

SDG Thinking: A hands-on learning activity for the SDGs

Cameron Guthrie, Associate Professor
TBS Business School, Information, Operations and Management Sciences, 1 Place Alphonse Jourdain, 31068, Toulouse, France

1. Introduction

The 17 UN Sustainable Development Goals (SDGs) are a call to action to end poverty and inequality, protect the planet and ensure that all people enjoy health, justice, peace, and prosperity. Universities and business schools share the responsibility of preparing their students for these major societal challenges of the 21st century.

The UN Principles for Responsible Management Education (PRME) has recently called on business educators to develop more “effective business leaders” with the holistic skills and mindset to address today’s challenges through more meaningful, engaging, iterative, socially interactive, and joyful pedagogies¹. In this paper, we present a hands-on learning activity that responds to this call and helps make complex problems of sustainability more tractable in the classroom.

The paper is organized as follows. We first review the literature on systems thinking for complex societal problems in business schools. We then detail a pedagogy that has been successfully used both online and in the classroom in a French business school. The results and lessons from this pedagogy are then discussed. We conclude with an analysis of how this pedagogy responds to the characteristics of the UN PRME impactful five (i5).

2. Systems thinking for sustainable development

Understanding and working on complex societal issues are hampered by a number of cognitive barriers such as poor factual clarity of the situation (Bord, O’connor, and Fisher 2000), difficulty identifying causes and effects, and problems understanding feedback, accumulations and delays (Sterman 2006). Systems thinking provides an approach that helps overcome some of these difficulties. It involves describing the system of social, economic, and environmental factors in interaction that give rise to complex problems. By better understanding “the deep roots of these complex behaviors”, we can “better predict them and, ultimately, adjust their outcomes” (Arnold and Wade 2015).

Not surprisingly, systems thinking is seen as an essential skill to understand and act on complex issues of sustainability (Bansal, Grewatsch, & Sharma, 2021; Lambrechts, Mulà, Ceulemans, Molderez, & Gaeremynck, 2013; Rieckmann, 2012; Wiek, Withycombe, & Redman, 2011). However, systems thinking is notoriously difficult to teach in business schools. Various explanations have been advanced including the dominant analytical paradigm (Atwater and Pittman 2006), and traditional, linear thinking embedded in management mental models (Senge 2006).

¹ The UN PRME i5 framework is presented here: <https://www.unprme.org/the-impactful-five-i5>

3. SDG Thinking

SDG Thinking is an innovative, fun, and engaging pedagogy that has been developed to overcome these barriers. It is based on the premise that students need to relate to an issue of sustainable development, feel liberated by simple tools to understand it, and empowered to design impactful actions. SDG Thinking aims to develop feelings of hope and agency in learners when faced with complex issues of sustainability (Goralnik, Thorp, and Rickborn 2018; Ojala 2017).

SDG Thinking is a pedagogy built around three ideas: a focus on the UN SDGs; a choice of a complex issue from current affairs in the online news; and then storytelling of the issue using rigorous systems thinking tools.

3.1 Focus on the UN SDGs

The 17 UN SDGs provide a framework and a context with which students are familiar. The UN has identified measurable objectives and key performance indicators for each goal. There is a trove of online resources that illustrate the underlying issues, the actions taken and progress towards each goal². For example, on the UN SDG website alone, the page for SDG 1 “No Poverty” lists 7 objectives, links to 48 relevant publications, and describes 83 events and 1363 actions³. SDG Thinking involves first choosing an SDG where learners wish to make a difference.

3.2 Choose an issue from the online news

SDG Thinking involves working with the online news. The news media regularly reminds us of society’s wicked problems, such as climate change, resource depletion, terrorism, poverty, and discrimination. Learners select an online news story that reports on a complex problem of sustainability within the realm of their chosen SDG. It is the starting point of their learning journey. The use of the online news favours emotional connection with issues of sustainability, increased engagement and a “shift from knowledge to action” (Goralnik, Thorp, and Rickborn 2018).

3.3 Tell the story with systems thinking

Systems thinking provides a perspective, a set of skills, methods, and processes to define, frame and model complex problems, and then identify leverage points for effective action. Previous research has found that improved decision-making results from students’ ability to apply “higher level” systems thinking skills (Atwater and Pittman 2006; Maani and Maharaj 2004). Higher-level systems thinking skills include an ability to frame a problem as a pattern of behaviour over time, to describe feedback loop structures, and to explain how behaviour is generated through a complex web of causal relationships.

Students learn the systems thinking skills necessary to complete their SDG Thinking tasks by first following the “Thinking Complexity” online course⁴.

4. How it works

SDG Thinking follows an inquiry-based learning design that enables learning by doing. It is a complete set of content (online courses, guides, templates) and administrative instruments (planning, evaluation grids) that allows business schools to train students to understand and act on SDGs.

² <https://sdgs.un.org/goals>

³ <https://sdgs.un.org/goals/goal1> visited 24/07/2023

⁴ The course is available at <https://www.thinkingcomplexity.com>. Illustrations of how to integrate the course into sustainable development classes are available at <https://www.sdgthinking.com>.

An SDG Thinking project can be run online, in the classroom or in a hybrid format. It can also be run as a stand-alone student-driven individual project or as an instructor-led group project over a short period, such a 3, 5 or even 10 days. In all designs, there are five main steps to the activity.

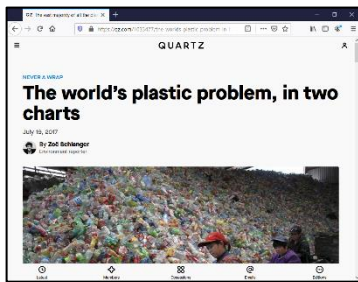
Step 1: Take an online class on SDG thinking

Learners begin their journey by taking an online class on systems thinking. The “Thinking Complexity” online course is a practical, hands-on course to understand how to tackle everyday complexity. Students learn to take a news story about a sustainable development issue, describe what makes the situation complex and identify opportunities for effective action or change. Each chapter of the course uses the online news to illustrate and practice working with complex situations.

Learners then complete tasks as they move through each stage of the complex problem-solving process.

Step 2: Find a news item

Learners begin by looking for a news item that reports on a complex problem within the scope of one of the 17 UN SDGs. They then write a problem statement to frame their thinking. It involves identifying the behavior under study and describing how it has evolved over a specific time period.



For example, the following news item discusses the rise in plastic pollution⁵. It falls within the scope of SDG 12 “ensure sustainable consumption and production patterns”.

The problem statement could read as follows: Plastic waste has increased by 5 billion tonnes since 1950.

Step 3: Tell the story

Learners then research and write out the complete story of the problem to create a richer picture of the issue, the variables, and the stakeholders involved. Several online sources are often required to tell a rich story.

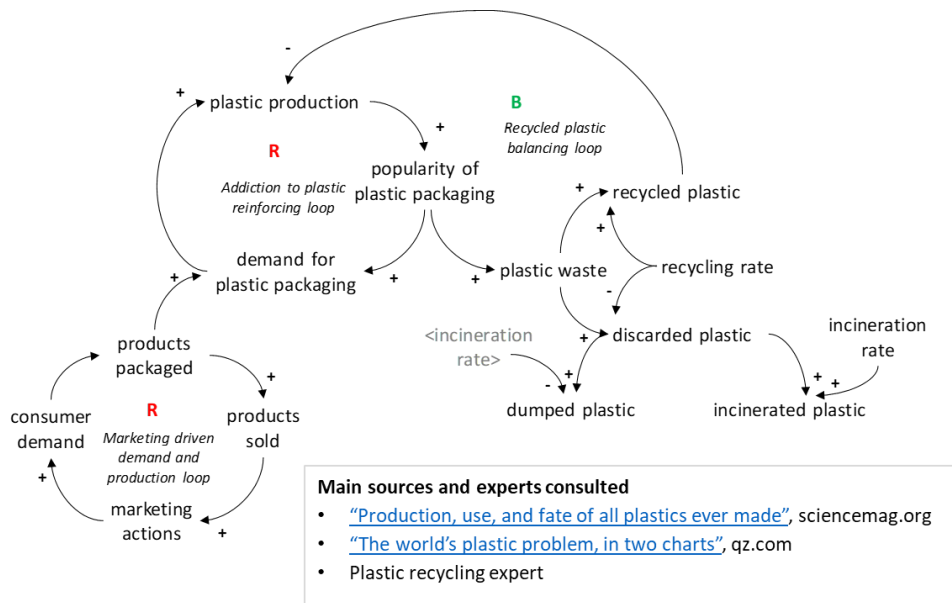
For example, the **production of new plastics** increases the **popularity of plastic packaging** which in turn increases **demand for plastic packaging** and **plastic waste**. Plastic waste is **recycled**, **incinerated**, or **dumped** according to a specific **rate**. **Marketing actions** increase **consumer demand** which in turn increases **products produced** and **sold**, further increasing **demand for plastic packaging**.

The main variables are shown in bold. They are then listed and defined. Following systems thinking principles, the story should be parsimonious.

⁵ <https://qz.com/1033477/the-worlds-plastic-problem-in-two-charts/>

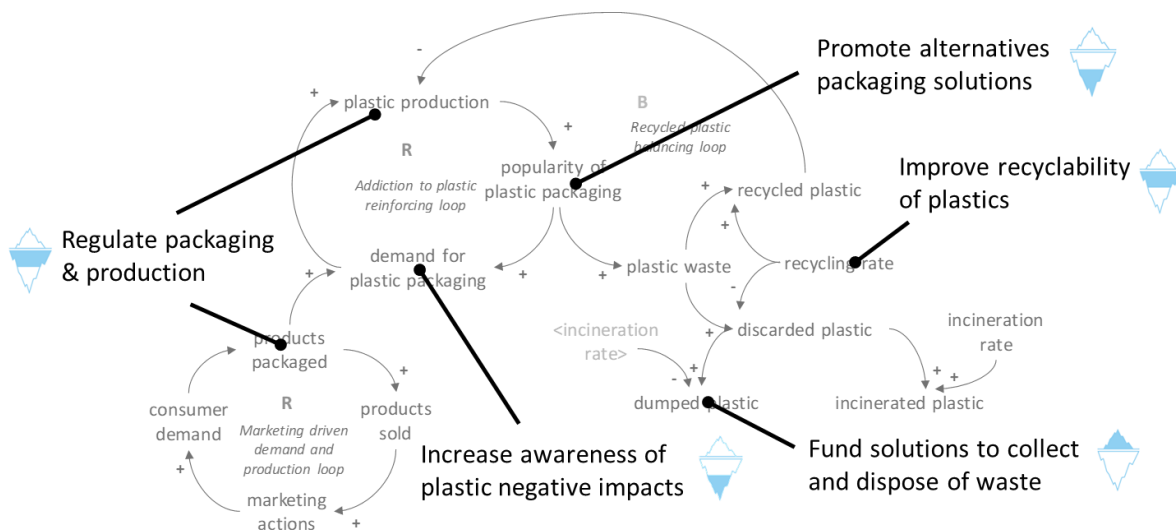
Step 4: Model the system

Learners then use systems thinking tools to draw the system of variables in interaction to explain the behaviour under study. The result is a causal loop diagram of the situation. Domain experts may be consulted to validate the model.



Step 5: Look for leverage

Learners then identify leverage points in the systemic structure where actions will yield the greatest impact and design an action plan to influence the complex behaviour.



At the end of each step, instructors may require learners to submit an assignment (e.g., a problem statement and link to the news article at the end of step 2) to create opportunities for formal feedback.

5. Learning outcomes and student feedback

At the end of the SDG Thinking activity, students are asked to evaluate and reflect on their learning experience. In the following section we analyse the feedback received from 161 students that completed the activity following a self-paced, online, and individual design between April 2020 and August 2023.

Table one presents means and ranges for three questions concerning satisfaction and engagement. Questions were scored on a scale from 1 to 5.

Question	Mean (sd)	Range
Q1. How would you rate your overall satisfaction with this course? (1: very unsatisfied to 5: very satisfied)	4.31 (0.22)	4.03 - 4.60
Q2. Before taking this course, how interested were you in its general topic? (1: not at all interested to 5: very interested)	3.39 (0.29)	3.07 - 3.80
Q3. After this course, has your interest in this subject increased? (1: not at all to 5: it greatly increased)	4.05 (0.18)	3.82 - 4.28
Increase in interest (Q3-Q2/Q2)	+ 20%	10% - 31%

Table 1. Summary quantitative feedback

On average, students were satisfied to very satisfied with the learning activity (4.31/5). Their interest in complex issues of sustainability also increased significantly throughout the activity (20%).

Learners also provided written feedback on what they appreciated in the activity, and where they saw opportunities for improvement. Several examples are provided below to illustrate how SDG Thinking responds to the PRME impactful 5 characteristics (in bold) of playful pedagogies.

Firstly, students appreciated the way the activity expanded their thinking and brought them to reflect on current issues. It made learning **meaningful**.

"This course has broadened my way of thinking. I have a new approach to current issues."
Learner 1

"The course was very interesting; I learned a lot about the presence of systems in everyday life and the importance of understanding the tools related to them to adapt and understand the world around us." Learner 2

"I enjoyed learning about things that I didn't pay attention to" Learner 3

"I really enjoyed how the course continuously refers back to real-life situations and systems, so that we can get a hold of why the knowledge we're acquiring is always relevant - right now and into our professional and personal future." Learner 4

Using the online news and current affairs as a driver for learning about sustainable development motivated students to participate and **facilitated active engagement**.

"I liked the real-life examples e.g., climate change, reference to global events as well as business events" Learner 5

“It was very interesting and exciting, first of all the lessons are illustrated with very good examples which makes it easier for us to understand. The quizzes take up the key elements of the videos, moreover in order to carry out the exam there are many supports such as exercises and also case studies. Even if it seems to be a complicated course it is very well explained and I was able to learn a lot of things, it was a pleasure for me to follow this course. In addition, we have the possibility of progressing at our own pace without having an imperative deadline, this allows us to work at our convenience. I loved it.” Learner 6

The modelling activity in SDG Thinking was **iterative**, designed to allow tutors to provide regular feedback, and encourage students to seek out additional information to better tell the story of cause and effect. However, while the group design is based around collective model building, some learners in the individual online design suggested running live sessions to stimulate debate and provide **supportive social interaction**.

“I suggest proposing a zoom class per chapter to take stock” Learner 7

Others reported the importance of receiving regular, timely feedback on their work from instructors.

“I don't see any particular points to improve. I really appreciated the structure of the course, its content and its dynamism. In addition, the teachers respond very quickly to our work.” Learner 8

Finally, students found the freedom of the online format, the short videos, quizzes and regular exercises **fun**.

“I'd like the fact that we we're totally free to do this class whenever we want and taking the time we wanted to do it. Plus, I find the videos very easy to understand more than a real class because the teacher went straight to the point in the videos (5 to 7 min to understand everything)” Learner 9

“What I loved about this course was how well things were explained, at first you are afraid of not succeeding since you don't have a face-to-face class, but this course showed you that despite everything, we can follow easily thanks to fun learning exercises and always with examples so that we don't get confused but moreover, we work in conditions that make us think we are in class and everything is directly answered on the videos without even having to ask questions, we literally have all the details to know! We don't get bored while working and that's what I really liked, the editing and explanations allow us to always stay on top of the course and understand it playfully without getting bored because we have the impression of entering a bubble that we know, like when we watch a film at home.” Learner 10

6. Conclusion

SDG Thinking provides business school educators with a hands-on learning activity that has been shown to help students better understand and engage with complex problems of sustainability. Built around the principles of systems thinking, the activity overcomes several barriers to using these tools in the classroom. It's simple, five step approach allows for both individual, group, online and hybrid class designs. By the end of the activity, learners demonstrate an increased interest in complex societal issues and appreciate the meaningful, engaging, and playful pedagogical design.

Bibliography

- Arnold, Ross D, and Jon P Wade. 2015. "A definition of systems thinking: A systems approach." *Procedia computer science* 44: 669-678.
- Atwater, J Brian, and Paul H Pittman. 2006. "Facilitating systemic thinking in business classes." *Decision Sciences Journal of Innovative Education* 4 (2): 273-292.
- Bord, Richard J, Robert E O'connor, and Ann Fisher. 2000. "In what sense does the public need to understand global climate change?" *Public understanding of science* 9 (3): 205.
- Goralnik, Lissy, Laurie Thorp, and Alissa Rickborn. 2018. "Food System Field Experience: STEM Identity and Change Agency for Undergraduate Sustainability Learners." *Journal of Experiential Education* 41 (3): 312-328.
<https://doi.org/10.1177/1053825918774810>.
<https://journals.sagepub.com/doi/abs/10.1177/1053825918774810>.
- Maani, Kambiz E, and Vandana Maharaj. 2004. "Links between systems thinking and complex decision making." *System Dynamics Review: The Journal of the System Dynamics Society* 20 (1): 21-48.
- Ojala, Maria. 2017. "Hope and anticipation in education for a sustainable future." *Futures* 94: 76-84.
<https://doi.org/https://doi.org/10.1016/j.futures.2016.10.004>.
<https://www.sciencedirect.com/science/article/pii/S0016328716301422>.
- Senge, Peter M. 2006. *The fifth discipline: The art and practice of the learning organization*. Broadway Business.
- Sterman, John D. 2006. "Learning from evidence in a complex world." *American journal of public health* 96 (3): 505-514.