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RESEARCH ARTICLE

Integrating sustainability transition into non-specialized university curricula: Two case studies from France

[version 1; peer review: 1 approved with reservations, 1 not approved]

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v1 **First published:** 02 Jul 2026, **6**:226
https://doi.org/10.12688/openreseurope.21999.1
Latest published: 02 Jul 2026, **6**:226
https://doi.org/10.12688/openreseurope.21999.1

Abstract

As climate change accelerates and the need for the sustainability transition becomes more complex, universities are asked to equip students with the knowledge and skills needed to address sustainability challenges. While existing teaching approaches often concentrate on environment-focused disciplines and academic programs specialized in sustainable development, this study investigates the potential for integrating sustainability-related content into non-specialized university courses. The aim is to explore how such integration can foster students' awareness and engagement in sustainability issues.

The article presents two case studies from the University of Lille, France. The first one involves a Sociology of Reading course, taught to students in Information and Library Studies. Although the course primarily focused on understanding libraries and their publics, a module on sustainable libraries and the Sustainable Development Goals was introduced through interactive, problem-solving activities. The second case study examines Infometrics seminars for students in Information and Documentation Studies. While the course aimed to develop research skills through group projects and quantitative methods, sustainability emerged as a recurring theme in student projects, which focused on reducing food waste in university canteens, sustainable transportation, or other topics related to the implementation of Sustainable Development Goals. To assess the effectiveness of these approaches, students completed questionnaires at the end of the courses.

Across both courses, results demonstrate strong student engagement, with on average 90% of participants reporting that they

Open Peer Review

Approval Status ? ✗

	1	2
version 1 02 Jul 2026	? view	✗ view

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felt engaged in the learning process. More than two-thirds of students highlighted an increased awareness of sustainability issues, and on average over 80% of participants expressed increased motivation to take climate action after the courses.

These findings suggest that embedding sustainability topics in non-specialized courses is a promising strategy to support ecological transition. Integrating such content not only enhances student engagement but also develops interdisciplinary thinking and encourages active involvement in climate action.

Plain Language summary

Over the past ten years, universities have increasingly changed their teaching practices in response to climate change and the need for ecological transition. New teaching approaches encourage students to learn through action, collaboration, and the use of digital and research tools, helping them better understand sustainability issues. Until now, these approaches have mainly been used in teaching environmental subjects.

This study investigates how sustainability topics can be included in university courses that are not directly linked to the environment. While most teaching on sustainability happens in specialized university programs, we explored how students in other fields can also benefit from learning about ecological transition in general and the Sustainable Development Goals (SDGs) in particular.

We examined two courses at the University of Lille, France. In the first case, students in a Sociology of Reading class (focused on libraries and their audiences) were introduced to ideas about “sustainable libraries.” They discussed practical solutions such as energy efficiency and digital access, and linked them to the SDGs. In the second case, students in Infometrics seminars (focused on research methods) carried out projects where sustainability naturally became a key theme. Their projects addressed issues like reducing food waste in university canteens, sustainable transport, and climate activism.

To understand the impact of these teaching approaches, we asked students to fill in a feedback form. The feedback form included questions about the students’ background, their opinions about different components of the seminars (e.g., the structure of the course, the conducted project, environment-related issues), as well as positive and negative aspects of each class. The results showed that around 90% of students felt engaged in the learning process. More than two-thirds claimed they became more aware of sustainability issues, and over 80% reported stronger motivation to take action afterwards.

The findings suggest that bringing sustainability into different types of university course – even if it is not the main subject – can help students think in new ways about ecological transition and encourage them to engage more actively in sustainability efforts.

Keywords
Sustainability education, ecological transition, higher education, non-specialized university curricula, student engagement, sustainable development goals, teaching methods

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Author roles: Samofalova Y: Conceptualization, Data Curation, Formal Analysis, Methodology, Project Administration, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

Grant information: This project has received funding from the European Union's Framework Programme for Research & Innovation as part of the COST Action [CA21166; Social Sciences and Humanities for Transformation and Climate Resilience] as supported by the COST Association (European Cooperation in Science and Technology)
The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

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How to cite this article: Samofalova Y. **Integrating sustainability transition into non-specialized university curricula: Two case studies from France [version 1; peer review: 1 approved with reservations, 1 not approved]** Open Research Europe 2026, **6**:226 https://doi.org/10.12688/openreseurope.21999.1

First published: 02 Jul 2026, **6**:226 https://doi.org/10.12688/openreseurope.21999.1

Introduction

In response to climate change and the need for ecological transition, universities have been incorporating diverse pedagogical approaches to enhance students' engagement and understanding of sustainability. Among these approaches, the "towards action" model emphasizing experiential learning to encourage concrete environmental actions (Gladu & Curadeau, 2022). Research-based learning – integrating the development of research competences and use of computational tools – was effectively applied to teach Environmental Communication in Germany (Marcella & Samofalova, 2022). The partnership approach highlighted the importance of collaboration among educators, students, and stakeholders (Sauvé, 2002). More recently, Orellana et al. (2024) proposed an interdisciplinary and intersectoral perspective, incorporating creative and cultural dimensions to foster knowledge sharing in teaching sustainability transition. The abovementioned approaches collectively reflect the evolving landscape of sustainability education, emphasizing action-oriented, technologically enriched, and collaborative learning frameworks. However, these approaches have largely been applied to environment-focused disciplines. We suggest that integrating sustainability-related topics into different disciplinary subjects can also yield significant outcomes and we test this hypothesis in the French university context.

In the following parts, we, first, discuss the integration of the SDGs into the French higher education system. Second, we provide two case studies from the University of Lille, where the SDGs were introduced as a secondary component into the educational program. Finally, we propose a discussion on the case studies and reflect on the limitations and future perspectives.

Integrating SDGs into the French higher education system: TEDS teaching modules

The French university system is currently undergoing a significant transformation, driven by the need to respond more effectively to societal and environmental transitions. As the climate crisis intensifies and ecological limits become ever more apparent, educational institutions must equip students with the knowledge and skills necessary to navigate and contribute to a sustainable future. Integrating the SDGs into university curricula is, therefore, not only timely but imperative.

In response to this challenge, the French Ministry of Higher Education and Research launched a national consultation to promote the Ecological Transition for Sustainable Development[1]. Aligned with the SDGs, this initiative aims to incorporate sustainability education across all graduate and undergraduate programs between 2022 and 2027 (Jouzel & Abbadie, 2022). According to official guidelines, each student in both public and private institutions must complete a teaching unit dedicated to environmental and societal transition – referred to as *Transition Écologique pour un Développement Soutenable* (TEDS). This unit covers key theoretical frameworks, including climate change, biodiversity preservation, resource management, equitable and just transitions, and the concept of planetary boundaries (Ministère de l'enseignement supérieur et de la recherche, 2023).

The development of TEDS modules in France aligns not only with the SDGs but also with broader European objectives. Notably, the European Commission's *GreenComp* framework supports lifelong learning strategies aimed at fostering sustainability competencies in both formal and informal educational contexts (Bianchi et al., 2022). Emphasizing inclusivity, *GreenComp* is designed for learners of all ages and backgrounds and supports the EU's goal of achieving climate neutrality by 2050.

French universities are currently experimenting with various forms of content and pedagogical approaches to implement the TEDS modules across different levels of education. For instance, Panthéon Sorbonne University Paris 1 has introduced interdisciplinary workshops examining the interrelations between environmental change and territorial development (Panthéon Sorbonne Université Paris 1, 2025). Similarly, the University of La Rochelle offers online and in-person seminars, including interactions with professionals actively engaged in ecological transition efforts (La Rochelle Université, 2025). At the University of Lille, new undergraduate and graduate-level courses are being developed using active learning methods to incorporate SDG-related themes into different disciplines (Université de Lille, 2023). These efforts demand systematic evaluation to identify effective teaching practices for implementing the SDGs within the national higher education framework.

This year's research has begun to explore the implementation of TEDS teaching modules. Some studies have examined the effectiveness of the *Fresque du Climat* (Maleval, 2025), a collaborative workshop format designed to educate participants about the mechanisms and consequences of climate change. Other research papers have focused on the social aspects of TEDS implementation, emphasizing the importance of co-constructive methods and the quality of

[1]In French: Transition Écologique pour un Développement Soutenable (TEDS).

interpersonal dynamics within university teams (Dabadie et al., 2025). Until now, these works were mainly focused on science-related disciplines.

This article seeks to address this gap by exploring how the SDGs can be integrated into TEDS modules within the social sciences. Specifically, we present two case studies in which sustainability education was incorporated through the TEDS framework. In both examples, the SDGs were not the primary focus but were used as integrative, secondary components within courses designed to develop students' professional competencies. These case studies illustrate the flexibility of SDGs integration and the importance of embedding sustainability within disciplinary and professional contexts.

Methods

The case studies were designed to assess the pedagogical effectiveness of integrating the SDGs into university curricula for non-specialist in environment undergraduate students. The objective was to evaluate how teaching methods and course designs could foster students' awareness, engagement, and potential behavioral change concerning sustainability, even when sustainability was not the central focus of their study program.

The case studies focused on two undergraduate courses – Sociology of Reading and Infometrics – taught to second-year students in the Department of Information and Documentation Sciences at the University of Lille during the 2024–2025 academic year. Both courses traditionally address disciplinary competencies unrelated to environmental studies or sustainability; thus, the inclusion of the SDGs served as an opportunity to evaluate interdisciplinary pedagogical innovation.

In each case study, the SDGs were integrated into course activities through problem-based and participatory learning strategies, which are described in detail in the following part. To assess the pedagogical effectiveness of this approach, students were invited to complete a feedback questionnaire at the end of each course. Completion of the proposed feedback form was voluntary. In compliance with the GDPR, no personal data were collected. Prior to completing the questionnaire, students were provided with consent information specifying the absence of personal data collection and outlining the intended use of their responses (see Section 13 Ethics and consent).

The questionnaire included three large groups of questions: 1) students' background; 2) students' opinions regarding the course, and 3) students' attitudes and awareness regarding climate change and the SDGs. The full questionnaire is presented in part 13.1 Feedback form (translated from French). Responses were measured using a five-point Likert scale ranging from "Completely agree" to "Completely disagree." A total of 44 students (22 per course) participated in the evaluation. Quantitative data were analyzed descriptively, focusing on the distribution of agreement levels across key items, while qualitative comments were used to contextualize trends and interpret variations in responses.

In the next part, we detail the context of each case study, present the pedagogical activity in line with the SDGs, and analyze the results of the students' feedback forms.

Results from the case studies

Case study 1: Sociology of reading

Context and aims of the course

The Sociology of reading course was addressed to the second-year DEUST[2] students in Information and Library Studies. The course primarily focused on understanding library functioning, different publics and their needs in libraries. For example, students discussed the evolution of reading devices, libraries, and media centers in line with sociology theories. In addition, the course covered such themes as accessible and digital libraries. As a practical component, the students realized survey projects linked to their theme of interest within the theoretical themes discussed in the classroom, although not necessarily linked to sustainable development.

Sustainable development goals activity

In line with the SDGs and the introduction of sustainable development into the university curricula, two hours were dedicated to sustainable libraries. First, students were introduced with the notion and idea of the SDGs. Second, they discussed the existing toolboxes and handbooks on sustainable libraries and linked the proposed solutions to the SDGs. For example, they discovered sustainable initiatives and solutions applied by different libraries in France and other

[2]*Diplômes d'Etudes Universitaires Scientifiques et Techniques* (in French) is a type of French undergraduate university programs.

countries and associated them with one or multiple SDGs. Such solutions included, for example, installing solar panels to promote green energy or energy efficient lightning (in line with the SDG 7 Affordable and clean energy). Finally, the teaching process implied interactive problem-solving activities to engage students in proposing sustainability solutions in line with different SDGs for libraries, where they effectuated their internships this year.

Outcomes of the case study: students' feedback

Overall, 22 students filled in the feedback form. Regarding the students' academic background, most of them (82%) completed other university programs before starting DEUST, with average number of years spent in university equal three years. Previously followed programs by students were literature, languages, psychology, art, history, geography, mathematics, and anthropology.

Figure 1 presents student feedback on Sociology of Reading course (question 4, 13.1 Feedback form (translated from French)). Overall, the responses reflect a highly positive evaluation. Most students agreed that the course structure was well-thought (77.3%) and that they enjoyed carrying out the project (90.9%). A majority also found it useful for improving their professional skills (77.3%) and expressed interest in applying the methodology in their future careers (81.8%). While 68.2% reported gaining knowledge about the course subjects, a notable minority (18.1%) expressed disagreement, indicating varied learning experiences.

The strongest consensus emerged around the importance of discussing climate change and the SDGs (95.4%), confirming the relevance of these themes in higher education. Moreover, 81.8% of students felt the course added knowledge to their studies, and 90.9% said they were already aware of sustainability issues before the course. What is more interesting is that 54.5% reported increased awareness after the course, though 36.4% remained neutral (mainly students who already completed other undergraduate or even graduate programs) and only 9% disagreed, suggesting that prior awareness levels and educational background may have influenced perceived gains. 77.3% of students indicated that they are likely to be more active and careful about environmental issues in general, reflecting a promising potential for behavioral impact. Finally, a strong majority of responses indicated students' willingness to engage with sustainability in their future professional practice (91%, with 45.5% completely agree and 45.5% agree). Despite some neutral or negative responses, the overall trend points to the effectiveness of such initiatives in fostering engagement, professional relevance, and awareness of sustainability issues among undergraduate students.

Students highlighted several positive aspects of the course, particularly the relevance of the content for their future careers as librarians and the well-balanced structure of the seminars, which combined theoretical learning with practical exercises. Nevertheless, some students noted areas for improvement. They expressed a desire for a stronger focus on sociological perspectives within the course and mentioned organizational challenges. In particular, all seminars were scheduled twice a week during the final month of the term, requiring considerable effort and time management.

Case study 2: Infometrics

Context and aims of the course

The Infometrics theory and practice seminars were addressed to second-year Bachelor students enrolled in the Information and Documentation Studies program. The primary objective of the course was to develop students' research competencies, with a particular focus on the use of questionnaire-based methods.

The course was structured around a combination of theoretical instruction and practical application, comprising eight hours of interactive lectures and sixteen hours of group project work. The theoretical components included: introduction into research methods, theory of questionnaire method, statistical methods of questionnaire analyses, and principles of data visualization. During the practical sessions, students worked collaboratively in groups to carry out a research project. Each group was assigned a randomly selected topic (determined by the teacher), on which they were required to design, disseminate, and analyze a questionnaire. The results of their research were then visualized using appropriate graphical tools and presented in an oral presentation at the end of the course.

Sustainable Development Goals activity

Although sustainability was not the primary focus of the course, many student projects incorporated sustainability-related themes in line with different SDGs, such as reducing food waste in university canteens (SDG 12 Responsible consumption and production), or use of electric vehicles (SDG 11 Sustainable cities and communities). Figure 2 provides several examples of themes for students' projects.

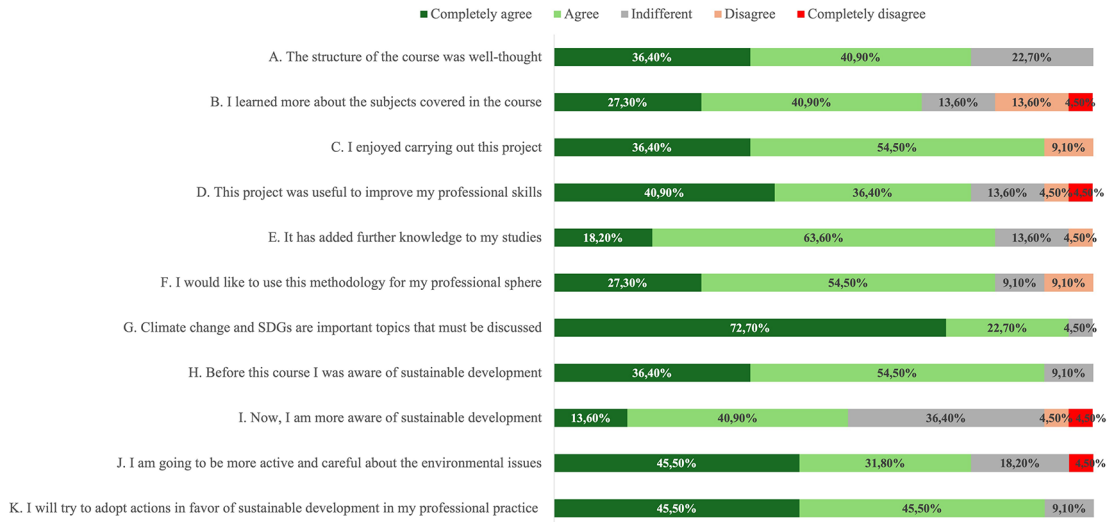


Figure 1. Sociology of Reading, question 4 feedback.

Project 1	Students' eating habits linked to climate change issues: A survey of reducing meat consumption
Project 2	Selective sorting practices on university campuses (behaviors and obstacles): A survey of student and staff opinions
Project 3	Food waste in the university canteens (perceptions and solutions): Analysis of student practices and university policies implemented to limit waste
Project 4	Climate activism among young people: A survey on the perception of militant actions (climate marches, online petitions, activism on social networks) and their impact on individual behavior.
Project 5	Impact of public policies on the adoption of electric vehicles: Study of motivations and disincentives to the purchase of an electric vehicle.

Figure 2. Examples of student project themes.

Overall, in this course, students were introduced to sustainability and the SDGs in an indirect way: through applied, problem-solving research projects rather than through dedicated theoretical seminars. As part of their group work, students independently consulted scientific literature and existing public surveys related to their assigned topics in order to design and analyze their questionnaires. The teacher acted primarily as a facilitator and mediator, responding to students' questions, providing additional resources, and encouraging critical reflection through guided discussions.

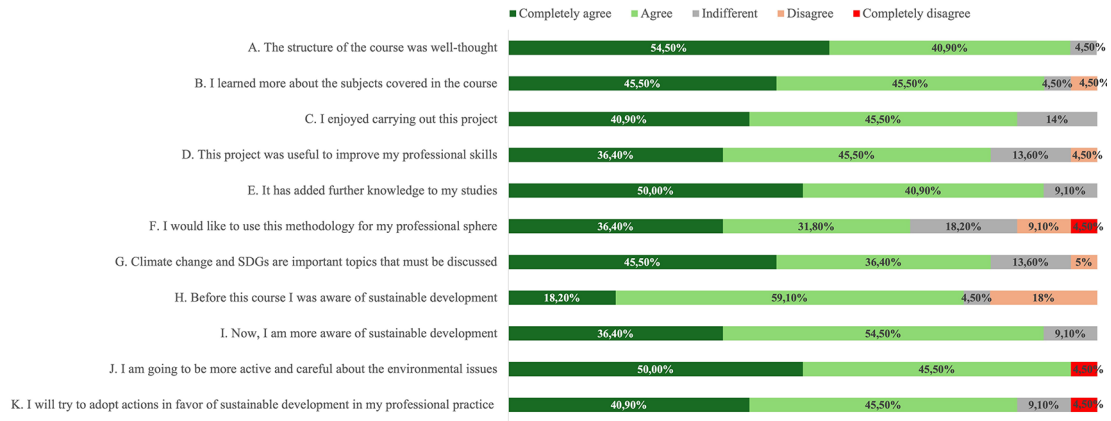


Figure 3. Infometrics, question 4 feedback.

Outcomes of the case study: students' feedback

Overall, 22 students filled in the feedback form, out of 79 students enrolled in the programme. Regarding the students' background, slightly less than half of them (45,4%) completed other university programs before starting the Information and Documentation Bachelor program, with an average number of two years spent in a university. Previously followed programs included medicine, political studies, economics, mathematics, law, art and design, marketing, and management.

Figure 3 shows students' feedback (question 4, 13.1 Feedback form (translated from French)) on the Infometrics course. In general, the results indicate a strong positive perception of the course. A significant majority considered the course structure well-thought (95.4% of students agreed or completely agreed), and nearly as many reported learning more about the subjects covered in the classroom (91%). Students largely enjoyed conducting the project work (86.4%) and found it beneficial for professional skill development (81.9%). Over 90% recognized added academic value, and 68.2% expressed interest in applying quantitative methods and data visualization professionally.

The highest level of consensus was around the relevance of climate change and the SDGs, with 81.9% agreeing these are important topics that must be addressed. Before the course, 77.3% of students were already aware of sustainable development. After the course 90.9% of students reported increased awareness of sustainability and environment-related issues and 9,1% of students remained indifferent in this sub-question. Notably, 95.5% of students stated they would be more active and careful about environmental issues, and 86.4% said they would try to adopt sustainable actions in their professional practice. Despite a small share of indifferent or disagreeing students across a few items, the feedback results overall demonstrate that the course was impactful in enhancing knowledge, awareness, engagement, and intention to act sustainably among participants.

Regarding the positive aspects of the course, students emphasized 1) the teacher's role as a facilitator and tutor rather than a mere transmitter of knowledge; 2) the effective use of tools for data analysis and visualization; and 3) the overall clarity of the course structure and teaching methods. On the other hand, some students mentioned a few negative points, such as the dense pace of the theory-oriented seminars and the fact that project topics were assigned by the teacher rather than chosen by the students themselves.

Discussion

The findings from both case studies underscore the pedagogical value of integrating the SDGs and other sustainability-related themes into undergraduate curricula, even within programs not primarily focused on environmental issues. In both case studies, students responded positively to the structure, content, and teaching approaches, with a majority reporting increased awareness and understanding of sustainability-related themes.

Beyond knowledge acquisition, students also reported increased motivation to engage in more environmentally responsible behavior. However, they were less confident about directly applying sustainability strategies and the SDGs in their future professional contexts. This suggests a need to strengthen the connection between course content and its relevance for students' future careers. Integrating applied learning opportunities, post-course support, and collaborative efforts among educators, students, and external stakeholders may help address the challenges associated with partnership-based approaches to sustainability education (Sauvé, 2002).

Although students' feedback was broadly consistent across both case studies, notable differences emerged. Students in the Infometrics seminar reported a higher level of awareness of the SDGs (90.9%) compared to those in the Sociology of Reading course (54.5%). This discrepancy may be attributed to two factors. First, differences in academic background: many students in the Sociology of Reading course were pursuing advanced or interdisciplinary studies, which may have diluted the perceived novelty or relevance of SDG content. Second, the nature of the pedagogical activities varied between the two cases. The Infometrics seminar centered on research-based projects related to sustainability, while the Sociology of Reading course focused primarily on interactive exercises about the SDGs. This difference in teaching methods could possibly influence the degree of learning and impact and should, therefore, be addressed by future research.

The teaching strategies used in the case studies, i.e., dialogue, active participation, and the integration of digital tools, are aligned with previous studies that had highlighted their effectiveness in sustainability education, particularly in science-related disciplines such as geography (Yli-Panula et al., 2020). Our findings extend this research to the social sciences, showing that such methods are equally valuable in non-environmental fields.

Moreover, the results support prior evidence suggesting that project-based learning can enhance students' understanding of climate-related issues and foster a desire to act (Marcella & Samofalova, 2022). Our contribution goes further by

embedding sustainability into existing disciplinary frameworks, rather than treating it as an isolated or elective theme. This reflects broader pedagogical shifts that promote universal approaches, such as problem-based and project-based learning, as effective tools for cultivating sustainability competencies (Wang et al., 2022).

Finally, in both case studies, the teacher played a facilitator role, guiding students through individual and group projects. As described by Berglund et al. (2025), this role entails structuring activities, ensuring adherence to guidelines, and overseeing the project's progression. In addition, such facilitation provides essential organizational and methodological support that contributes to the success of team-based learning (Berglund et al., 2025).

Conclusion and future perspectives

This study demonstrates that integrating sustainability topics into non-specialized undergraduate programs can effectively foster interdisciplinary thinking, critical reflection, and environmentally responsible attitudes. By linking sustainability-related content to students' professional training this approach strengthens their capacity to address sustainability challenges in their future careers. We argue that embedding sustainability into existing non-specialized curricula provides a concrete and adaptable strategy for French universities aiming to align their educational missions of developing TEDS teaching modules with the SDGs.

Drawing on two case studies from a French university, this research offers insights into pedagogical methods, such as project-based learning and interactive exercises, that can be successfully applied in diverse educational contexts. However, the study's scope is limited: both cases were conducted within a single department at one institution, with undergraduate students during the same academic year. These constraints limit the generalizability of the findings across disciplines, degree levels, or institutional contexts.

Future research should expand this exploration to include Master's level programs, different academic departments, and a broader range of universities. Comparative studies across national contexts would also be particularly valuable, given that the cultural and institutional characteristics of French higher education may have influenced the outcomes observed. Such research could investigate how the integration of the SDGs varies across educational systems and help identify common challenges, as well as effective and transferable practices. In this case, the researchers can use the proposed feedback form to evaluate other sustainability-related university courses.

Finally, developing European and international academic partnerships could enhance the development and dissemination of effective sustainability education models. Joint initiatives, curriculum co-construction, and comparative pedagogical research would support the broader aim of embedding the SDGs into higher education systems, contributing to the global effort toward a sustainable transition.

Ethics and consent

In this study, the ethical approval was not required because the study involves a routine improvement of teaching/education. The questionnaires were implemented as part of standard teaching practice. Only at a later stage, the results were recognized as having scholarly value, since they illustrate the relevance of integrating sustainability-related content into university courses that are not directly focused on sustainability.

Nevertheless, the study was conducted in accordance with established ethical standards for research involving human participants. In particular, it fully complied with the GDPR, and the data management and reporting follow the FAIR principles.

No personal or identifying data were collected at any stage of the study. Participation in the feedback surveys was entirely voluntary. Students could decline to take part without any academic or administrative consequences. Prior to completing each questionnaire, participants were provided with a clear information and consent statement explaining the purpose of the feedback collection and the conditions under which their responses might be used for research and publication. Proceeding with the questionnaire constituted informed consent.

For transparency, the original French version of the consent statement used in the Sociology of reading course is provided in Figure 4, followed by an English translation.

Figure 4 **translation**

This questionnaire aims to collect your opinion on the *Sociology of Reading* course. It will take you about 5 minutes to complete.

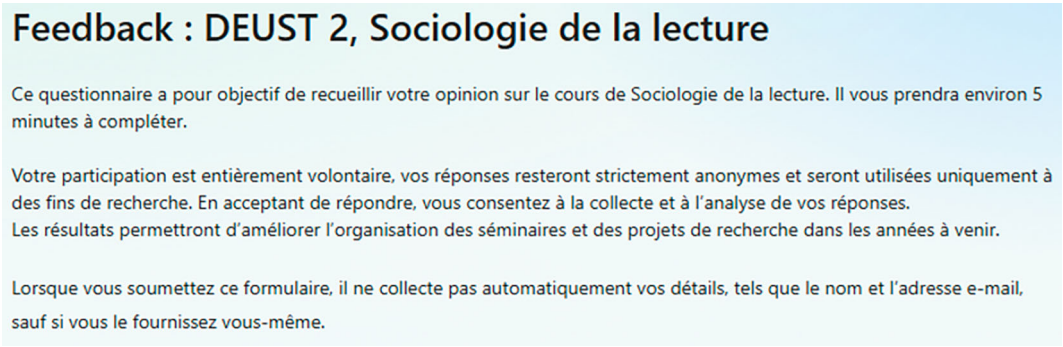


Figure 4. Consent information, sociology of reading.

Your participation is entirely voluntary. Your responses will remain strictly anonymous and will be used solely for research purposes. By agreeing to participate, you consent to the collection and analysis of your responses.

The results will help improve the organization of seminars and research projects in the coming years.

When you submit this form, it does not automatically collect your personal details, such as your name or email address, unless you choose to provide them yourself.

For the Infometrics course, the original French version of the consent form is presented in Figure 5, followed by the English translation below.

Figure 5 **translation**

This questionnaire aims to collect your opinion on the Infometrics course. It will take you approximately 5 minutes to complete. Your participation is entirely voluntary, your responses will remain strictly anonymous, and they will be used solely for research purposes.

By agreeing to participate, you consent to the collection and analysis of your responses.

The results will help improve the organization of seminars and research projects in the coming years.

When you submit this form, it does not automatically collect your personal details, such as your name or email address, unless you choose to provide them yourself.

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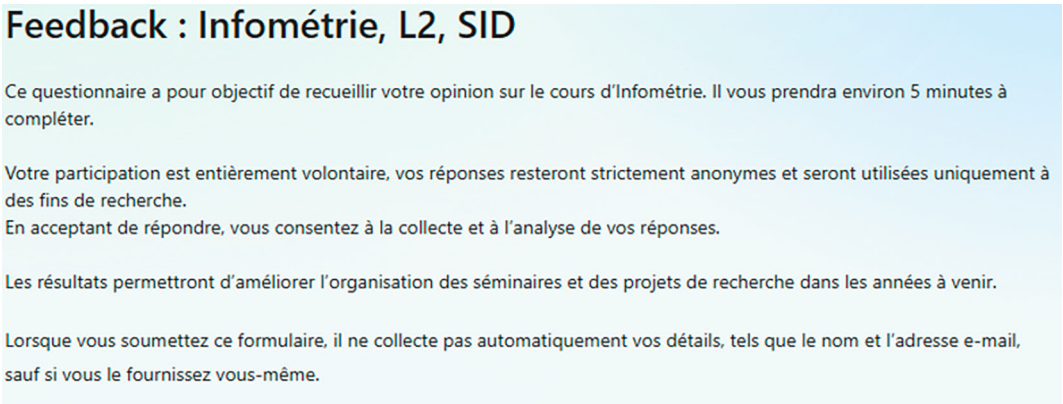


Figure 5. Consent information, infometrics.

Data availability

The survey data associated with this study were pre-registered and are publicly available on the Open Science Framework (OSF) platform: DOI: 10.17605/OSF.IO/5AVQX (Samofalova, 2025). The data are hosted in Frankfurt, Germany.

The OSF project contains the following underlying datasets:

1. Feedback data – Sociology of Reading course (in French, as the course was taught in French) in Excel format.
2. Feedback data – Infometrics seminars (in French, as the course was taught in French) in Excel format.
3. Feedback form translated into English, DOCX format.
4. Metadata for Excel files – containing the description of all variables.

The values used to build graphs in this article are columns E-O in the shared excel files.

No personal or identifying data were collected. All datasets are shared under the terms of the CC-BY 4.0 data waiver, ensuring unrestricted reuse and compliance with Open Science principles. No specialized software beyond standard spreadsheet tools (e.g., Microsoft Excel or LibreOffice Calc) is required to access or analyze the data.

Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).

Reporting guidelines

This study follows the FAIR data principles to ensure transparency and reproducibility of research outcomes.

- Findable: Metadata describing the study, its objectives, and methodology have been clearly and explicitly assigned to the dataset. The data are registered with a DOI (10.17605/OSF.IO/5AVQX) on the Open Science Framework (OSF), ensuring persistent identification and traceability.
- Accessible: All research materials, including datasets and the feedback questionnaire, are freely available on the OSF platform under an open license, without access restrictions.
- Interoperable: The datasets are provided in standard spreadsheet formats. The metadata and feedback form are shared in docx format. All files are compatible with commonly used open-source software, such as LibreOffice Calc and other table or text editors, facilitating broad accessibility and usability.
- Reusable: The feedback questionnaire and the collected data can be reused by other researchers for similar pedagogical or sustainability-related studies.

Regarding sex and gender reporting, these variables were not collected as part of this study, as they were not relevant to the research objectives. Therefore, the study is not subject to the SAGER guidelines.

Acknowledgments

We would like to thank DEUST and Bachelor students of the University of Lille who participated in the survey and gave their feedback in 2024-2025 academic year and made this research possible.

References

Berglund T, Gericke N, Forssten Seiser A, *et al.*: **The role of ESD facilitators in bringing about change in schools.** *Environmental Education Research.* 2025; **31**: 1436–1460.
Publisher Full Text

Bianchi G, Pisiotis U, Cabrera M: **GreenComp: The European sustainability competence framework.** *Publications Office of the European Union.* 2022.
Publisher Full Text

Dabadie I, Kedzierski M, Gensac E, *et al.*: *Co-construction d'un dispositif sur la Transition Écologique pour un Développement Soutenable (TEDS): Une expérimentation du décloisonnement des composantes au sein de l'Université.* Bretagne Sud: QPES Questions de Pédagogie Dans l'enseignement

Supérieur; 2025, May.
Reference Source

Gladu S, Curadeau M: **Implantation d'une nouvelle approche éducative visant l'engagement environnemental des citoyens. Biodôme, Espace pour la vie.** *Éducation relative à l'environnement: regards - Recherches - Réflexions.* 2022; **17-1**(1).
Publisher Full Text | **Reference Source**

Jouzel J, Abbadie L: **Sensibiliser et former aux enjeux de la transition écologique dans l'Enseignement supérieur.** *Ministère chargé de l'Enseignement supérieur et de la Recherche.* 2022.
Reference Source

La Rochelle Université: *Un module de formation à la transition écologique pour les étudiants·es de Licence 3.* La Rochelle Université; 2025, February 4.
Reference Source

Maleval V: **Enseigner la transition écologique à l'université, à partir de la fresque du climat, pour un développement soutenable.** *Physio-Géo. Géographie physique et environnement.* 2025; **21**: 3–18. Article Volume 21.
Publisher Full Text

Marcella V, Samofalova Y: **Data-driven and research-based learning approaches to environmental education in university contexts: Two case studies in Italy and Germany.** *Language Learning in Higher Education.* 2022; **12**(2): 567–586.
Publisher Full Text

Ministère de l'enseignement supérieur et de la recherche: **Cadrage et préconisations du ministère de l'Enseignement supérieur et de la Recherche « Former à la transition écologique pour un développement soutenable les étudiants de 1er cycle ».** 2023.
Reference Source

Orellana I, Brière L, Asselin H, *et al.*: **Éducation relative à l'environnement: Trajectoires, perspectives et défis contemporains.** *Presses de l'Université du Québec.* 2024.
Publisher Full Text

Panthéon Sorbonne Université Paris 1: **Atelier Environnement et territoires (TEDS) (fr).** *ebriere#utilisateurs.* 2025, May 19.
Reference Source

Samofalova Y: Integrating sustainability transition into university curricula: Survey data. [Dataset Publication]. 2025.
Publisher Full Text

Sauvé L: **Le partenariat en éducation relative à l'environnement: Pertinence et défis.** *Éducation relative à l'environnement. Regards - Recherches - Réflexions.* 2002; **3**. Article Volume 3.
Publisher Full Text

Université de Lille: **Plan de transition écologique de l'Université de Lille: Feuille de Route 2023-2033.** 2023.
Reference Source

Wang Y, Sommier M, Vasques A: **Sustainability education at higher education institutions: Pedagogies and students' competences.** *International Journal of Sustainability in Higher Education.* 2022; **23**(8): 174–193.
Publisher Full Text

Yli-Panula E, Jeronen E, Lemmetty P: **Teaching and Learning Methods in Geography Promoting Sustainability.** *Education Sciences.* 2020; **10**(1): Article 1.
Publisher Full Text

Open Peer Review

Current Peer Review Status: ? ✗

Version 1

Reviewer Report 27 July 2026

https://doi.org/10.21956/openreseurope.23806.r78013

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✗

Rodrigo Lozano
University of A Coruña, A Coruña, Galicia, Spain

Dear authors,

Thank you for your paper. I have the following comments:

- The introduction is missing many of the seminal papers on education for sustianable development focussing particularly on curricula development (e.g. Carew & Mitchel, 2008; Lozano & Lozano, 2014; Pappas et al., 2013; Segalàs et al., 2010)
- It also misses a discussion on why the SDGs are important in higher education institutions. It should be noted that the SDGs were developed by governments for governments, never for universities, therefore, the discussion is how these can contribute to achieving the SDGs
- The second section (I take it is a literature review) describes the French context, but not what has been written about curricula development, and for example pedagogical approaches and sustainabilty competences (e.g. Beagon et al., 2022; Bianchi, 2020; R. Lozano et al., 2025; Segalàs et al., 2009; Wiek et al., 2011)
- The methods section is not really about case studies, the courses are the units of analysis. I am missing the selection criteria for these. Since the survey asked about opinions, attitudes, and awareness, I would have expected to see these topics discussed in the literature review. 44 responses is very low for any proper statistical analysis. A descriptive analysis is rather basic. I miss the limitations of the methods
- The results are rather basic. I would have expected much more details on the SDGs
- The conclusions could have better addressed the 'so what' question, i.e. what can the learning of the research be used by other researchers? And what is the contribution of the paper to scientific knowledged (in this case to education for sustainable development, in particular curricula development and delivery)?
- The reference list is quite limited, and mainly in French, there have been many papers on the topic published in English, Spanish, and German

References

Beagon, U., Kövesi, K., Tabas, B., Nørgaard, B., Lehtinen, R., Bowe, B., Gillet, C., & Spliid, C. M.

(2022). Preparing engineering students for the challenges of the SDGs: What competences are required? *European Journal of Engineering Education*, 1–23. https://doi.org/10.1080/03043797.2022.2033955
Bianchi, G. (2020). *Sustainability competences: A systematic literature review*. EU Commission.
Carew, A. L., & Mitchel, C. A. (2008). Teaching sustainability as a contested concept: Captializing on variation in engineering educators' conceptions of environmental, social, and economic sustainability. *Journal of Cleaner Production*, *16*(1), 105–115.
Lozano, F. J., & Lozano, R. (2014). Developing the curriculum for a new Bachelor's degree in Engineering for Sustainable Development. *Journal of Cleaner Production*, *64*, 136–146. https://doi.org/10.1016/j.jclepro.2013.08.022
Lozano, R., Barreiro-Gen, M., Ortiz-Martínez, G., Mendoza, A., Segalàs, J., Caeiro, S., Simão, J., Favi, C., Gładysz, B., Alló, M., Gago-Cortés, C., Tortato, U., Mónus, F., Pietikäinen, J., Södervik, I., Ratvio, R., Bostanci, S., Tóth, M. D., Benayas, J., … Sassen, R. (2025). Students' Perspectives on Sustainability Competences and Pedagogical Approaches: Groupings and Interrelations Results From 17 International Case Studies. *Sustainable Development*, sd.3368. https://doi.org/10.1002/sd.3368
Pappas, E., Pierrakos, O., & Nagel, R. (2013). Using Bloom's Taxonomy to teach sustainability in multiple contexts. *Journal of Cleaner Production*, *48*, 54–64. https://doi.org/10.1016/j.jclepro.2012.09.039
Segalàs, J., Ferrer-Balas, D., & Mulder, K. F. (2010). What do engineering students learn in sustainability courses? The effect of the pedagogical approach. *Journal of Cleaner Production*, *18*, 275–284. https://doi.org/10.1016/j.jclepro.2009.09.012
Segalàs, J., Ferrer-Balas, D., Svanström, M., Lundqvist, U., Mulder, K. F., Segalas, J., Ferrer-Balas, D., Svanstrom, M., Lundqvist, U., Mulder, K. F., Segalàs, J., Ferrer-Balas, D., Svanström, M., Lundqvist, U., & Mulder, K. F. (2009). What has to be learnt for sustainability? A comparison of bachelor engineering education competences at three European universities. *Sustainability Science*, *4*(1), 17–27. https://doi.org/10.1007/s11625-009-0068-2
Wiek, A., Withycombe, L., & Redman, C. L. (2011). Key competencies in sustainability: A reference framework for academic program development. *Sustainability Science*, *6*(2), 203–218. https://doi.org/10.1007/s11625-011-0132-6

Is the work clearly and accurately presented and does it engage with the current literature?
No

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
No

Are all the source data and materials underlying the results available?
Partly

If applicable, is the statistical analysis and its interpretation appropriate?
No

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: education for sustainable development, pedagogical approaches, sustainability competences, course development

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Reviewer Report 23 July 2026

https://doi.org/10.21956/openreseurope.23806.r76772

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Suzanna ElMassah
Zayed University – Abu Dhabi Campus, Abu Dhabi, United Arab Emirates

This article addresses a relevant and timely issue: how sustainability and the SDGs can be integrated into university courses that are not primarily environmental in orientation. Drawing on two cases from the University of Lille—Sociology of Reading and Infometrics—the study demonstrates the practical potential of embedding sustainability themes within disciplinary and professionally oriented curricula.
The manuscript has clear value. It responds directly to current debates on mainstreaming sustainability in higher education and is well situated within the French TEDS framework. The practical examples are useful, particularly the integration of sustainable library concepts and sustainability-related research projects into courses with different disciplinary objectives. The study also provides open access to the survey data, questionnaire, and metadata, which is a considerable strength. However, the manuscript requires substantive revision before its conclusions can be considered scientifically sound.

Presentation and engagement with the literature
The article is generally clear and logically structured, and it engages with recent literature and policy frameworks, including TEDS, GreenComp, project-based learning and sustainability education. Nevertheless, the literature review remains somewhat descriptive. The manuscript would benefit from stronger engagement with the literature on sustainability competencies, curriculum mainstreaming, transformative learning, evaluation of educational interventions, and the distinction between behavioural intention and actual behavioural change. The authors should also explain more clearly how the theoretical concepts discussed in the introduction relate to the variables measured in the questionnaire. At present, there is a gap between the broader claims regarding interdisciplinary thinking, critical reflection and behavioural change and the relatively limited self-reported indicators used in the study.

Study design and technical soundness
The study design is appropriate for an exploratory teaching case, but not for establishing the effectiveness or causal impact of the interventions. The evaluation is based on voluntary questionnaires administered only at the end of the courses. There is no pre-course assessment, comparison group, objective measurement of learning, or follow-up assessment of actual behaviour. The results therefore reflect student perceptions, reported awareness and behavioural intentions rather than demonstrated changes attributable to the courses. The manuscript should consequently be reframed as an exploratory and descriptive study. Statements such as “the study demonstrates, “effectively fosters", “was impactful,” and “strengthens their capacity” should be moderated. More accurate wording would refer to:

- positive student perceptions;
- self-reported increases in awareness;
- reported intentions to act more sustainably; and
- the potential value of integrating sustainability into non-specialised curricula.

This distinction is essential for aligning the conclusions with the study design.

Response rates and potential bias
The response rate in the Info metrics course is low: only 22 of 79 enrolled students completed the questionnaire. This raises a significant concern regarding self-selection and non-response bias. Students who were more engaged with the course or more interested in sustainability may have been more likely to participate. The total number of students enrolled in the Sociology of Reading course should also be reported to calculate the response rate. The manuscript should explicitly acknowledge that the respondents may not be representative of the full cohorts and that the findings cannot automatically be generalised to all enrolled students.

Comparability of the two case studies
The two cases differ substantially in content, duration, and pedagogical design. The Sociology of Reading course included a two-hour activity explicitly focused on sustainable libraries and the SDGs. The Infometrics course included a more extensive combination of lectures and group research projects, several of which addressed sustainability-related issues. The pedagogical approach alone cannot account for the differences in reported awareness between the two groups. The cohorts also differed in academic background, course objectives, and level of exposure to sustainability content. The comparison should be descriptive, not evidence that one teaching approach was more effective than the other.

Methods and replication
The manuscript provides a useful general description of the courses and questionnaire, but additional methodological detail is needed to support replication. The authors should report:

- total enrolment and response rate for each course;
- the timing and mode of questionnaire administration;
- whether all respondents answered every question;
- how missing responses, if any, were handled;
- the precise learning objectives of the sustainability activities;
- the instructions and materials used in each course;
- whether the questionnaire was piloted or adapted from an existing instrument; and

- how the qualitative comments were analysed.

The qualitative feedback is useful, but it is currently unclear whether comments were systematically coded or selected illustratively. The manuscript should either describe a simple qualitative analysis procedure or clearly state that the comments are presented only as illustrative examples.

Statistical analysis and interpretation
Descriptive analysis is appropriate for an exploratory case study. However, the interpretation should be more cautious. Given that each analysed group includes only 22 respondents, the manuscript should report both frequencies and percentages. For example, “21 of 22 students” is more transparent than reporting “95.4%” alone. The manuscript should also avoid implying statistically meaningful differences between the two groups, since no inferential analysis was conducted and the groups were indirectly comparable. Importantly, the questionnaire measures perceptions and intentions, not actual behaviour. Claims concerning “climate action” or behavioural impact should therefore be revised to refer to “intention to act” unless follow-up evidence is provided.

Data and materials
The Data Availability section is a strong feature of the manuscript. The authors report that the two datasets, the translated questionnaire and metadata, are publicly available through the Open Science Framework under an open license. This supports transparency and reproducibility of the descriptive analysis. To enable fuller replication of the educational interventions, the authors should also consider sharing the teaching materials, project instructions, activity sheets, and presentation slides used in the two courses.

Ethics and registration
The ethics section requires clarification. The manuscript states that ethical approval was not required because the questionnaires were initially implemented as part of routine teaching improvement and were only later recognised as having research value. However, the consent statements indicate that responses would be used for research purposes. The authors should clarify the sequence and identify the institutional policy or responsible authority under which formal ethical approval was considered unnecessary. Where applicable, confirmation of exemption should be provided. The statement that the data were “pre-registered” should also be checked. If the protocol and analysis plan were not registered before data collection, the more accurate wording would be that the data were “registered,” “archived” or “deposited” on the OSF.

According to the above, the following points must be addressed:

- Reframe the study as exploratory and descriptive rather than as evidence of causal effectiveness.
- Moderate claims regarding learning, behavioural change, interdisciplinary thinking and professional capacity.
- Report enrolment numbers and response rates for both courses and discuss self-selection bias.
- Clarify the limited comparability of the two case studies.
- Strengthen the methods section and explain the treatment of qualitative feedback was treated.
- Report frequencies alongside percentages and avoid unsupported statistical comparisons.

- Clarify the ethics and registration statements.
- Undertake careful English-language editing throughout.

Subject to these revisions, the manuscript has the potential to make a useful contribution to the literature and practice of sustainability education in higher education.

Is the work clearly and accurately presented and does it engage with the current literature?
Partly

Is the study design appropriate and is the work technically sound?
Partly

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

Are all the source data and materials underlying the results available?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Partly

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Economics, Sustainability, Interdisciplinary, Education.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.