**TASK™ by Sulitest – Model of Sustainability Knowledge**

Position Paper

October 2022

*To build a sustainable future, it is imperative to improve sustainability knowledge, skills, and mindsets. While the world and organizations need experts who can solve specific problems in their field, it is now essential to massify sustainability literacy and ensure that a growing number of graduates and professionals have a sufficient understanding of sustainability and the ability to integrate it into their personal and professional practices and decisions. Sulitest provides online engagement and assessment tools that enable higher education and organizations to mainstream sustainability literacy.*

In 2023, Sulitest is releasing **TASK™ – The Assessment of Sustainability Knowledge –** with the ambition to **transform education** by (re)setting the **standard of sustainability knowledge** which should underline human decision making. TASK™ is a robust, science-based assessment delivering an international certificate on sustainability knowledge. The assessment provides an easy to integrate tool which provides relevant & comparable metrics for monitoring and steering education for sustainability across any educational program.

By design, TASK™ is meant to be coherent with existing frameworks in the field of education for sustainability such as the UNESCO Education for Sustainable Development Goals Learning Objectives[1], the European sustainability competence framework, GreenComp[2] or the framework from the report led by Jean Jouzel[3] for the French Minister of Higher Education "Sensibiliser et former aux enjeux de la transition écologique dans l'Enseignement supérieur"[4].

TASK™ is one tool in the education for sustainability toolbox, focusing on sustainability knowledge. It fills a current gap in the landscape by measuring the

[1] https://unesdoc.unesco.org/ark:/48223/pf0000247444

[2] https://publications.jrc.ec.europa.eu/repository/handle/JRC128040

[3] Former vice-chair of the Scientific Working Group of the Intergovernmental Panel on Climate Change (IPCC) and co-laureate of the Nobel prize with the IPCC.

[4] https://www.enseignementsup-recherche.gouv.fr/fr/sensibiliser-et-former-aux-enjeux-de-la-transition-ecologique-dans-l-enseignement-superieur-83888

level of modern sustainability knowledge, as expressed through concepts, processes, branches, and overall interdisciplinarity. The positioning of TASK as a robust measuring tool within this context is inspired by the Four-Dimensional Framework documented by the Center for Curriculum Redesign (CCR)[5] for the 21st century education: knowledge, skills, character, meta-learning.

While curriculum and pedagogical transformation can take multiple forms across diverse contexts, **TASK™ will be a game changer in making sustainability a common language for all,** regardless of the degree, specialization, profession, or sector. It is the common knowledge base that will enable an engineer to exchange and build with a manager or a biologist tomorrow. Of course, knowledge is not enough, and sustainability literacy also covers skills, mindsets, and behaviors to enable action. However, several studies (including the ones previously cited) state that sharing a common knowledge base is crucial to enable transformative actions and to trigger systemic change.

The development of TASK™ is going through the following cycle:

- Defining our model of sustainability knowledge (focus of this paper)
- TASK™ - Assessment Design & Item Development
- Pilot: sampling and in-depth analysis for internal consistency, robustness and validity
- Rolling-out: learn & iterate for continuous improvement.

This position paper focuses on the first foundational phase: defining our model of sustainability knowledge.

## A model of sustainability knowledge

Even though ancient Greek scientists such as Eratosthenes proved that the Earth was round more than 2500 years ago, it is only recently that humanity started to realize it also has boundaries. By transgressing them, we are endangering the balance that makes Earth a unique place where the community of life, including humanity, can thrive.

A paradigm shift toward sustainability should allow us collectively to come back within the planetary boundaries that protect Earth's life-supporting systems, while ensuring that we meet humanity's needs, and we create the conditions for a flourishing life.

[5] Fadel, Bialik & Trilling, 2015, Four-Dimensional Education: The Competencies Learners Need to Succeed, Center for Curriculum Redesign (CCR). https://curriculumredesign.org/framework/

However, sustainability is a contested concept that does not rely on a stabilized domain of knowledge. It encompasses diverse (and sometimes conflicting) approaches.

Defining our domain of sustainability knowledge required engaging with the relevant scientific literature and existing approaches and frameworks for sustainability. Sulitest gathered a task force with academics and sustainability professionals and an assembly of stakeholders, the "Fellows", to document and to ensure consistency. It also implied that we make choices that are positioning our tools and actions within the field of sustainability and education for sustainability: **we build our own model of sustainability knowledge, which carries our vision for sustainability**.

We consider it as a bold vision that builds upon the embeddedness of Earth system, human welfare and all levers that make sustainability possible, and the necessity to know and understand each dimension, as well as their systemic interlinkages. This vision is a call for radical systemic change to enable all of us to build a sustainable future.

*Main sources of inspiration*

For building this model, we conducted an extended review of literature, reports, tools, and frameworks on sustainability literacy, education for sustainability (EfS), education for sustainable development (ESD), sustainability assessments, etc. Considering existing knowledge in these fields, our model builds on three main sources of inspiration.

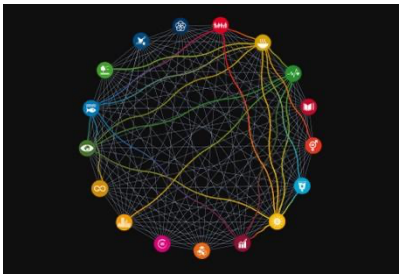
1 – The UN 2030 Agenda for Sustainable Development[6], which provides a common roadmap embracing the systemic nature of sustainability with 17 Sustainable Development Goals (SDGs) and 169 targets.

Integrated by design, the 17 SDGs carry a systemic approach of sustainability through their multiple interlinkages: synergies, co-benefits, trickle-down effects, feedback loops, but also potential conflicts and trade-offs.

Embracing the systemic nature of sustainability requires science-based analysis and tools to navigate that complexity and to realize the ambition of the 2030 Agenda, as emphasized by the International Council of Science in the *Guide to SDG*

[6] https://sdgs.un.org/goals

*Interactions: from Science to Implementation*[7]. It also requires a radical shift from business as usual to unleash profound transformations through collaboration between multiple stakeholders. The *2019 Global Sustainable Development Report (GSDR)*[8] provides "a process for advancing collaboration among actors in science, Government, the private sector and civil society towards identifying and realizing concrete pathways for transformation driven by evidence". The GSDR identifies four levers to support such transformations that we adapt for our model: Governance, Economy & Finance, Science & Technology, Individual & Collective Action.

2- Our model is then inspired by the embedded conceptualization of sustainability that fits within the planetary boundaries.

This approach builds on the framework developed by the scientists of the Stockholm Resilience Institute[9] identifying the nine planetary boundaries that regulate the stability and resilience of the Earth system and provide a safe operating space for humanity to thrive[10]. This approach has strong implications on the conceptualization of sustainability and the role of humanity, society, and economy: they are embedded within the Earth system and its physical boundaries. One powerful illustration of this conceptualization is David Elkington calling back his own concept of the "Triple Bottom-Line" (people, planet, profit) and calling for sustainability frameworks that have the "suitable pace and scale – the necessary radical intent – needed to stop us all overshooting our planetary boundaries"[11].

---

[7] Griggs, D. J., Nilsson, M., Stevance, A., & McCollum, D. (2017). *A guide to SDG interactions: from science to implementation.* International Council for Science, Paris. https://council.science/publications/a-guide-to-sdg-interactions-from-science-to-implementation/

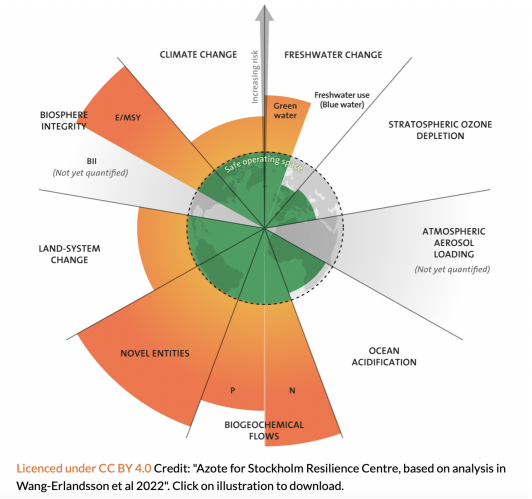
[8] Messerli, P., Murniningtyas, E., Eloundou-Enyegue, P., Foli, E. G., Furman, E., Glassman, A., ... & van Ypersele, J. P. (2019). Global sustainable development report 2019: the future is now–science for achieving sustainable development. https://sdgs.un.org/gsdr/gsdr2019

[9] https://www.stockholmresilience.org/research/planetary-boundaries.html

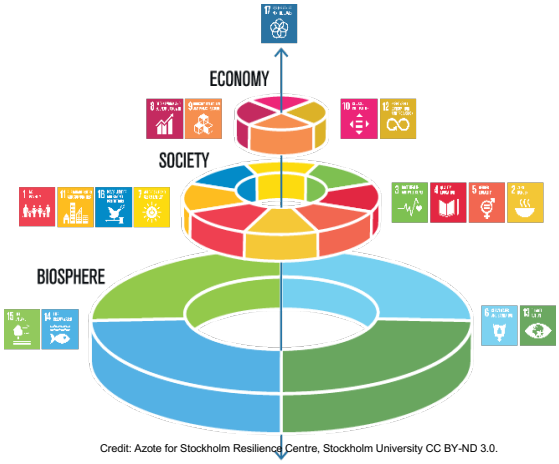
[10] Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin III, F. S., Lambin, E., ... & Foley, J. (2009). Planetary boundaries: exploring the safe operating space for humanity. *Ecology and society*, *14*(2).

[11] Elkington, J. 25 years ago I coined the phrase "Triple Bottom Line." Here's Why It's Time to Rethink It. *Harvard Business Review*, 25 June 2018. Available online: https://hbr.org/2018/06/25-years-ago-i-coined-the-phrase-triple-bottom-line-heres-why-im-giving-up-on-it

In the embedded conceptualization of sustainability, the SDGs can be viewed as a "wedding cake" where Economy is embedded in Society, which is itself embedded in the Biosphere.








3- The third main source of inspiration is Kate Raworth's (2017) "Doughnut Economics"[12], offering a vision for humanity to thrive in the 21st century, with the aim of meeting the needs of all people within the means of the living planet.

The Doughnut model builds on the planetary boundaries framework and consists of two concentric rings: a social foundation, to ensure that no one is left falling short on life's essentials, and an ecological ceiling, to ensure that humanity does not collectively overshoot the planetary boundaries that protect Earth's life-supporting systems. It allows us to rethink the economy as a system that should fit between these two sets of boundaries, in a doughnut-shaped space that is both ecologically safe and socially just: a space in which humanity can thrive.


Credit: Kate Raworth and Christian Guthier. CC-BY-SA 4.0

[12] Raworth, K. (2017). *Doughnut economics: seven ways to think like a 21st-century economist.* Chelsea Green Publishing.

*Structuring & operationalizing our model in a foundational matrix*

Combining these sources of inspiration with the existing literature in the fields of sustainability and education for sustainability, we structure our model of sustainability knowledge in a foundational matrix. This matrix seeks to articulate the inspirational frameworks previously mentioned in a coherent model, enriched with our own vision of sustainability knowledge.

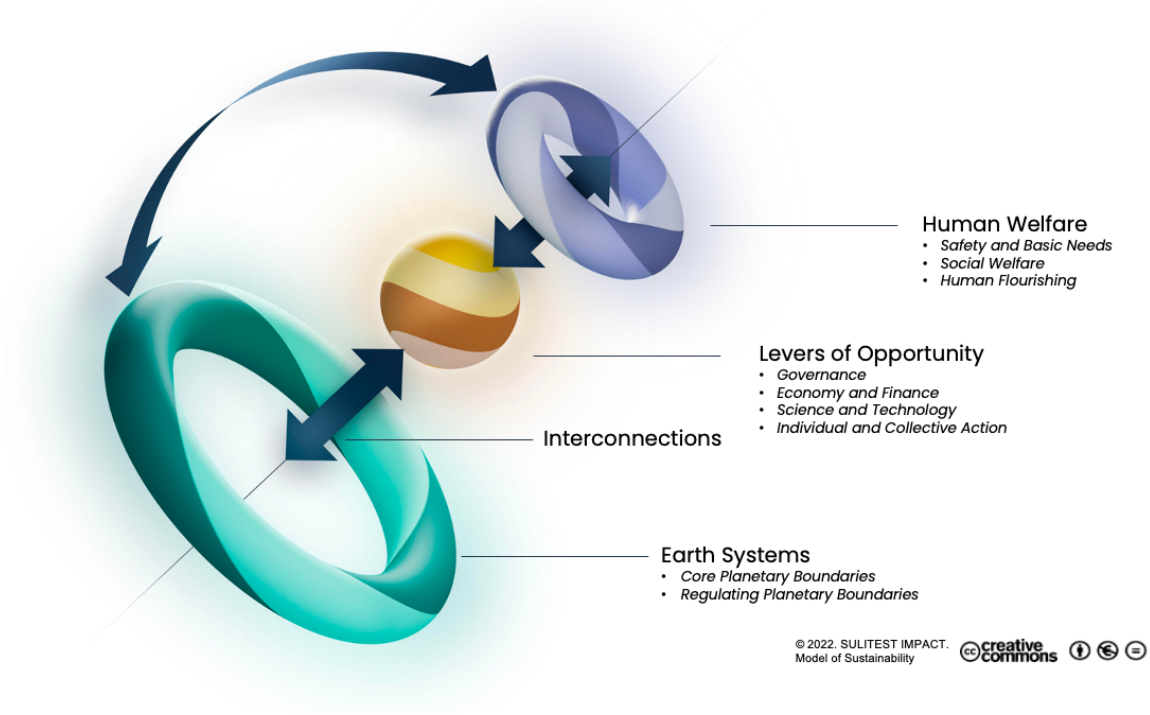
This model of knowledge is not specific to a discipline or a sector but follows the thematic and systemic nature of sustainability literacy.

**Our model of Sustainability Knowledge ››** All individuals should know and understand the planetary boundaries, the social foundations of human welfare, the levers that affect our ability to build a sustainable future, and the systemic interlinkages existing between and across these branches.

This model of sustainability knowledge is operationalized in a foundational matrix organized in three main themes:

- **Earth Systems,** includes core planetary boundaries and regulating planetary boundaries that provide a safe operating space for humanity;
- **Human Welfare,** with the social foundation to ensure safety and basic needs for all, social welfare, and human flourishing;
- **Levers of Opportunity** includes four main levers that could make sustainability possible: Governance, Economy and Finance, Science and Technology, Individual and Collective Action.

**Figure 1. TASK™ by Sulitest - Foundational Matrix – Graph**




The three high order branches of the matrix are organized in 9 second-order branches and 28 concepts (see Table 1). In addition, the **types of knowledge** applied to these concepts should be specified.

Within epistemology, the types of knowledge are differentiated between propositional knowledge (also referred to as descriptive knowledge[13]) and non-propositional knowledge (knowledge-how and knowledge by acquaintance referring to familiarity with a topic that results from experience with another topic). Both types of knowledge are considered forms of cognitive success[14].

Our model organizes the different types of knowledge into **perspectives** that ensure its coherence and consistency: knowing and understanding the concepts should act as a filter before exploring the systemic interlinkages between these concepts.

The first two branches of the matrix are threshold-based, they represent a set of boundaries for **Earth Systems** and **Human Welfare**. For each concept included in these two branches, **four perspectives** are integrated in our model of sustainability knowledge: definitions, trends, major causes, and systemic impacts.

- **Definitions** require to know the function of a concept.

[13] Burgin, M. (2016). *Theory of knowledge: structures and processes* (Vol. 5). World scientific.
[14] https://plato.stanford.edu/entries/epistemology/

- **Trends** include processes, as well as evolutions of a concept.
- **Major Causes** identify the main drivers for transgressing a boundary (in Earth Systems or Human Welfare).
- **Systemic Impacts** relate to the impacts of boundary transgression on other concepts.

The third branch of the matrix is different in nature: it represents the **Systems Made by Humans** as levers to act on sustainability, enabling (or hindering) our ability to build a sustainable future. For each of these levers, two perspectives are integrated in our model of sustainability knowledge: definitions and trends.

- **Definitions** require to know and understand the importance of a lever for acting on sustainability.
- **Trends** include processes, as well as evolutions of a lever's action on sustainability.

The resulting **matrix structure** consists of: 3 higher order branches (e.g., Earth Systems); 9 second-order branches (e.g., Core Planetary Boundaries); 28 concepts (e.g., Climate Change), and 96 test items at the most granular level (e.g., definition of climate change), see **Table 1**.

This **foundational matrix** carries **our vision of sustainability knowledge**. **TASK™** is providing a robust, science-based assessment that **will make this domain of sustainability knowledge the new standard.**

## Table 1. TASK™ by Sulitest – Foundational Matrix – Granular Version

| | | | Knowing & Understanding | | Interlinkages | |
|---|---|---|---|---|---|---|
| | | | **Definition & key concepts** (what are we talking | **Current state & trends** (where are we?) | **Major causes** (Why is this happening?) | **Systemic Impacts** (How is it affecting the rest of the system? |
| 1. **Earth Systems** (environmental ceiling) | **1.1 Core planetary boundaries** | 1.1.1 Climate change | 1.1.1.1 | 1.1.1.2 | 1.1.1.3 | 1.1.1.4 |
| | | 1.1.2 Biosphere integrity | 1.1.2.1 | 1.1.2.2 | 1.1.2.3 | 1.1.2.4 |
| | **1.2 Regulating planetary boundaries** | 1.2.1 Freshwater use | 1.2.1.1 | 1.2.1.2 | 1.2.1.3 | 1.2.1.4 |
| | | 1.2.2 Land system change | 1.2.2.1 | 1.2.2.2 | 1.2.2.3 | 1.2.2.4 |
| | | 1.2.3.Ocean acidification | 1.2.3.1 | 1.2.3.2 | 1.2.3.3 | 1.2.3.4 |
| | | 1.2.4 Novel entities | 1.2.4.1 | 1.2.4.2 | 1.2.4.3 | 1.2.4.4 |
| | | 1.2.5 Biogeochemical flows | 1.2.5.1 | 1.2.5.2 | 1.2.5.3 | 1.2.5.4 |
| | | 1.2.6 Atmospheric aerosols loading | 1.2.6.1 | 1.2.6.2 | 1.2.6.3 | 1.2.6.4 |
| | | 1.2.7 Stratospheric ozone depletion | 1.2.7.1 | 1.2.7.2 | 1.2.7.3 | 1.2.7.4 |
| **2. Human welfare** *(social foundation)* | **2.1 Safety & basic needs** | 2.1.1 Nutrition | 2.1.1.1 | 2.1.1.2 | 2.1.1.3 | 2.1.1.4 |
| | | 2.1.2 Health | 2.1.2.1 | 2.1.2.2 | 2.1.2.3 | 2.1.2.4 |
| | | 2.1.3 Access to water & santitation | 2.1.3.1 | 2.1.3.2 | 2.1.3.3 | 2.1.3.4 |
| | | 2.1.4 Housing & human settlements | 2.1.4.1 | 2.1.4.2 | 2.1.4.3 | 2.1.4.4 |
| | | 2.1.5 Access to energy | 2.1.5.1 | 2.1.5.2 | 2.1.5.3 | 2.1.5.4 |
| | **2.2 Social welfare** | 2.2.1 Basic income | 2.2.1.1 | 2.2.1.2 | 2.2.1.3 | 2.2.1.4 |
| | | 2.2.2 Social equity | 2.2.2.1 | 2.2.2.2 | 2.2.2.3 | 2.2.2.4 |
| | | 2.2.3 Gender equality | 2.2.3.1 | 2.2.3.2 | 2.2.3.3 | 2.2.3.4 |
| | **2.3 Human Flourish - Emancipation** | 2.3.1 Education & Culture | 2.3.1.1 | 2.3.1.2 | 2.3.1.3 | 2.3.1.4 |
| | | 2.3.2 Peace, Justice, & Political voice | 2.3.2.1 | 2.3.2.2 | 2.3.2.3 | 2.3.2.4 |
| | | 2.3.3 Access to networks / social interactions | 2.3.3.1 | 2.3.3.2 | 2.3.3.3 | 2.3.3.4 |
| | **Importance of each system for acting on sustainability** | | | | | |
| **3. Systems made by humans** (acting on sustainability) | **3.1 Governance** | 3.1.1 Laws, Policies, & Institutions | 3.1.1.1 | 3.1.1.2 | | |
| | | 3.1.2 Infrastructure, Planning, & Natural Resources Management | 3.1.2.1 | 3.1.2.2 | | |
| | **3.2 Economy & Finance** | 3.2.1 Macroeconomic Considerations & Finance | 3.2.1.1 | 3.2.1.2 | | |
| | | 3.2.2 Business, Industry, and Microeconomic Considerations | 3.2.2.1 | 3.2.2.2 | | |
| | **3.3 Science & Technology** | 3.3.1 Sustainability Science | 3.3.1.1 | 3.3.1.2 | | |
| | | 3.3.2 Technology & Innovation | 3.3.2.1 | 3.3.2.2 | | |
| | **3.4 Individual & Collective Action** | 3.4.1 Transformative Change | 3.4.1.1 | 3.4.1.2 | | |
| | | 3.4.2 Cognitive Capactiy for Sustainable Development | 3.4.2.1 | 3.4.2.2 | | |

**List of References**


Burgin, M. (2016). *Theory of knowledge: structures and processes* (Vol. 5). World scientific.

Elkington, J. 25 years ago I coined the phrase "Triple Bottom Line." Here's Why It's Time to Rethink It. *Harvard Business Review*, 25 June 2018. Available online: https://hbr.org/2018/06/25-years-ago-i-coined-the-phrase-triple-bottom-line-heres-why-im-giving-up-on-it

Fadel, Bialik & Trilling, 2015, Four-Dimensional Education: The Competencies Learners Need to Succeed, Center for Curriculum Redesign (CCR). https://curriculumredesign.org/framework/

Griggs, D. J., Nilsson, M., Stevance, A., & McCollum, D. (2017). *A guide to SDG interactions: from science to implementation.* International Council for Science, Paris. https://council.science/publications/a-guide-to-sdg-interactions-from-science-to-implementation/

Jouzel, J., Abadie, L. (2022). Sensibiliser et former aux enjeux de la transition écologique dans l'Enseignement supérieur. Rapport remis au ministère de l'Enseignement supérieur et de la Recherche. https://www.enseignementsup-recherche.gouv.fr/fr/sensibiliser-et-former-aux-enjeux-de-la-transition-ecologique-dans-l-enseignement-superieur-83888

Messerli, P., Murniningtyas, E., Eloundou-Enyegue, P., Foli, E. G., Furman, E., Glassman, A., ... & van Ypersele, J. P. (2019). Global sustainable development report 2019: the future is now–science for achieving sustainable development. https://sdgs.un.org/gsdr/gsdr2019

Raworth, K. (2017). *Doughnut economics: seven ways to think like a 21st-century economist.* Chelsea Green Publishing.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin III, F. S., Lambin, E., ... & Foley, J. (2009). Planetary boundaries: exploring the safe operating space for humanity. *Ecology and society*, *14*(2).

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., ... & Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *science,* 347(6223), 1259855.

Steup, M., & Neta, R. (2005). Epistemology. Stanford Encyclopedia of Philosophy. Metaphysics Research Lab, Stanford University. https://plato.stanford.edu/entries/epistemology/

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2017). Education for sustainable development goals: Learning objectives. https://unesdoc.unesco.org/ark:/48223/pf0000247444