students possess in the aggregate; it also provides instructors with indicators of the structure of the knowledge students possess in terms of statistically significant knowledge

gaps and/or complementarities. This has obvious and important implications for how education for sustainability is taught across the landscape of higher education.

With the examples just provided above, the visual interpretation of the heatmap becomes clear: **everything is connected**. Some subjects are connected more widely than others but all subjects show clearly correlated knowledge patterns across the matrix. As such, **the correlation heatmap clearly confirms the systemic and interrelated nature of sustainability subjects and the interconnected structure of the corresponding knowledge**.

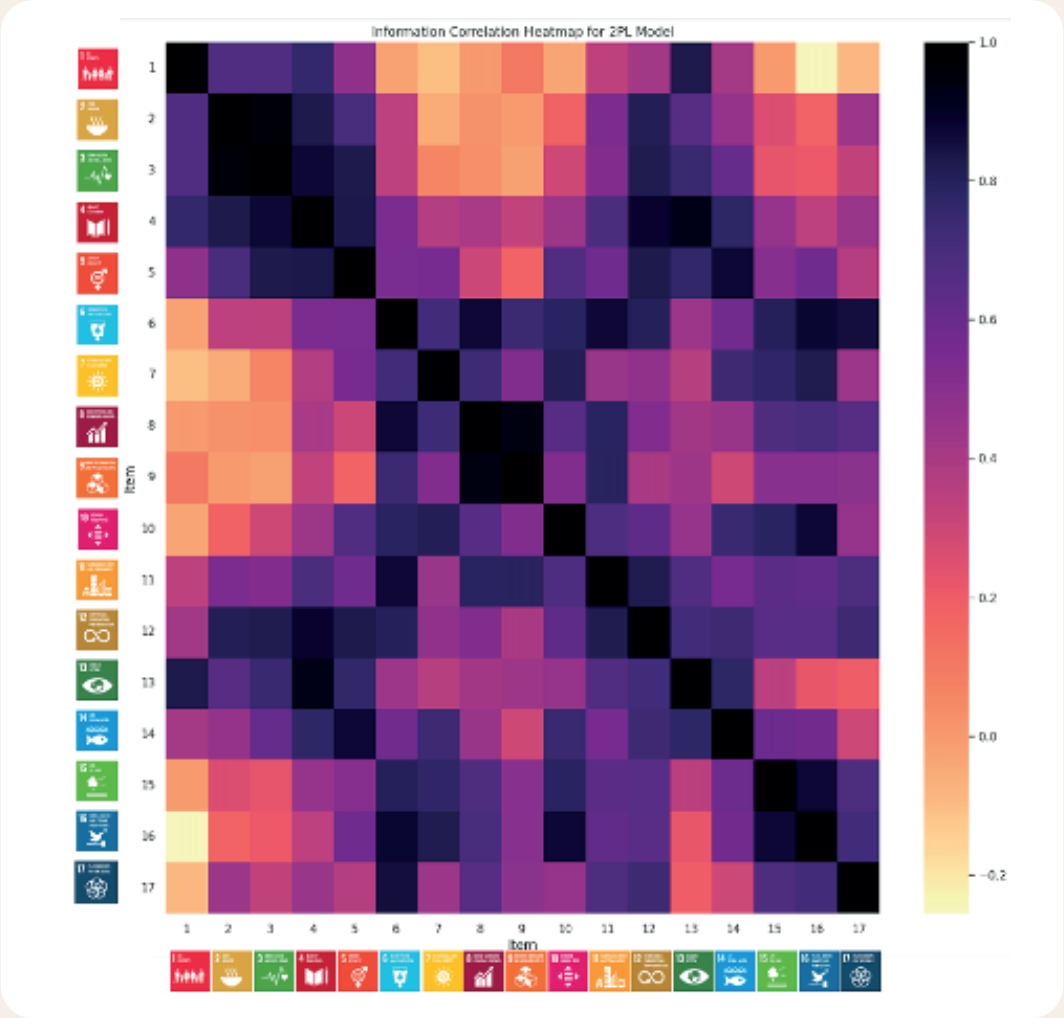
As additional examples, some subjects such as Ocean Acidification (1.2.3) or Novel Entities are characterized by relatively more specific areas of knowledge with lower correlation coefficients with few subjects. However, they still show important correlation with most subjects.

All other subjects present high correlation with each other, which confirms the systemic nature of sustainability, as reflected into the correlation between ability levels for the different subjects of the matrix. When compared to the analysis conducted last year with a smaller sample (about 4,000 TASK™ takers) after 4 months of TASK™ use, the heatmap displays a clear increase in the level of correlation measured. Our interpretation is that after one year, TASK™ data outcomes provide a finer estimate of the correlation between subjects due to:

- A larger sample of respondents (from 4000+ respondents to 17,000+ respondents)
- Greater diversity in the population of test takers (more comparisons can be done)
- More items developed for the assessment resulting in interlinkages being better measured by the psychometric model.

Subsequently, we mapped the content of TASK™ to the **Sustainable Development Goals (SDGs)**. The SDGs represent globally recognized objectives aimed at addressing a range of pressing environmental, social, and economic challenges. By aligning TASK™ content with these goals, we can better understand how sustainability knowledge, as measured by TASK™, contributes to broader sustainable development objectives.

With this alignment in place, we recalculated the correlation matrix, this time for all SDGs, and generated a second heatmap. This heatmap reveals the correlations between the ability levels of respondents across the different SDGs. As with the first heatmap, this visual representation offers an at-a-glance overview of the relationships between the various SDGs within our context, demonstrating where strong relationships exist and where they are weaker.



The heatmap of correlations between SDGs-related subjects presents a similar result. **It emphasizes how all SDGs are interconnected, as measured by the correlation of ability levels between subjects**.

Two small areas present a slightly lower correlation in our sample of 17000+ TASK™ takers:

1. The area linking energy and economics-related SDGs, i.e., SDG-7 (Clean Energy), SDG-8 (Decent Work and Economic Growth), and SDG-9 (Industry, Innovation, and Infrastructure) shows less correlation with more socially driven SDGs, i.e., SDG-1 (No Poverty), SDG-2 (Zero Hunger), and SDG-3 (Good Health and Well Being). This does not mean that these subjects are not connected; it indicates only that in the current sample of our data, the knowledge-ability in economics-related SDGs is not highly correlated with knowledge-ability in socially driven SDGs. In other words, knowing about SDG-7, -8 and -9 is not highly correlated with the ability to know about SDG-1, -2 and -3. This may indicate that these two areas require distinct abilities that are not as closely linked as others. This result suggests that more "data training" is needed for addressing the interlinkages between these two groups of SDGs (linking economics subjects with more socially driven subjects).

2. The correlation between SDG-1 (No Poverty) and SDG-15 (Life on Land), SDG-16 (Peace, Justice, and Strong Institutions) and SDG-17 (Partnerships for the Goals) is also lower. Again, this lower correlation does not mean that these subjects are not connected; it suggests only that there is not a strong

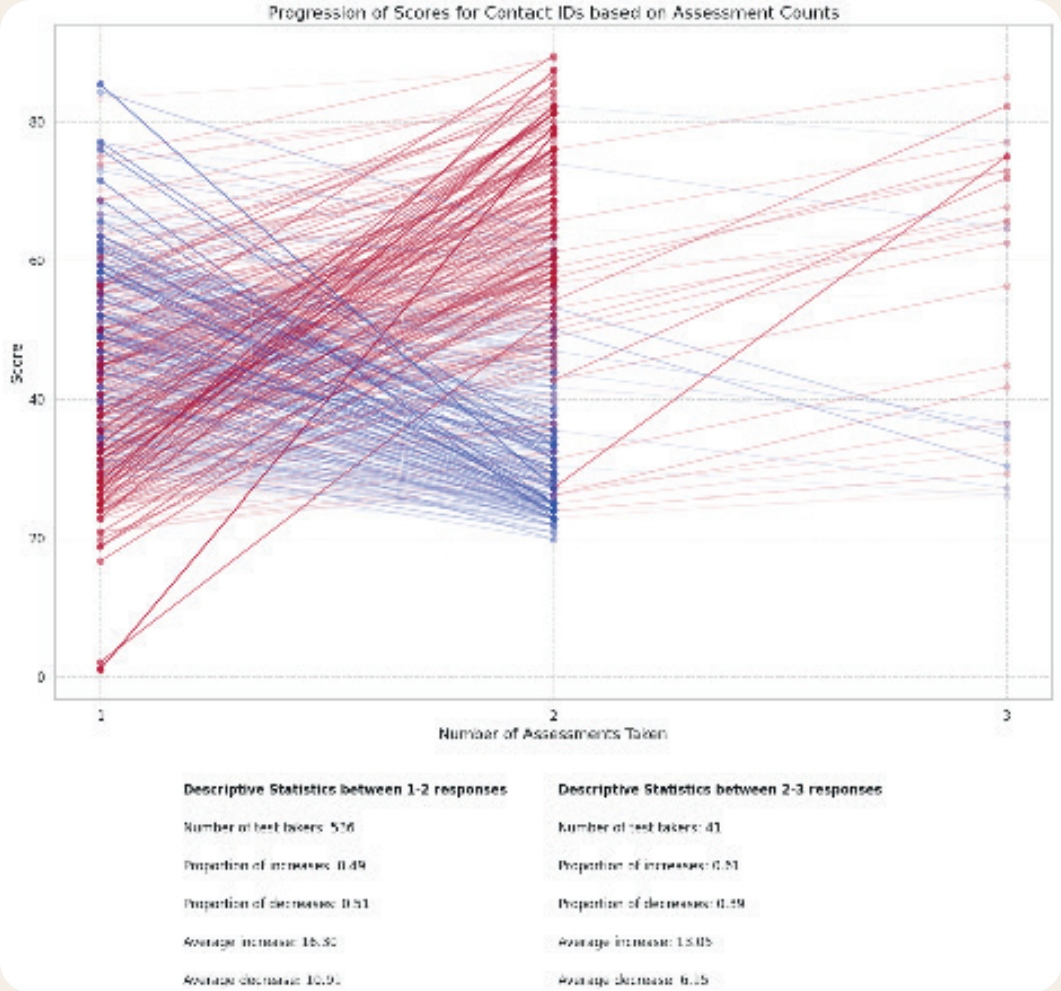
correlation in the TASK™ takers' level of ability between SDG-1 and SDG-15, -16, and -17. Again, what is needed is more "data training" to more finely articulate the interlinkages between poverty and SDG-15, -16 and -17.

Looking at the rest of the heatmap, the systemic nature of the SDGs is highlighted with high correlation levels between all SDGs. SDG-4 (Quality Education), SDG-5 (Gender Equality), SDG-11 (Sustainable Cities and Communities), SDG-12 (Responsible Consumption and Production), SDG-13 (Climate Action), and SDG-14 (Life Below Water) are characterized by a highly systemic nature in the current levels of ability in our sample with high correlations across the entire scope of the 16 other SDGs.

In essence, these correlations reflect the integrated and interconnected nature of the SDGs themselves, affirming that the abilities related to different SDGs are not isolated but rather mutually reinforcing. This presents an added layer of intricacy to our assessment, underscoring the need for items capable of accurately gauging these interrelated abilities and the systemic interactions between the SDGs.

Progress in scores

As TASK™ use and deployment grows, some universities are starting to conduct test/retest for selected student cohorts, such as, for example, **entry/exit assessments to measure the impact of programming and pedagogy on student learning progress**. The number of students having taken TASK™ more than once is still limited as the tool is quite new. TASK™ was launched only in March 2023 and only a few programs have had sufficient time to organize several assessments with the same cohort. However, we were able to extract **a sub-sample of 536 candidates who took TASK™ more than once** to gain some insight into how students progress in scores over time. Of course, these initial findings should be viewed with caution due to the limited size of the sub-sample, but they do indicate some initial trends that will be likely sharpen as the use of TASK™ increases.



The first "trend" to highlight indicates a **relative balance between the average number of TASK™ takers whose scores increase and decrease**. However, we see that the **magnitude of increase** (thus reflecting progress in scores) is **on average significantly higher than the magnitude of decrease** (thus reflecting a potential for learning about sustainability and improving your score between two assessments).

As a second "trend", the data shows that on average **candidates often improve their scores when the first assessment generated a slightly lower score (most of them below 60), which can be interpreted as an incentive to learn and improve one's score.** In contrast, a significant number of candidates for whom the score decreased had a higher score on the first assessment. We could interpret this trend as the result of lower motivation to perform well when required to retake a test for which a high score had already been achieved at the first attempt.

Finally, and as a third "trend", **for those who took the assessment three times, scores are increasing more frequently than decreasing between the second and the third attempt.** This may indicate a stronger motivation to improve when taking the assessment more than twice.

It is important to reiterate that these "trends" are preliminary given the limited size of the sub-sample of test / retest. However, such provisional insights as these provide universities using TASK™ with data that can be used to incentivize student learning, guide instructional and pedagogical strategy, inform assessment planning, and demonstrate overall institutional impact vis-à-vis developing student sustainability literacy.

Respondent meta-characteristics and score

To delve further into the complex relationship between respondents' meta-characteristics and test scores, we employ the technique of linear regression analysis. This approach aids in identifying potential linear relationships between these meta-characteristics—including factors such as **age, gender, and education level** —and the obtained test scores obtained.

For this analysis, the sample size decreases from 17,651 to 12,206 respondents, due to the fact that not all respondents chose to answer the optional survey questions embedded within TASK™. As a result, for the regression analysis involving these meta-characteristics, we only include respondents who completed the relevant sections of the survey. And while this reduction in sample size is significant and limits our analysis, the remaining sample still provides interesting and valuable insights.

In the context of our analysis, categorical survey questions such as **years of education** (with categories including 'none', 'began secondary education, 'has bachelor, 'has master or more'), **amount of sustainability training received** (categorized as '0', '1', '2', '3 or more sustainability trainings'), and **self-reported sustainability knowledge** (categorized as 'basic', 'some', 'moderate', 'expert') are transformed into dummy variables.

This allows each category to be treated independently in the regression model, enabling us to investigate the impact of each category on the dependent variable (in this case, the test scores) while holding other variables constant.

To ensure an accurate and valid regression analysis, and avoid multicollinearity, one category from each of the categorical variables is typically excluded from the regression model. These are referred to as the "reference categories": 'none' for years of education, '0' for amount of sustainability training received, 'basic' for self-reported sustainability knowledge, and 'men' for gender.

Subsequently, the coefficients of the dummy variables represent the change in the mean response relative to this reference category. For example, the coefficient for 'has bachelor' represents the mean difference in test scores between individuals who hold a bachelor's degree and those with no formal education, while keeping other variables constant.

This approach allows us to comprehensively explore the relationship between the respondents' meta-characteristics and their test scores, thus providing valuable insights that can help us better understand the determinants of performance on our test.

Regression results

Through our linear regression model, we discovered significant connections between respondent attributes and their performance on the TASK™ assessment (see Result Table in Appendix D). The variables contributing to this relationship encompass the level of education achieved, the extent of sustainability training undergone, and the self-rated sustainability knowledge.

The first important result is that **education matters!** Our analysis shows a **positive trend linking the progress in higher education to better performance on TASK™**. The progression from partial higher education to the completion of a bachelor's degree, and even further to the attainment of a master's degree or higher, corresponded to successive increases in TASK™ scores. This pattern hints at a positive correlation between increased educational attainment and higher TASK™ scores.

Education for sustainability also significantly matters! We identify a **positive relationship between the number of sustainability trainings completed and the TASK™ score.** Respondents who completed three or more sustainability trainings experienced a noticeable average score increase, evidenced by a mean increment of 4.29 points.

In addition, **self-perceived sustainability knowledge proved to have a significant impact on TASK™ scores**. This resonates with the principle of 'self-efficacy' prevalent in psychometrics, suggesting that individuals who believe in their competence in a particular domain do perform better in that area. Supporting this notion, **respondents who classified their sustainability knowledge as having "some" knowledge and "moderate" knowledge experienced an average score increase of 5.75 and 8.74 points, respectively. However, it is less true for respondents classifying their knowledge as "expert": the impact on the score is significantly lower (2.80)**.

This last result is particularly interesting as it is counter-intuitive. Bearing in mind the fact that the present analysis is exploratory and needs confirmation via further research as the sample of TASK™ takers increases, we propose two possible interpretations:

- Firstly, experts are usually experts in one specific field or domain (i.e. climate change or ooverty or governance). As they master a particular domain of sustainability such as these, they rightfully perceive themselves as experts. However, when it comes to developing a systemic understanding of sustainability—as the one, for example, we convey with TASK™, where the purpose is to build a common understanding through a holistic view of sustainability including the multiple interlinkages between TASK™ subjects—"expert" respondents necessary find themselves outside of their expert zone where they are likely to score lower.

- Secondly, the current knowledge and understanding of sustainability is both changing and fast evolving. In such a context, individuals who have recently "discovered" the topic of sustainability may indeed learn a lot quickly and feel they are becoming an "expert" on the larger field of sustainability. However, they may not yet grasp the complexity of this systemic domain of knowledge, given that they might be at the beginning of their learning curve.

In terms of socio-demographics, the factor of **age** still has a **positive effect on TASK™ scores**, even when controlling for years of education. We also note that women, on average, tend to have higher scores than men. This coefficient is consistent with the previous analysis, but not statistically significant in this regression.

Again, it is crucial to emphasize the limitations of our model. The adjusted R-squared value was found to be 0.159, indicating that our model explains about 16% of the variance in TASK™ scores. Although this relationship is statistically significant, approximately 84% of the variance remains unaccounted for by this model.

Conclusion

In the quest to advance the global 2030 sustainability agenda, our comprehensive study of the TASK™ assessment instrument provides valuable insights into the complex structure of sustainability knowledge and education. We delve deeply into the intersection of respondents' performance, abilities, and their alignment with the SDGs, all through the lens of a sophisticated IRT model.

This analysis unpacks the TASK™ scores, using an **innovative machine learning-empowered IRT algorithm which allows for a nuanced understanding of respondents' abilities**, dependent on individual item parameters and their groupings. This IRT model creates a meaningful context, acknowledging the complex structure of underlying abilities that collectively shape an individual's sustainability knowledge.

Through regression analysis, we found significant associations between TASK™ scores and factors such as the respondents' level of education, the number of sustainability courses completed, and self-perceived level of sustainability knowledge. Notably, while these factors are statistically significant, they accounted for only about 15% of the variance in TASK™ scores, underscoring the **multifaceted nature of test performance and sustainability knowledge.**

Analyzing the relationship between the scores, the TASK™ matrix subjects, and the SDGs, we discovered strong relationships between the abilities related to various subjects and SDGs. This **interconnectedness reflects the holistic and integrated nature of the SDGs themselves and emphasizes the need for a comprehensive approach in sustainability education**.

However, as we assessed the average scores of respondents' abilities in terms of Matrix Subjects and SDGs, we discovered that performance was not uniformly high across all areas. This variability highlights areas where respondents might require additional support and guidance and **underlines the importance of targeted education strategies in enhancing sustainability literacy**.

In essence, **this study underscores the complexity of measuring sustainability literacy and the critical roles of education, training, and self-perception in shaping it**. As we move forward in our collective pursuit of the global sustainability agenda, it becomes paramount to continuously refine our measurement techniques, harness the power of data-driven insights, and enhance our education strategies. The ultimate goal is to foster a comprehensive understanding of sustainability and empower individuals worldwide to contribute meaningfully to the attainment of the UN Sustainable Development Goals and the 2030 Agenda.

Impactful Pedagogy – our research for the PRME i5 project

The Principles for Responsible Management Education (PRME) is a United Nations-supported initiative founded in 2007. As a platform to raise the profile of sustainability in business and management schools around the world, PRME's goal is to equip today's business students with the understanding and ability to deliver change tomorrow. As such, **PRME's mission aligns with the Sulitest commitment to support deep and urgent transformational change in higher education.**

To this end, and recognizing the importance of rethinking not only what business schools teach, but how they teach, the LEGO Foundation awarded PRME a generous grant to develop what is now called the **Impactful Five (i5) Project**. From its inception, i5 was inspired and motivated by two urgent imperatives: 1) the need for business schools to respond to current global socio-economic and ecological challenges by **fostering a new type of responsible manager endowed with more holistic and socially responsible skill sets, and**; 2) the need to **increase the relevance of business school education** across the newly emerging landscape of micro-credentials, digital learning, open access academic content, and life-long learning and re-skilling.

Through a partnership with Project Zero at the Harvard Graduate School of Education, PRME found inspiration from The LEGO Foundation childhood and youth development research spheres to create a pedagogy for the higher education business school context. These findings were translated into a Playbook and a call for educators to:

- Make Learning Meaningful
- Foster Joy & Wellbeing
- Facilitate Active Engagement
- Design for Iteration
- Develop Supportive Social Interaction.

PRME
an initiative of the
United Nations Global Compact

"The Principles for Responsible Management Education (PRME) is a United Nations-supported initiative founded in 2007 through the UN Global Compact. PRME equips today's business schools, including their leaders, educators, and students, with the understanding and ability to deliver change tomorrow. In the past years, Sulitest has allowed hundreds of business schools and universities to raise the awareness of their students on sustainability. With TASK™– The Assessment of Sustainability Knowledge – Sulitest is now enabling business schools to assess and demonstrate the impact of their pedagogy on students' knowledge of sustainability. PRME is happy to contribute to this impactful initiative and to recommend Sulitest as a best practice for integrating the SDGs into business education. PRME is happy to engage with Sulitest through TASK™-based partnership and through their expert contributions to our pedagogical development work in the Impactful-five (i5) project."

– Meredith Storey, Senior Manager at Principles for Responsible Management Education (PRME)

Sulitest serves as the assessment partner of the i5 project. Our mission is to develop a tailored assessment system to **understand and evaluate how educators are adopting the i5 pedagogical framework, as well as the impact it has both in and out of the classroom, upon students and faculty, administrative colleagues, and on the broader sector of business education**. This mission is delivered through three parallel research "tracks":

- Track 1—Longitudinal surveys that are sent to educators who participate in the i5 training workshops.

- Track 2—Focus groups and observations before and after their i5 training bringing together a group of 9 educators participating in the interviews.

- Track 3—Connecting the practice of i5 as observed in the previous two tracks with the existing literature of impactful pedagogy.

This project has enabled Sulitest and PRME to better understand the challenges faced and levers available for educators to change how they teach. Just as TASK™ provides a framework, process, assessment tool, and communities of practice for curricular review, so too does i5 provide participants with an innovative pedagogical structure and process as articulated by the i5 Playbook and the community of practice fostered by PRME.

Preliminary research in i5 outcomes is encouraging. Educators report greater classroom engagement, more appropriate use of devices, the building of stronger connections between students, and improved knowledge retention. We encourage all educators to review the i5 Playbook and explore how they can make their classes more Meaningful, Joyful, Active, Iterative, and Social. **Achieving sustainability literacy, it turns out, can be both fun and impactful.**

How to best support faculty in changing curriculum? Results from a global survey

With the importance of sustainability growing over the past two decades, HEIs are working to integrate it into curricula, research, and community engagement. This necessitates support from both higher education institution leadership and the entire faculty, ensuring faculty efforts are part of a cohesive strategy.

Although experts in their teaching field, some professors may lack expertise in areas such as environmental or social sciences, as well as solution-based levers, all of which are essential to sustainability education. **Supporting faculty with practical tools and training is therefore crucial for any higher education institution aiming to equip students with impactful sustainable literacy.** However, like any training initiative, it is essential to understand the target populations and adapt strategies accordingly. Similar to the student population it serves, faculty members vary widely in their interest, knowledge, expertise, and commitment to these subjects.

Therefore, Sulitest, in partnership with HESI, Campus de la transition, CGE, CIRSES, EFMD, Enseignants de la transition, GRLI, IAU, THE and PRME, and with the support of UNESCO, UNITAR, UNU, launched a survey exploring the perception of faculty engagement in sustainability.

This research is contributing to the global effort to foster education for the Sustainable Development Goals (SDGs). Within this global agenda, we focus on faculty engagement. The SDGs convey a systemic perspective of sustainability, embedding economy & society within Nature. Our approach to sustainability encompasses both planetary boundaries, which set safe environmental limits, and social foundations, which ensure everyone has the resources for a dignified life. It also involves implementing action-based solutions like policy changes, innovations, and community initiatives to tackle socio-environmental challenges.

While in this current HLPF report, we present only a summary of the methodology and findings, the full research is available on sulitest.org/2024-reports.

Purpose

The primary objective of this survey was to **better understand how sustainability is being implemented within the faculty as a whole and to identify the main obstacles to its implementation**. A secondary objective was to **gather examples of training levers, tools and engagement strategies** tailored to various faculty profiles and, where applicable, to identify the most suitable approaches for significantly impacting target groups through adapted methods.

Methodology

The survey instrument included **quantitative and qualitative** questions to capture a broad range of experiences and perspectives. The 30-question survey was developed from December 2023 to January 2024 with the assistance and feedback from research and institutional partners. It was then distributed between February to April 2024. A text embedded cluster analysis was employed to organize large quantities of text into clusters, helping to organize the responses and uncover underlying themes and similarities.

Participation

The survey was targeted at **those responsible for integrating sustainability into pedagogy**, as they are likely the most capable of understanding the obstacles and potential levers they encounter with their colleagues. Therefore, the target audience includes program managers, sustainability officers, professors, instructional designers, and leaders actively involved in promoting sustainability reforms. A potential bias in survey responses was anticipated, as participants are likely to be the most interested and engaged in sustainability issues.

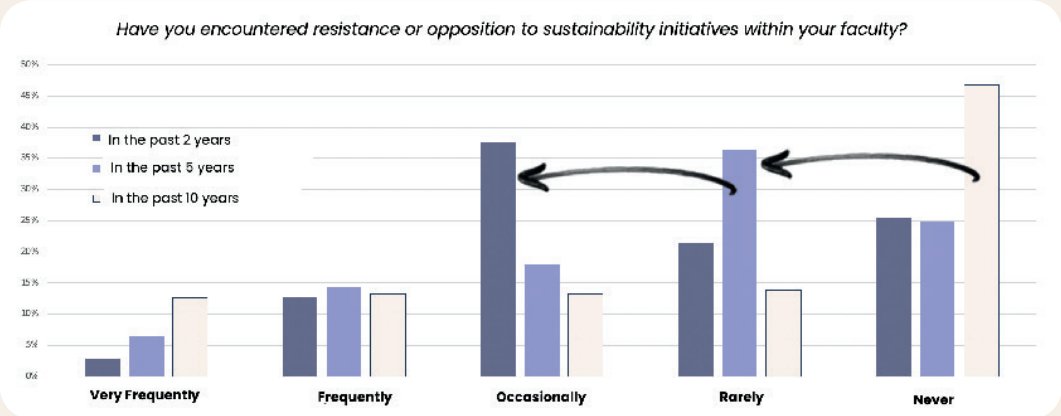
The survey received a total of **425 responses**, with 175 being complete and 250 incomplete, which were still considered valuable. Survey answers came from 42 different countries, the majority from Asia (60.71%), Europe (24.18%) and North America (9.07%).

Results

NAVIGATING DIVERSITY: TAILORING FACULTY SUPPORT FOR EMBEDDING SUSTAINABILITY INTO HIGHER EDUCATION

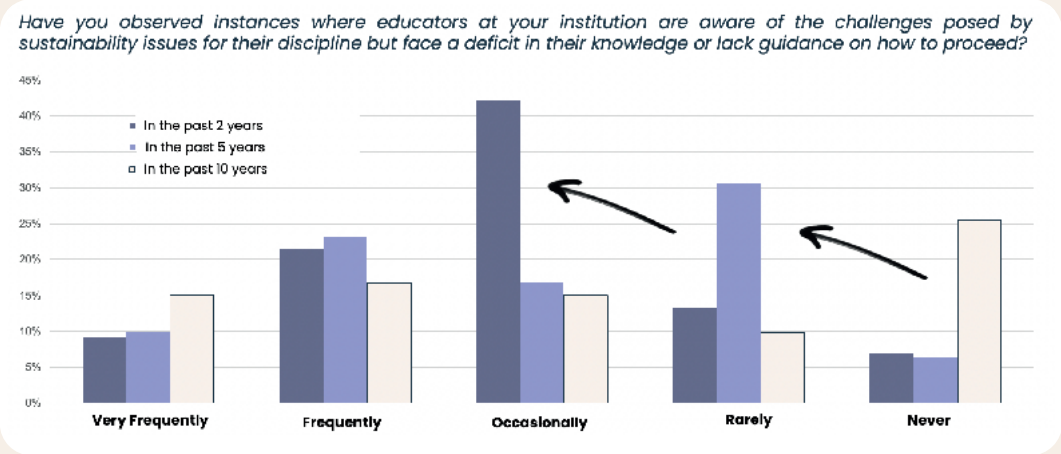
Participants were surveyed regarding their experiences with resistance or opposition to sustainability initiatives within their institution over the last 2, 5, and 10 years (Graph 1). The number of respondents selecting “Very frequently” has decreased over time, indicating that faculty are encountering less opposition in the past 2 years compared to 10 years ago. Significant transitions to higher counts in the answer options “Occasionally” and “Rarely” were observed. For faculty who never experienced opposition to the promotion of sustainability

initiatives, the counts have decreased. **This suggests that while some faculty might experience more opposition due to the increasing popularization and polarization of the subject, others face less opposition, perhaps due to transformations occurring at the institutional level.**



An analysis of open-text responses reveals several themes regarding the nature of the resistance or opposition, including:

- **Lack of interest or understanding:** Insufficient understanding, misconceptions, or narrow perspectives on sustainability and its importance.
- **Resistance to change and institutional barriers:** Concerns about the disruption caused by changes, fear of new challenges, and general apathy or inaction toward sustainability.
- **Time constraints and knowledge gaps:** Faculty members face challenges due to busy schedules, competing priorities and the need for training and support to enhance understanding of sustainability concepts and teaching methods.



Next, participants were asked on whether they had observed, over the last 2, 5, and 10 years, instances where educators recognized the challenges posed by sustainability issues to their professional field but lacked the knowledge on how to address them.

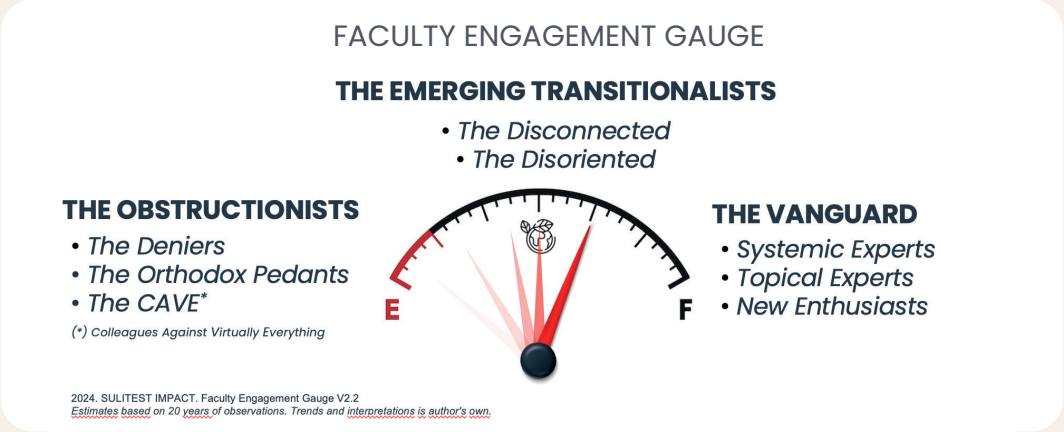
The analysis shows a **persistent gap in actionable knowledge and systemic support remains.** Again, faculty cited time constraints, competing priorities, and inadequate training as significant hurdles. Moreover, the interdisciplinary

nature of sustainability is frequently at odds with the traditional, siloed structure of educational institutions, making it difficult to integrate sustainability into existing curricula and activities.

Faculty also observed **a significant increase over the past 10 years in educators actively incorporating sustainability into their expertise** (Graph 3). Respondents shared various initiatives by engaged individuals to promote sustainability, such as organizing sustainability-themed hackathons, hosting conferences, and building partnerships with companies, local communities, and stakeholders for the development of sustainability projects. Leading research in climate-related topics and advocating for policy changes at different levels were also highlighted as examples of active engagement in sustainability.

UNDERSTANDING FACULTY TRAINING DYNAMICS: EXPLORING DIFFERENT PROFILES FOR SUSTAINABILITY ENGAGEMENT

To gain a better understanding of who are the agents of change and to identify effective methods of change-based faculty training, input was gathered on a spectrum of profiles representing various attitudes and levels of engagement vis-à-vis sustainability issues. For each profile, participants were asked to share effective engagement strategies they observed and obstacles which were often encountered. These open-text responses were examined using a **text-embedded cluster analysis**, which can organize data into categories and enables a thematic analysis.



Results display defined engagement strategies for those perceived as New Enthusiasts (recently aware and dedicated to curricular reform, bringing contagious enthusiasm and energy for others). Open-text responses share a **common emphasis on leveraging this commitment and enthusiasm through targeted training and mentorship to drive systemic change**. While other profile groups showed less distinct strategies, **responses highlighted a multifaceted approach**. This includes leadership endorsement, engagement through practical projects, early and continuous education, tailored and diverse training methods, and integration into university operations.

When exploring the obstacles encountered in helping faculty members, two distinct sets of challenges were identified. One group, characterized as Sustainability Deniers or Orthodox Obstructionists, expresses skepticism about the urgency of sustainability and maintains that traditional teachings remain relevant. Their challenges include deeply held beliefs, resistance to change, potential ideological clashes, and susceptibility to conspiracy theories and tech-nosolutionism. In contrast, the group identified as New Enthusiasts faces difficulties in maintain-ing motivation and focus, the risk of burnout, and the need for guidance to create sustainable change. Despite these distinctions, many respondents highlighted **shared challenges across all profiles**, including time constraints, heavy workloads, and reluctance to adopt new methods. Additionally, the importance of **transdisciplinarity is emphasized as a critical yet under-valued component** in the current education system. Universities often operate in silos, and professors may feel compelled to master all the subjects they teach, which limits their ability to experiment with relevant but disconnected topics.

Conclusion

This exploratory survey highlights the **need to refine the understanding of faculty engagement profiles** in advancing sustainability within each higher education institution. Over the past decade, **sustainability has gained significant traction in higher educatio**n and data reveals a **decline in opposition to sustainability initiatives** within educational institutions, with fewer faculty encountering resistance. However, a segment of respondents still experience opposition, potentially influenced by growing polarization on sustainability issues. This underscores the **ongoing need for fostering open dialogue and understanding** within academic communities to further reduce resistance.

Respondents increasingly acknowledge the challenges posed by sustainability but often lack the necessary knowledge or guidance to address them effectively. Despite growing awareness, a gap remains in actionable knowledge and systemic support. Significant barriers cited include time constraints, competing priorities, and inadequate training. Additionally, integrating sustainability into traditional academic structures proves challenging due to its interdisciplinary nature conflicting with the siloed approach of educational institutions.

While institutions and their leadership have begun implementing tools to support faculty in integrating sustainability into curricula and research, there is a **lack of strategic coordination in the higher education sector** and a need for

tailored strategies to engage different profiles of stakeholders. Most efforts have focused primarily on identifying outright deniers or fostering the enthusiasm of new supporters. However, there is a broad spectrum of individuals with varying degrees of interest toward sustainability. Engaging these diverse groups **requires a more nuanced and strategic approach** specific to their needs.

Moving forward

To enhance faculty engagement with sustainability, this research identifies some recommendations for action. First, sustainability profiles should be refined to better reflect faculty needs and data-driven strategies employed. Second, comprehensive training programs that are interdisciplinary and address both theory and practice should be developed. Collaboration across disciplines is further encouraged through joint projects, workshops, and teaching initiatives. To address potential resistance, open dialogue forums and sharing success stories of sustainability initiatives are recommended to foster understanding and acceptance.

Looking ahead to 2030

We at Sulitest are proud of what we have achieved across the first ten years of our existence—advocating for curricular reform across higher education, developing a suite of tools and processes that support this goal, raising awareness around sustainability of over a quarter-million students, assessing knowledge of thousands more, building a caring community of practice among educational professionals across the globe, and sharing a vision of how a sustainable future is actually built—by me, by we, and by all of us.

At the same time, we are humbled and alarmed by how much remains to be done. We are making progress on the SDGs—but not nearly enough and not fast enough. This is evidenced by the knowledge gaps shown by TASK™, as well as the results of our global survey on faculty engagement identifying a persistant lack of actionable knowledge and systemic support for educators. Higher education is responding to the Earth crisis and beginning to rethink what students might actually need to know, value, and be able to do to meet the very different social, economic, and political challenges ahead in the 21st century—but too timidly and without "flashing red-light" urgency. Accreditation bodies, ranking and rating agencies, and even governmental Ministries of Education are beginning to re-evaluate what actually might constitute a quality education in the Anthropocene—but with insufficient prescriptive energy and imagination.

As such, as we look ahead to the fast-approaching finish line of the 2030 Agenda for Sustainable Development, we at Sulitest reaffirm our commitment and passion to mainstream sustainability literacy across the entire landscape of higher education, primarily via SDG target 4.7:

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

In the short 5.5-year period that remains to hit this target, we will concentrate our efforts and action in providing educators, their institutions and stakeholders with the tools, resources, metrics and assessment processes they need to help students acquire such sustainability knowledge and skills. Moreover, we will continue to foster collaboration among and beyond higher education, because mainstreaming sustainability literacy calls for collective action.

It is H.G. Wells who reminds us that "History is a race between education and catastrophe." In this year of the Olympics 2024, the race is indeed on! And because we all want to see education and SDG-4 cross the finish line first in 2030, Sulitest remains a steadfast enabler in this endeavor. Join our movement!

Words from our community

"We support the Sulitest movement because we are convinced of the need for a tool to assess students' knowledge of ecological and social issues. The Sulitest tools are based on a strong scientific foundation and cover a wide range of topics (environmental, social and organizations). The TASK™ certification enables students to identify their current degree of expertise on sustainability, and allows us as a school to further improve the content we offer."

– Maud Chassande, Ecological Transformation Lead at ESSEC

"I support the Sulitest movement because it embodies values that are close to my heart. The Sulitest tools offer a unique opportunity to promote sustainability and social responsibility in higher education. They enable us to measure and evaluate our understanding of these issues, as well as our ability to respond to them effectively. I use Sulitest tools with my students to assess their knowledge and skills, identify gaps and take concrete steps to improve their contribution to a more sustainable future. Thanks to Sulitest, I can play an active role in building a better world."

– Sébastien Bourdin, Professor at EM Normandie

"At IESEG, we have integrated TASK™ as part of the mandatory course on Change Management for Sustainability. Integrating TASK™ helped us rethink the content of our core sustainability courses to ensure we were going deeper into the understanding of climate change, biodiversity, and planetary boundaries. At the end of the course students pass the test and then write a reflective essay on their knowledge on sustainability and the gaps they identify. TASK™ is also proposed on a voluntary basis to all students and to Alumni. We also want to create awareness around TASK™ among companies so they value the test and see it as valuable in their recruitment process."

– Maria CASTILLO, Social and Environmental Impact Director at IESEG School of Management

"We are very excited about implementing TASK™ at KAUST. TASK™ will provide a comprehensive overview of our students' sustainability knowledge, allowing us to identify gaps and tailor their academic paths effectively. This ensures that sustainability literacy is deeply integrated into their education at KAUST, preparing them to address global sustainability challenges. Beyond their academic and professional journeys, this literacy will empower them to become changemakers and responsible citizens, equipped to contribute positively to society."

– Prof. Ana Margarida Costa, Professor of Practice and Head of Sustainability at KAUST

GRENOBLE ECOLE DE MANAGEMENT

"Since 2014, GEM has actively engaged in the development and implementation of Sustainability Literacy Test tools to enhance sustainability awareness among students, alumni, staff, and faculty. The customizable tools, such as Sulitest, Suliquiz, and Looping, have been deployed across various programs and have helped to promote strategic initiatives like GEM's Zero Waste ambition and its Société à Mission status. The recently introduced TASK™ certificate allows for measuring and benchmarking core sustainability knowledge, including understanding planetary limits and emerging economic models like the Donut. Grenoble Ecole de Management is working to equip our students with the knowledge and skills necessary to provide responses to pressing global sustainability issues and create a common language to address them as professionals and citizens. The Sulitest has been an important enabler in this transformation."

– Julie Perrin-Halot, Associate Dean & Director at Grenoble Ecole de Management

TERRA INSTITUTE

"As a school dedicated to sustainability training, Sulitest's TASK™ came at just the right time. We assess our students at the start and end of their course to measure their progress. The certification requirement is a powerful incentive for students to prepare thoroughly for the tests."

– Celine Degrave, Director at Terra Institute

ésta school of business & technology Belfort

"The TASK™ Change Leader offers an excellent opportunity for higher education institutions to join forces in raising awareness among learners about the major issues in sustainable development. A series of workshops are organised to share best practice and help the users gain a deeper understanding of the platform and its challenges. It is exciting to be in the early stages of its deployment and to be playing a role in its evolution. TASK™ is also a pragmatic tool for our institution, enabling us to assess the level of knowledge of our learners and to measure the positioning of our teaching approach. The results of the initial sessions demonstrate whether or not students have mastered the subjects, thereby enabling us to identify the teaching models that require optimisation in order to train our future decision-makers."

– Sarah Alavi, Lecturer at ESTA - School of Business and Technology

OMNES EDUCATION

"After a pilot year with our 2 schools ESCE and ECE, during which 500 students were able to take the TASK, the OMNES Education Group is rolling out this international sustainability certification to all 15 of its schools and all its campuses in France and abroad. More than 20,000 students will potentially have the opportunity to take the TASK, as will a large number of teachers and CSR advisors, so that our entire community is on board. The TASK™ is part of our Group's CSR strategy, in its training component, and is helping to transform us and make us a 'change leader' in transitions within higher education."

– Muriel Cordier, OMNES Education Group CSR Director at OMNES Education

excelia

"EXCELIA's pedagogical commitment to Sustainable Development is widely known and recognised. This manifests itself, in particular, through a learning goal that extends across all our study programmes. For many years, as part of an ongoing drive to constantly improve the quality of our teaching, we have been using the Sulitest as a tool to measure the level of acquisition of such skills by our students at the end of their programme. Then, in 2022, Excelia has joined this movement by becoming a 'change leader', so that its entire community can benefit from this certification. We were a member of the expert committee responsible for ensuring that the project was theoretically and methodologically sound, before taking part in the pilot in Autumn 2022. After the launch, we invited our community to participate on a voluntary basis. With the ambition of 100% of our graduating students obtaining their certification, the decision was taken to develop a specific training course to prepare for TASK™ certification. This is a fantastic opportunity for our community to evolve our teachings and challenge ourselves in the face of transition issues."

– Prof. Tamym Abdessemed, Dean at Excelia Business School

The American University in Cairo
School of Business

"We started our sustainability journey around 2013. Sulitest was an integral part of our efforts. We started by using the Awareness Test in many exploratory studies to map and improve the level of knowledge of our students. Currently we require all our undergraduate students to take the test to ensure that they gain critical sustainability awareness before graduation. The next natural progress in our journey in sustainability is TASK. We are in our first year of the engagement and the outcomes are promising. The selected students who took the assessment were very excited about obtaining the certification. Our next step is to incorporate some of the provided learning materials into the curriculum and perhaps as a base for core courses for all students. The tools, guidelines and extensive advice provided by the Sulitest team are very crucial for our success in our journey!"

– Ali Awni, Director of the John D. Gerhart Center for Philanthropy, Civic Engagement & Responsible Business at American University in Cairo - School of Business

Nantes Université

"Experimenting with the TASK™ certificate within our university community corresponds to the idea of increasing the culture of socio-ecological issues and taking seriously a broad understanding of the transformations needed in the socio-economic and institutional worlds. It is a spur to develop training in sustainable development, converging with other initiatives such as the setting up of our sustainable development conference."

– Laurent Devisme, Vice-president at Nantes Université

HEC MONTRÉAL

"Higher education institutions must not only continue their research to understand the challenges facing humanity, but also train the leaders who will help resolve them. The complexity of these issues necessitates humility, and we must find new ways to pool high-level expertise. Thanks to TASK™, we have a tool that allows students to become aware of their own knowledge, as well as the expertise they lack, in order to continue their learning journey and collaborate with each other.."

– Jean-Michel Champagne, Senior Advisor for Sustainable Transition at HEC Montréal

"Sulitest should not be reduced to being the TASK supplier, which is already a lot! It is the focal point of energies facilitating and accompanying the teaching/learning themes raised to achieve sustainable behavior. Training and assessments cover all of the SDGs, leading students to acquire and proove knowledge or skills in most areas impacted by global change. We have spent years raising awareness among student populations on these subjects, the work is still going on but remains insufficient, Sulitest makes it possible to move from awareness to literacy on sustainable development."

– Gérard Vidal, Lecturer at ENS de Lyon

"As a professor, it is essential for me that students are fully aware of all the dimensions and challenges of sustainable development. At the Université Paris-Saclay, we want to train them so they acquire all these dimensions. Sulitest's TASK™ offers an independent, universal assessment that integrates all the dimensions of sustainability. Students can show the value of their knowledge and skills through TASK's score, but they also get an idea of where they lacking are and what they need to improve."

– Claire Lartigie, Professor at Université Paris-Saclay

"Decision-makers and managers need to adapt to the imperatives of transformation while guiding their teams. There is no miracle method for transformation, but rather reflexes to adopt and a way of approaching the subject. With this in mind, Y SCHOOLS has committed to a global approach by becoming a Change Leader. All our students take the TASK™ certificate at the end of their course to objectively assess their level of awareness and involvement in sustainable development."

– Julien Renoult, General Director at YSCHOOLS

"Ecopia supports the Sulitest movement since we are convinced that sustainable transformation is necessary for organizations and thus we need to mainstream sustainability knowledge for that. TASK is a recognition for our students, a "plus" for their resumes. It also enables us to better understand the level of our students' knowledge on several sustainability topics, so that we can improve our programs. Today, each student must pass the TASK certificate to obtain the Ecopia diploma. Ecopia also offers it to its teachers on a voluntary basis, to help them assess their sustainability knowledge."

– Aude Serrano, Academic Director at ECOPIA

"We support the Sulitest movement because we firmly believe in the importance of sustainability education. As Director of Social Transition, Sulitest offers an ideal platform for assessing and improving knowledge of environmental and social issues. TASK™ embodies the value of concrete action. Through the practical mission and clear objectives, we have been able to develop the valuable skills of our learners, and contribute to meaningful projects. Over the past 18 months, we have integrated TASK™ into all our programs to make a tangible positive impact."

– Florent Deisting, Director of Social Transition at TBS Education

"At Ynov, with our 15 campuses and 11,000 students in France, we are determined to integrate the sustainability principles defined by the UN's SDGs into our teaching methods. In partnership with Sulitest, we use TASK™ to certify our students' knowledge of sustainability. This partnership aims to raise our graduates' awareness of current environmental and societal challenges. By certifying 75% of our students within three years, we are committed to training aware and responsible leaders, ready to meet the challenges of the future."

– Anil Benard-Dende, General Director at YNOV

"The ESME engineering school with Sulitest is the guarantee of being able to challenge our knowledge on environmental and social stakes on a global scale. Our students will progress and evolve professionally and personally by validating a level of certification with the TASK tools to have a common language and culture of the CSR in a fast changing world. Thanks to this tool, we can develop our learning methods and use strong references in sustainability."

– Véronique Bonnet, General Manager at ESME

"We have introduced a cross-disciplinary sustainable development course for all our students. We wondered about the assessment tools. TASK by Sulitest seemed to us to be a relevant tool, so we offered it for the first time this year to all the participants in that course. The tool proved to be highly relevant and, above all, addressed the entire field covered by our course. Furthermore, those who have taken TASK were proud of it and, those who have obtained a good score, were quick to promote it.."

– Patrice Bras, Director at CAMPUS XIIe AVENUE

ESG ACT

"I chose to use TASK™ for all of my students because we are a business school dedicated to sustainability. We used TASK™ at the beginning of the academic year in order for the students to measure their knowledge. We will use it again at the end of the academic year for the students to evaluate their progress. We also proposed the assessment to all of the academic staff, for their own appreciation of their knowledge. The results were very inspiring as many students already passed the assessment with good results, the same for the teachers. We will continue to use the test for the years to come, to compare et evaluate the evolution of knowledge of the cohorts of the students. TASK™ is a very powerful tool, easy to implement, easy to take but not so easy to master–quite the right recipe!"

– Nathalie Patrat, Executive Director at ESG ACT

ésta
school of business & technology
Belfort

"The TASK™ Change Leader offers an excellent opportunity for higher education institutions to join forces in raising awareness among learners about the major issues in sustainable development. A series of workshops are organised to share best practice and help the users gain a deeper understanding of the platform and its challenges. It is exciting to be in the early stages of its deployment and to be playing a role in its evolution. TASK™ is also a pragmatic tool for our institution, enabling us to assess the level of knowledge of our learners and to measure the positioning of our teaching approach. The results of the initial sessions demonstrate whether or not students have mastered the subjects, thereby enabling us to identify the teaching models that require optimisation in order to train our future decision-makers."

– Sarah Alavi, Lecturer at ESTA - School of Business and Technology

UA UFR ESTHUA
TOURISME ET CULTURE
UNIVERSITÉ D'ANGERS

"ESTHUA firmly believes that the ecological transition must be a collective effort and that raising awareness among students is vital to ensuring a sustainable future. This is why we are working with Sulitest to pave the way for sustainability education. Similarly, the opportunity offered by TASK™ to certify the majority of our students animates us in this key role we can play in training future generations and agents of change. The TASK™ Change Leader programme is therefore part of our aim to make sustainability the common language in our tourism education."

– Laureline Congnard, Education Projects Engineer at ESTHUA

UniLaSalle
Institut Polytechnique

"TASK™ by Sulitest is a tool that we have been using for the past two years at UniLaSalle. We use it has been set up both for our students and our staff: it enables everyone to assess its own knowledge independently and objectively. It makes it easier to identify topics that need strengthening. The measure of their progress is also an asset. The international dimension facilitates comparisons. It offers a common language, especially for students coming from or going abroad."

– Geoffroy Belhenniche, Head of Ecological and Social Change at UniLaSalle

KEDGE
BUSINESS SCHOOL

"Kedge Business School has been convinced for 10 years of the need to train 100% of our students in the challenges of sustainability and inclusiveness, and has supported Sulitest from the outset and ensured its successful deployment. Our school was one of the main contributors to the fundraising that led to the creation of Sulitest Impact in 2022. This new structure is supported by our incubator. One of the main assets of TASK™ is that it assesses an individual's knowledge of sustainability: it enables each student to measure their knowledge and thus feeds our desire to train change agents. It should be noted that the construction of the model specific to TASK™ was based on contributions from several of our Professors, members of Kedge Business School's Sustainability research centre. In line with the school's KEDGE Impakt strategy, TASK™ is currently offered in two of our MSc programmes specialising in impact: the MSc Sustainable Finance and the MSc Business Transformation for Sustainability. It has also been rolled out to our community of committed graduates - the Kedge Alumni for Impakt network. Next step for us: to commit, as a Change Leader institution, to having at least 75% of our graduates TASK™ certified within 3 years!"

– Elisabetta Magnaghi, Deputy General Director & Dean at KEDGE Business School

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Appendix A – Our governance

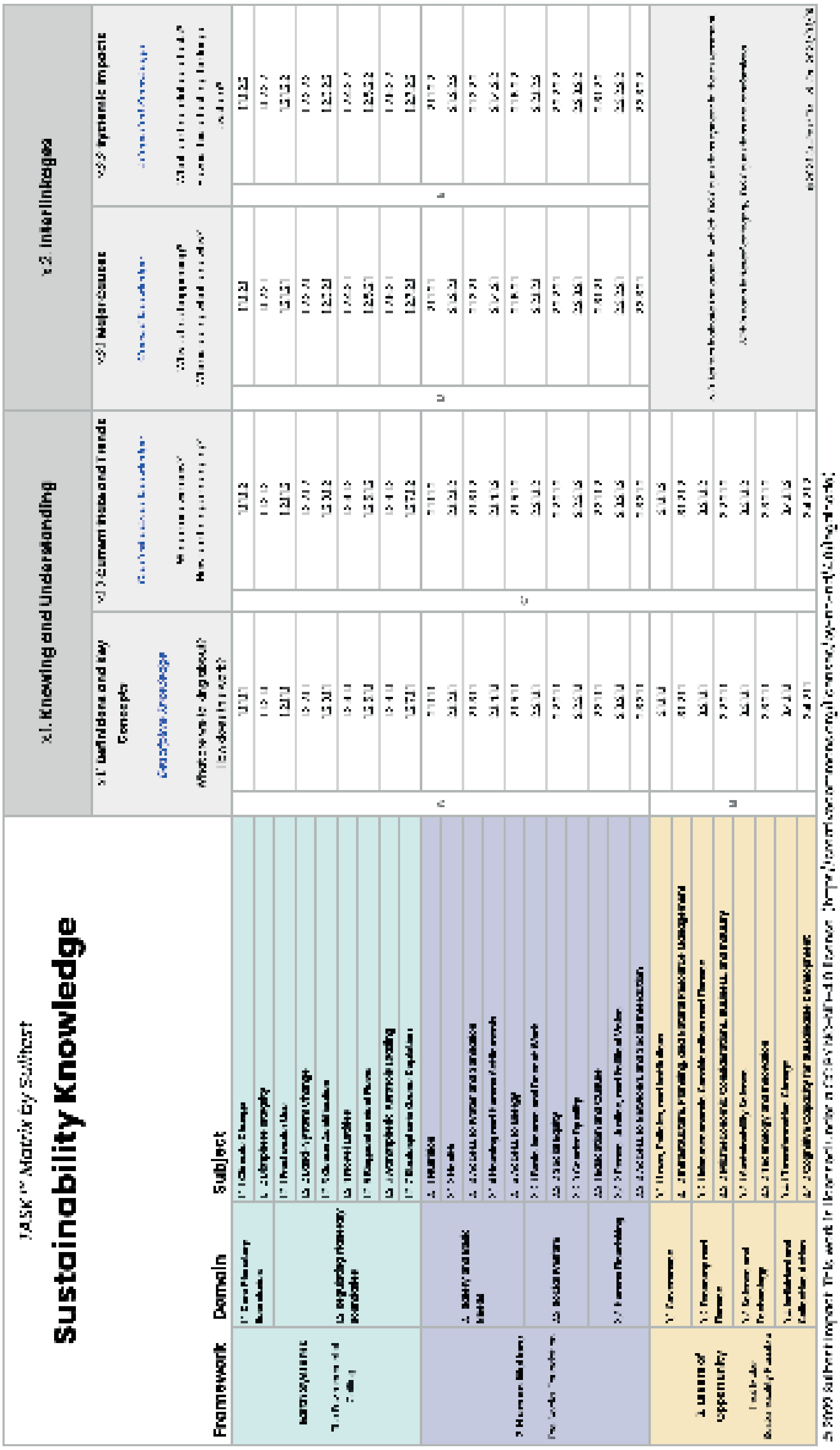
The Sulitest movement was born out of the dynamics of the Rio+20 Earth Summit. With the mission of “raising awareness and assessing sustainability literacy”, the Sulitest association, created in 2014, intends to play a key role in achieving objective 4.7 of the Sustainable Development Goals (SDGs) Agenda, which aims to “ensure that all learners acquire the knowledge and skills necessary to promote sustainable development”.

Tangible implementation of the Higher Education Sustainability Initiative (HESI), the Sulitest movement was recognized in 2016 as one of the remarkable initiatives in the United Nations partnership for the Sustainable Development Goals. Today, the association holds three United Nations accreditations, co-chairs HESI alongside UN DESA, and has a very strong international recognition.

In order to scale up its impact, the association and its two co-founders decided to create in 2021 a social business. Under the French law, Sulitest Impact is a Entreprise de l’Économie Sociale & Solidaire (SAS de type ESUS), a framework that guarantees not only purpose but also commitments and responsibilities of the company as a social business. In January 2022, a fundraising initiative saw the participation of six private and public HEIs, along with business angels, who invested capital into the venture.

We are committed to making Sulitest a movement and a community serving the ”common good”. Today the Sulitest movement is therefore supported by two legal structures, the association and the social business, in order to combine relevance, independence and efficiency. The association, shareholder of the social business, is the guarantor of meaning and purpose. It has a role of advocacy supporting the mainstreaming of sustainability literacy. It will eventually play a role in capacity building, supporting sustainability education and research. The social enterprise is responsible for the design, editing, development and management of all tools, as well as the deployment of the business. Finally, it develops research and development on the impact of the use of Sulitest tools on individuals and organizations.

Appendix B – TASK™ Matrix by Sulitest



Appendix C – TASK™ Model: Technical Specification and Test Reliability

The Multidimensional Bayesian Two-Parameter Logistic (2PL) Item Response Theory (IRT) model represents an evolution from the conventional 2PL IRT model. This advanced model is designed to accommodate multiple latent traits or abilities, a progression from the earlier version that only considered a single trait. The basis of this model is the Bayesian statistical framework, which allows for the integration of pre-existing data with new observations.

Bayesian sampling is achieved via Markov Chain Monte Carlo (MCMC) methods, integrating prior distributions for both item parameters and traits. The inclusion of prior distributions is crucial as it allows for the integration of external data into the model and acts as a regularization tool for estimates, especially beneficial in complex multidimensional models.

In the evaluation of the model sampling performance, we refer to "Bayesian Data Analysis" (Gelman et al., 2013) for the principles behind our diagnostic tools - the Rhat statistic and the ESS (Effective Sample Size) bulk. As per Gelman et al. (2013), the Rhat statistic, also known as the potential scale reduction factor, should ideally be near 1. A Rhat value significantly deviating from 1 could be indicative of potential non-convergence, suggesting a necessity for additional iterations.

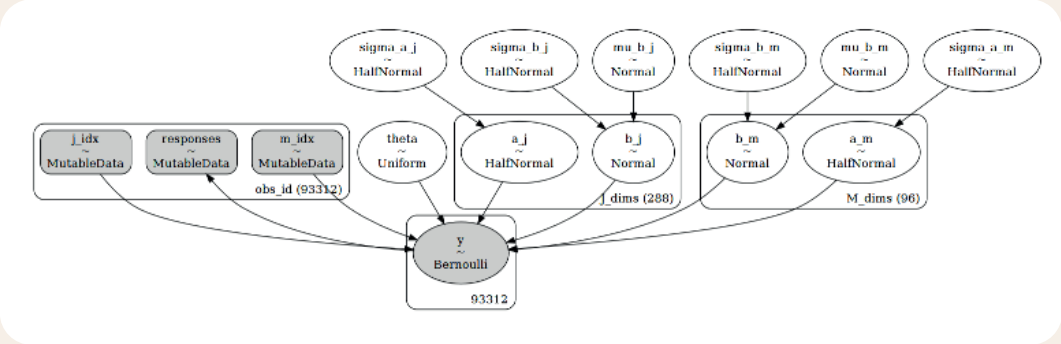
Furthermore, Gelman et al. (2013) highlight the role of the ESS, particularly the bulk ESS, as an indicator of the MCMC process's efficiency. A larger ESS is associated with a more efficient sampling procedure, leading to more accurate and trustworthy estimates. The acceptable threshold can vary based on the specific context of the analysis.

Throughout the production deployment of TASK™, both the Rhat and ESS have consistently stayed within the acceptable ranges as proposed by Gelman et al. (2013). This consistency implies satisfactory chain convergence, thereby endorsing the reliability of our model performance.

The model operates as a two-stage procedure, presenting a significant advantage over synchronous modeling techniques by enabling asynchronous estimation of item parameters and individual abilities. This asynchronous operation brings marked benefits in terms of operational efficiency and scalability.

The initial phase of the model focuses primarily on the estimation of item parameters, specifically discrimination (a) and difficulty (b). A large and diverse calibration sample is used during this stage to train the model and compute these parameters for each item. The model's learning process, which involves the refining of its estimates, is carried out over extended periods, leveraging high volumes of data for optimum results.

The first phase or the “learning” phase of the TASK™ model can be visually interpreted below:



At the onset, our model operates at the item or question-level, employing a collection of hyper priors that orchestrate the distribution of item parameters. These hyper priors play a pivotal role in re-calibrating the distribution of item parameters, thereby offering the model more flexibility to navigate the probability space.

The hyper priors include sigma_a_j, sigma_b_j, and mu_b_j. Here, sigma_a_j denotes the standard deviation of the item discrimination parameter ‘a’, while sigma_b_j represents the standard deviation of the item difficulty parameter ‘b’. The mean of the item difficulty parameter ‘b’ is symbolized by mu_b_j.

Following these hyper priors, we proceed to the item priors a_j and b_j. The former refers to the item discrimination parameter, signifying how effectively an item differentiates between individuals possessing varied ability levels. On the other hand, b_j represents the item difficulty parameter, indicating the challenge posed by an item to individuals.

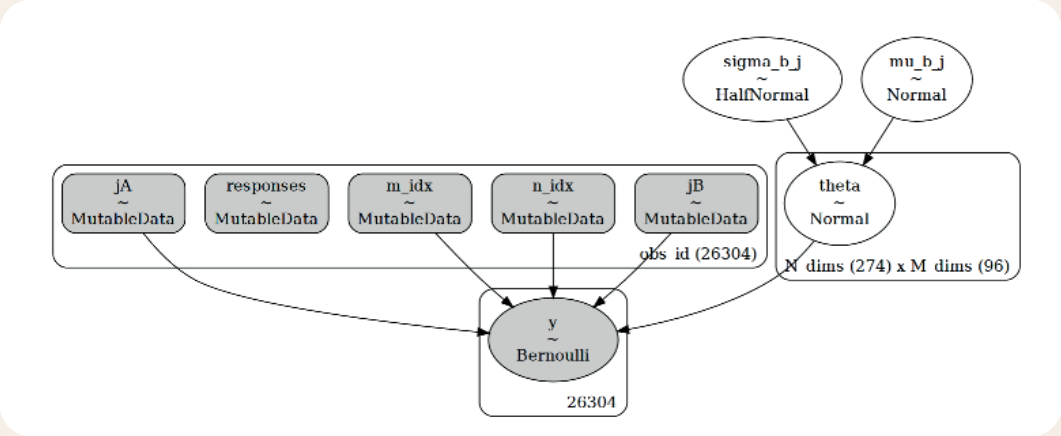
Transitioning to the matrix subject-level, the model employs another series of hyper priors that shape the distribution of matrix subject parameters. These comprise sigma_a_m, sigma_b_m, and mu_b_m. Here, sigma_a_m stands for the standard deviation of the matrix subject discrimination parameter ‘a’, whereas sigma_b_m designates the standard deviation of the matrix subject difficulty parameter ‘b’. The mean of the matrix subject difficulty parameter ‘b’ is represented by mu_b_m.

These hyper priors pave the way for the matrix subject priors a_m and b_m. The former signifies the matrix subject discrimination parameter, reflecting how well a matrix subject differentiates between individuals of varying ability levels. Conversely, b_m corresponds to the matrix subject difficulty parameter, expressing the level of difficulty a matrix subject presents to individuals.

These parameters converge into a Bernoulli distribution to form a probability function. This function determines the probability of a respondent correctly answering an item, considering their ability level and the item and matrix subject parameters, thereby encapsulating the probabilistic aspect of responses.

In the second stage of the model, we shift our focus to estimating the abilities or traits (denoted by θ) of new individuals engaging with the test. This two-stage procedure bolsters operational efficiency by leveraging pre-determined

item parameters to estimate new test-takers' abilities, eliminating the need for perpetual re-estimation of item parameters.



Within this stage, we revisit sigma_b_j and mu_b_j, which now function as hyper priors for the ability distributions of each new respondent. For each dimension of the item or matrix that the respondent encounters during the test, these hyperpriors offer preliminary estimates of variability (sigma_b_j) and central tendency (mu_b_j) for the respondents' abilities.

Subsequently, the model employs the jA and jB parameters, embodying the realized discrimination and difficulty for each test-taker in every response event. Preserved from the initial model sampling, these parameters provide valuable insights. The jA parameter conveys how efficiently a specific item differentiates between respondents with varied levels of the latent trait during each response event. Concurrently, the jB parameter reflects the level of the latent trait at which the item yields maximum information in that response event's context.

Incorporating item and matrix subject-level discrimination and difficulty parameters into our model allows for a sophisticated comprehension of how individuals, possessing varied ability levels, interact with distinct sustainability questions and topics. This approach not only generates a comprehensive picture of each respondent's sustainability knowledge but also facilitates the consistent enhancement and precision of our assessment tool.

TASK™ RELIABILITY

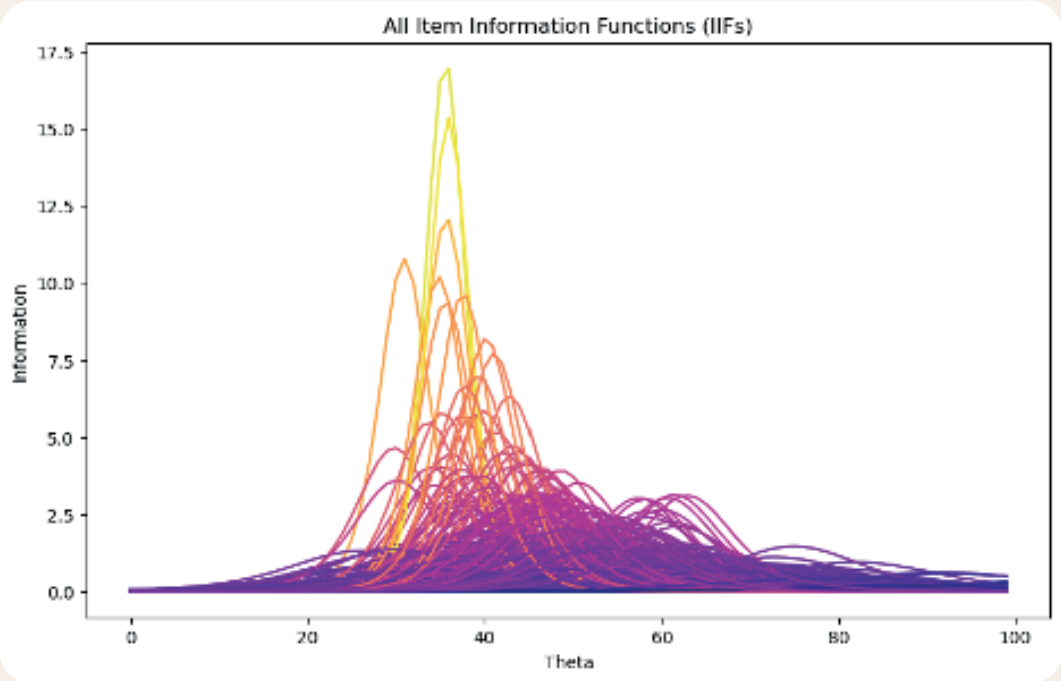
In assessing the reliability of a test under the lens of Item Response Theory, we focus our analysis on the Fisher Information statistic. This measure is derived from the variance of individual items or the entire set of items in the assessment. It provides an illustration of the association between the quantity of information, that is, the precision, and an examinee's ability across the entire ability spectrum (Baker, 2004).

A significant advantage of utilizing the Fisher Information function is its capacity to denote the degree of precision in estimating the examinee's ability at every point on the proficiency scale. In other words, it serves as a metric that showcases how accurately the assessment can gauge an individual's capability level, regardless of whether the individual is at the low end, high end, or anywhere in between on the ability continuum. This characteristic is integral

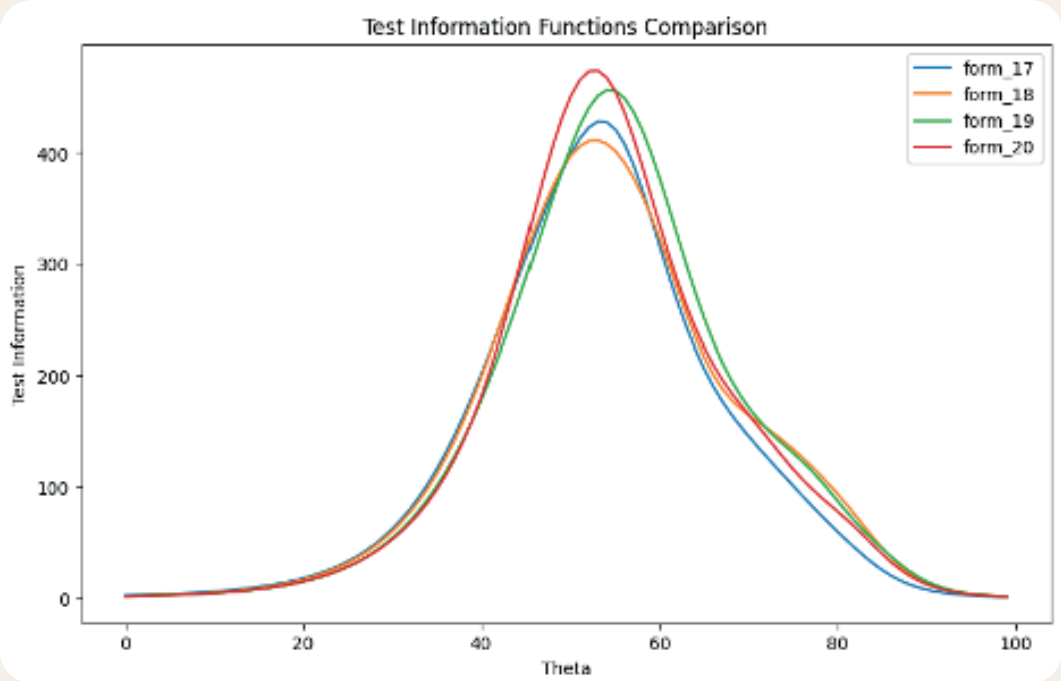
to ensuring the reliability and validity of the assessment, thereby promoting a more robust and comprehensive understanding of an individual's capabilities.

For Sulitest's 2024 HLPF report we provide an updated view of item response functions, as well as test information functions for each of provided assessment forms at the time of the creation of the 2024 HLPF report. Reliability measured through a collective test information function as provided in last year's report is continuously monitored and maintains at an acceptable level for high stakes testing for the majority mass of the assessed ability continuum. Defined reliability oefficients are 0.7 for early stages of research, a coefficient of .8 for applied settings, and for high stakes testing a coefficient of .9 is typically considered the standard (Nunnally, 1978).

These representations provide an intuitive way to visually interpret reliability across different levels of the latent trait. In an Item Information Function (IIF) or Test Information Function (TIF) graph, the x-axis signifies varying levels of the latent trait, while the y-axis symbolizes the amount of test information - a direct reflection of measurement precision - at each trait level. For this report's visualizations ability is normalized to 100 points across the spectrum of abilities assessed.



The IIF visualizations reveal a distributed nature across the spectrum of abilities with significant items near the border between the first two quarters of ability. TASK™ contains multiple choice items with four potential answers, we then hypothesize that the highly significant aforementioned item's behaviour is linked to the distinguishability between respondent's who guess throughout the entire assessment and those who do not.



The provided graph illustrates the Test Information Functions (TIFs) for forms 17, 18, 19, and 20. Observing the TIFs, we can see that the curves exhibit a highly similar nature, with peaks and overall shapes closely aligning. This similarity underscores the effectiveness of the forms in providing comparably informative assessment tools, fulfilling the objective of maintaining consistent and reliable measurement across different test versions. The convergence of the TIFs suggests that each form offers a comparable level of information at various levels of the latent trait (theta), ensuring fairness and accuracy in the assessments.

Appendix D - TASK™ OLS Regression Results

OLS Regression Results Dep. Variable:	ability_n_m	R-squared:	0.155			
Model:	OLS	Adj. R-squared:	0.155			
Method:	Least Squares	F-statistic:	210.1			
Date:	Fri, 25 Jun 2021	Prob (F-statistic):	0			
Time:	21:33:40 PM	Log-Likelihood:	-49968			
No. Observations:	12206	AIC:	9.995E+04			
Df Residuals:	12194	BIC:	1.000E+05			
Df Model:	11					
Covariance Type:	nonrobust					
	coef	std err	t	P>|t|	[0.025	0.975]
const	21.7716	0.875	24.101	0	19.458	22.887
User_gender_Woman	0.4088	0.218	1.92	0.055	-0.114	0.841 Men
began secondary ed	5.3146	0.717	11.8	0	6.21	2.72 None
has bachelors	11.086	0.668	17.440	0	10.036	12.143
has masters	11.2485	0.682	16.285	0	9.930	12.534
1 sus training	[illegible]	[illegible]	[illegible]	0	[illegible]	[illegible] Zero
2 sus training	2.1338	0.413	5.172	0	1.325	2.942
3+ sus training	4.3186	0.376	11.424	0	3.556	5.024
SR some K	5.7546	0.352	16.338	0	5.064	6.445 Basic
SR moderate K	[illegible]	0.336	[illegible]	0	[illegible]	[illegible]
SR expert K	2.8028	0.669	4.183	0	1.490	4.113
User_age	0.4024	0.02	24.124	0	0.452	0.552
Omnibus:	58.123	Durbin-Watson:	1.98E+00			
Prob(Omnibus):	0	Jarque-Bera (JB):	4.28E+01			
Skew:	0.042	Prob(JB):	5.71E-10			
Kurtosis:	2.728	Cond. No.	2.65E+02			
feature	VIF					
const	44.6116274					
User_gender_Woman	1.011728					
began secondary ed	4.128436					
has bachelors	8.473134					
has masters	5.100601					
1 sus training	1.5492					
2 sus training	1.669523					
3+ sus training	1.700332					
SR some K	1.42918					
SR moderate K	[illegible]					
SR expert K	1.151432					
User_age	1.[illegible]					

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July 2024

The Sulitest Association holds Observer status to the UN Environment Assembly (Accreditation 430/218) Special consultative status with the UN Economic and Social Council since 2019 NGO in official partnership with UNESCO (consultative status) since 2022

The Social Business Sulitest Impact is an “entreprise de l’Économie Sociale & Solidaire” under the French law (“SAS de type ESUS”)