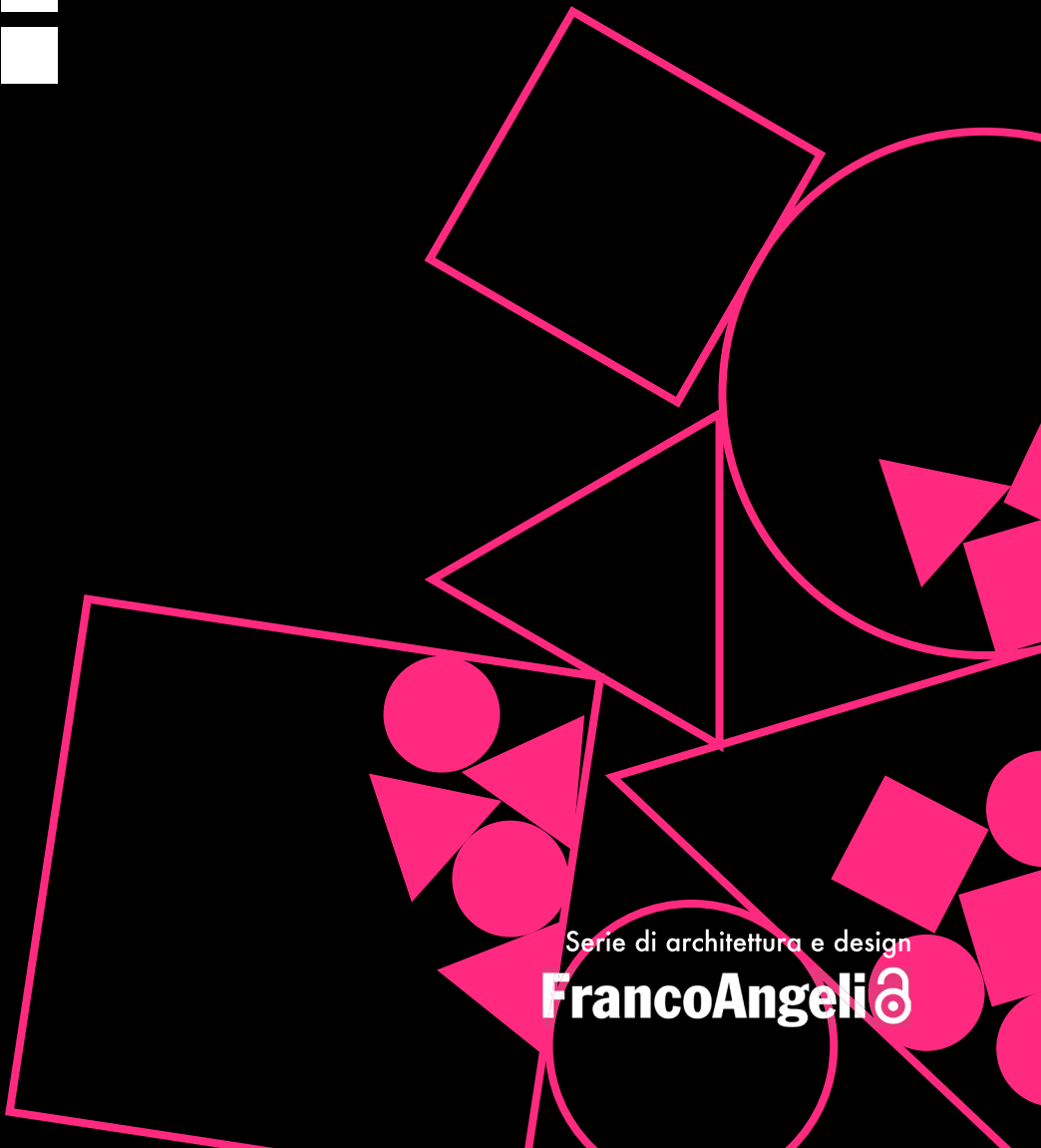
Behave. Mapping the commitment of higher education towards the sustainable development goals

2CO3-COmmunicating COmplexity

Selected contributions to the Conference
September 8-9, 2022

Edited by Nicolò Ceccarelli



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The present publication contains the communications presented at the 3rd edition of the International Design Conference 2CO-COmmunicating COmplexity, which took place from 8 to 9 September 2022 at the Department of Architecture, Design and Planning (DADU) of the University of Sassari, in Alghero, Sardinia, Italy.

The conference was organized by the Department of Architecture, Design and Planning of the University of Sassari.

All contributions where reviewed and selected through a blind peer-review process by the Conference's Scientific Committee.

www.2coconference.org

Conference Chair: Nicolò Ceccarelli
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Digital ISBN 9788835164326

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Behave.
Mapping the commitment of higher education towards the sustainable development goals

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Abstract. University campuses are wide and complex entities in which flows of people, activities, and spaces continuously interconnect, defining the campus' identity and giving life to scenarios in continuous transformation. Every tangible and intangible element of this system of relations contributes to the social, environmental, and economic impacts of the campus and its surroundings. In such a complex context, where different actors engage at different levels, it is crucial to understand how universities are approaching and contributing to the achievement of the Sustainable Development Goals (SDGs). These goals should be seen as an opportunity and not as a drag; hence the need to develop a visualization tool to map the campus' sustainability and the community's perception of it. A mapping approach could support the identification of gaps, the discovery and enhancement of already existing good practices, and the interpretation of new paths, for a more effective contribution to the 2030 Agenda.

Keywords. Higher Education / Data Visualization / Interactive platform / SDGs

1. Introduction

In 2015 the United Nations introduced the *Sustainable Development Goals* (SDGs), 17 universal points created to improve the current cultural, economic, and social system. Even if the SDGs propose a universal language, globally valid, it is necessary to visualize how to achieve these objectives, what actions need to be taken and the effects they will have.

Among all the actors who are called to take part in the SDGs mission, Higher Education Institutions are one of the most important. University campuses are not only containers of knowledge: they are social microcosms that promote community engagement, and relationships with external stakeholders, with a strong impact on the social, productive, and economic world. Being able to map — with a data-driven approach — how the contribution to the SDGs occurs daily is the aim of a design concept, born within the activities of the co-funded project *Change the Climate* by the Erasmus + Program of the European Union, which goal is to improve the contribution of Latin American universities through the integration of strategies for more sustainable education.

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2. Data-driven design for a sustainable approach

The actions of social, geographical, and economic environments can be translated into a huge amount of quanti-qualitative data, useful to read the trends of the current society. Without a context, data itself would not have any meaning: the environment — considered as natural, industrial, or individual — can be seen as the circumstance of visual artifacts regarding for instance climate, healthcare, energy production and consumption (Stabellini et al., 2017). Representing this type of data can be an opportunity to discover and interpret everyday behaviors inside an individual's life but also inside organizations. Data visualization is therefore a useful medium to support human perceptions, remember information and recognize patterns (Dur, 2014). In addition, data language — made up of dots, lines, and graphs — is universal and readable by a broader range of users.

3. Higher Education and the commitment to the SDGs

Sustainability topics in universities were introduced around twenty years ago, but only recently campuses have started to realize how necessary it is to radically change their knowledge and communication systems on these topics (Poza et al., 2021).
The role of universities as nodes of global networks able to spread stronger values is among the reasons why sustainability can be a turning point to raise their social mission, together with the students, as representatives of a community in which is fundamental to adopt more innovative behaviors (Sonetti et al., 2020). In this context, SDGs act as a support to integrate sustainable development, but only if efficiently managed: in the actual state of the art, SDGs are often used as a branding tool to promote the 'green' identity of the university, or they are managed as a separate entity from the study plans, under the shape of workshops or extracurricular activities.

4. Mapping sustainable behaviors

Among the many tools that are gradually becoming a prerequisite for private and public organizations to communicate sustainable approaches, there is the practice of Sustainability Reporting (SR), a document that collects information about the values, mission, and performances carried out by the author for a transparent disclosure. It's a yearly report, static or dynamic, made of texts, photos, maps, graphs or tables where future objectives and strategies can also be presented inside.
In the context of University SR, most of the examples are static resources with an unbalanced use of visual representations: in the *2019 Sustainability Report* by the Polytechnic of Turin, data visualization is at the core of the structure, allowing users to visually understand the commitment towards teaching, research, and third mission [Fig. 1]. In other cases, the output of the report is mainly textual, and the use of data

visualization is reduced to few bar charts and category numbers (e.g., the *Gloucestershire Sustainability Report 2020-2021).*

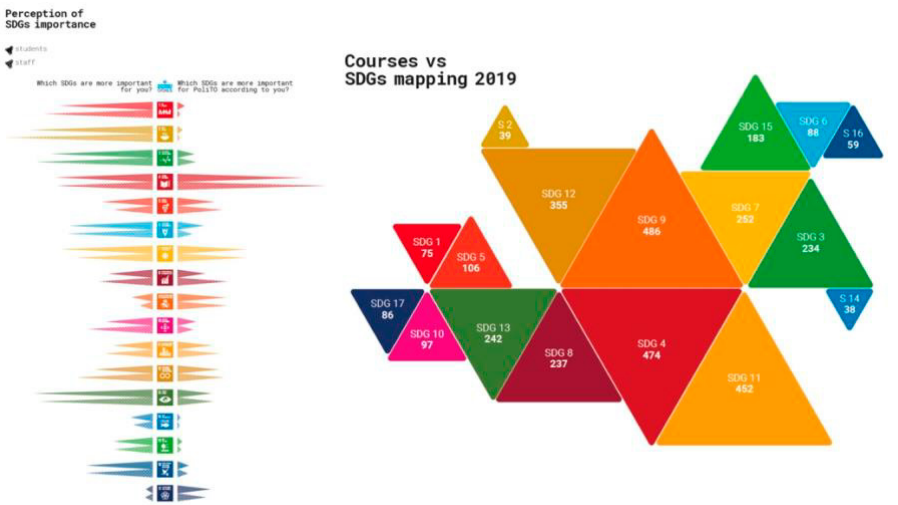

Fig. 1. Polytechnic University of Turin, 2019 Sustainability Report, examples of visual representations (campus-sostenibile.polito.it).

Examples of more data-viz oriented SR can be found in dynamic web tools and dashboards. The latter offered cues of further investigation thanks to the UNDP document *SDG Dashboard: The role of information tools in the implementation of the 2030 Agenda* (2017) which makes a distinction between Information and Development Dashboard: the former is a visual display of important information into a single screen, to be briefly monitored; the latter addresses a broader set of issues which require whole-of-government coordination with a broader set of institutions and stakeholders.

The different approaches and gaps that emerged from the state of the art allowed to settle the boundaries for the development of a tool focused on reaching a *Performing Analysis* of university campuses: information should be displayed to monitor and track their impact and enable public scrutiny from partners and other stakeholders [Fig. 2]. This approach requires the use of technical and scientific language to inform the reader and activate a comparing process. Furthermore, the use of a digital interface allows more user interactivity, by giving the possibility to carry out new actions and introducing unexpected perspectives on the use of content (Mauri & Ciuccarelli, 2014).

5. Behaving through data

The state of the art and the identification of the general guidelines assessed the base for the development of the platform Behave: a digital interface designed to allow universities to explore data and compare them according to different parameters. Particular attention was given to the explorative process that goes beyond the SDGs classification; being halfway through the process of achieving the 17 SDGs — scheduled to last until 2030 — it is fundamental to design actions and good practices that are not strictly bound to them. A long-term vision requires thinking of alternative representations, that can coexist with the actual scenario and potentially impact future visions. With this consideration, a double-reading layer was created: each SDG and its targets has been analyzed, identifying seven areas where campuses' sustainable commitment could impact their achievement [Fig. 3 – on the left]. The contribution to these areas comes from the action taken by the campuses that can be identified into 14 content categories. These can be then enclosed in six macro-topics that summarize the campus field of action [Fig. 3 – on the right] and that will represent
This classification helps in the creation of a *functional* interface, able to show the information clearly. Starting from the homepage, users become aware of what the platform has to offer, discover the joining campuses, and directly reach their pages, to *explore* the data [Fig. 4]. This is the main section of the tool, where all the data can be visualized, compared, and analyzed [Fig. 5] with a process of data aggregation that follows a 'subtractive' approach (Ciuccarelli & Ricci, 2009): users can see all the data but have the possibility to filter them according to entities, perspectives, or additional filters.

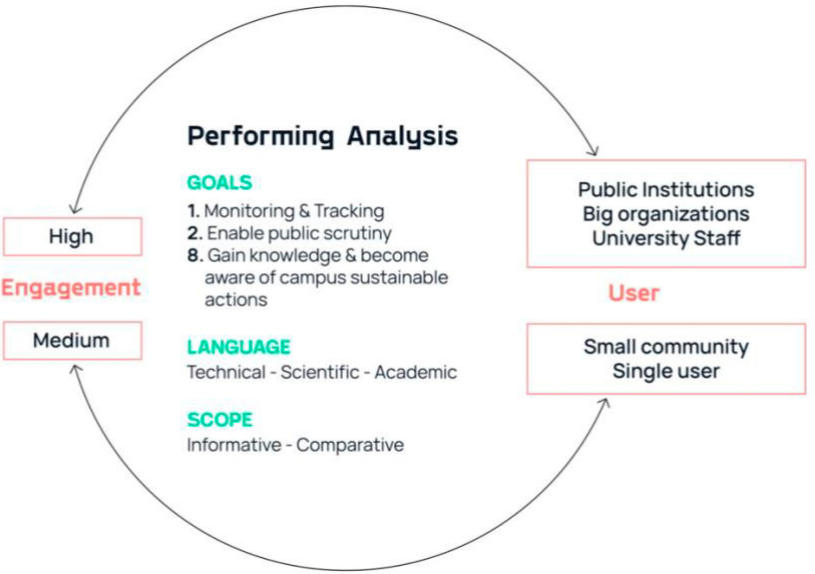

Fig. 2. Tool development: guidelines.

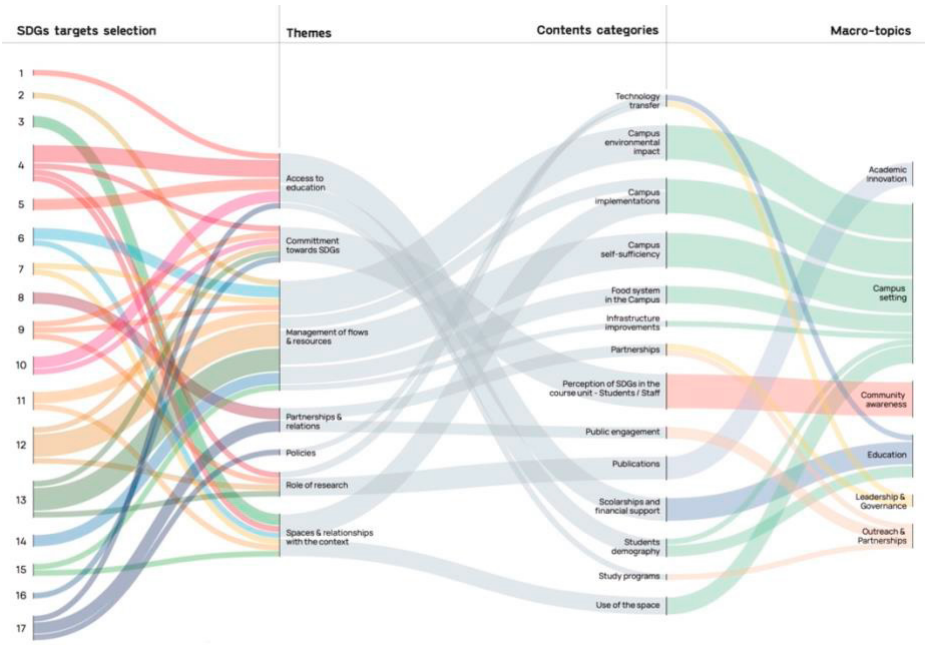

Fig. 3. From SDGs to specific contents: explorative process behind the tool.

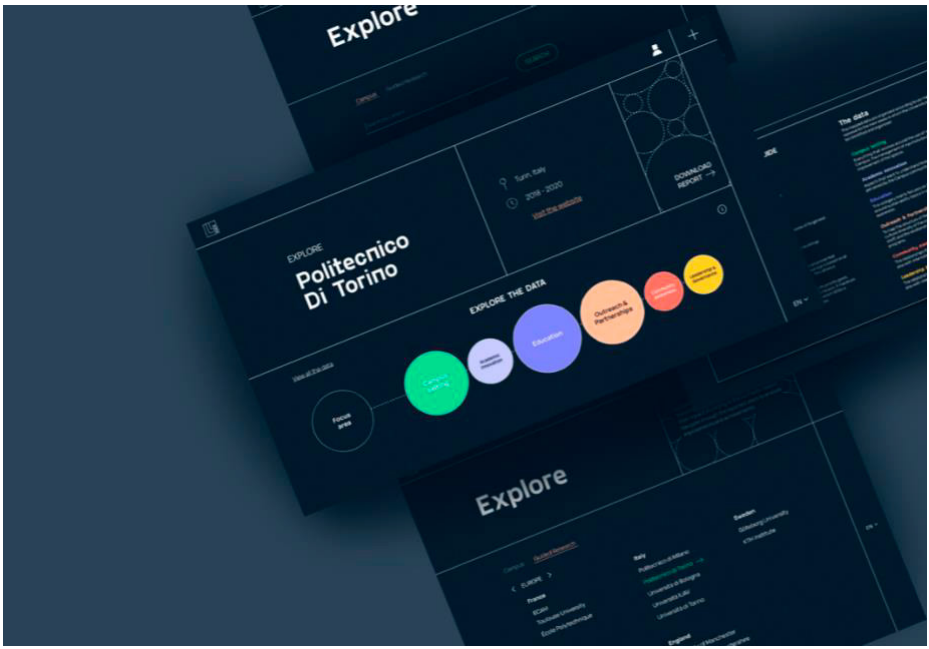

Fig. 4. Behave platform. Explore section, campus overview and general information.

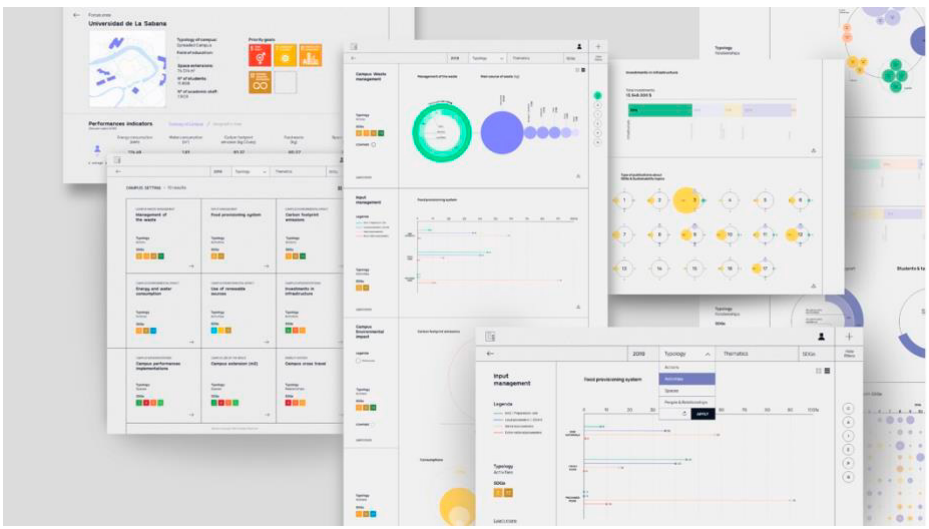

Fig. 5. Behave platform. Explore section, data visualization collection.

In Behave, the entities to be visualized are the six macro-topics that offer a brief overview of the investigated areas; the perspective of the analysis is the possibility to consider the actions, activities, spaces, or relationships in the campus; the additional filters are the 17 SDGs or their correspondent themes [Fig. 6]. In this way, users

navigate the information depending on their needs and their knowledge: public institutions, policymakers, partners, or members of the university staff are the main stakeholders to whom the platform is addressed; however, even students or research groups may have an interest in this type of data. Therefore, the exploration phase must be suitable for all those users who are not necessarily used to interpreting complexity.

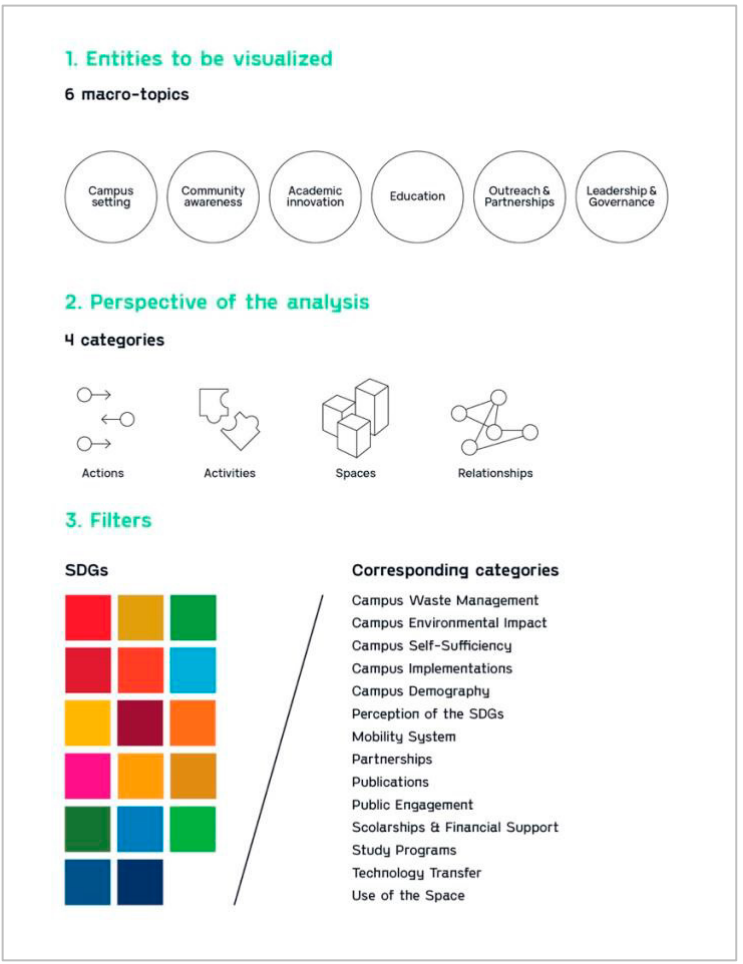

Fig. 6. Behave platform. Data aggregation process: entities, perspectives, and filters.

Additional sections complete the platform by giving the possibility to download a static report of the data or to deepen the SDGs knowledge. The overall result is an alternative to the annual reports published by campuses, with a greater supply of data, unified among the various members and offering greater user involvement.

6. Conclusions

The development of *Behave* revolved around data visualization as an approach to acquire more awareness of the actions that academic institutions carry on every day. The biggest challenge for visual artifacts is to find a way to untangle and represent complexity. Data visualization is a language whose duty is not to influence the user toward specific choices, and not even to suggest a final solution; visualizations must push towards an individual's critical analysis, provoking the rise of new questions.
Behave is the result of a project phase supported by preliminary research and it reached a first prototype that needs to be tested properly. The visualizations were developed from an effective collection of data from some university campuses in Latin America, but some implementations can be foreseen in the future; both in terms of platform functionality and data analysis, understanding how to integrate more qualitative data without making it quantitative. Overall, the tool offers campuses a common and shared space to communicate what makes each of them recognizable; it's a space that could evolve into an open web interface where the Higher Education System can develop new strategies and, at the same time, compare the various results with an open and collaborative approach.

References

Ciuccarelli, P., Ricci, D. (2009). Design and visualization. Diagrammatic tools for complexity. In Lupo, E. & Campagnaro, C. (Eds.), *International Summer School. Designing Connected Places*, 6-7. Editrice Compositori.

Dur, B. U. (2014). Data Visualization and Infographics in Visual Communication Design Education at the Age of Information in *Journal of Arts and Humanities*, 5 (12).

Mauri, M., & Ciuccarelli, P. (2014). Il ruolo dell'Information Visualization nella progettazione di interfacce per archivi digitali eterogenei. In F. Ciotti (Ed.), *Digital Humanities: progetti italiani ed esperienze di convergenza multidisciplinare,* (16). Sapienza Università Editrice.

Poza, E., Merello, P., Barberá, A., & Celani, A. (2021). Universities' Reporting on SDGs: Using THE Impact Rankings to Model and Measure Their Contribution to Sustainability. *Sustainability*, 13 (4), 2038. Retrieved from 10.3390/su13042038.

Sonetti, G., Barioglio, C., & Campobenedetto, D. (2020). Education for Sustainability in Practice: A Review of Current Strategies within Italian Universities. *Sustainability*, 12 (13), 5246. Retrieved from 10.3390/su12135246.

Stabellini, B., Remondino, C. L., Tamborrini, P. (2017). Data Visualization Collection. How graphical representation can inspect and communicate sustainability through Systemic Design in *The Design Journal*, 20:su1, S1673-S1681. Retrieved from 0.1080/14606925.2017.1352690.

United Nations Development Programme (2017). *SDG Dashboards: The role of information tools in the implementation of the 2030 Agenda*.

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This volume showcases the contributions presented during the last edition of the 2CO International Design Conference in Alghero (8-9.9.2022), in the two conference tracks Full Paper and Junior Track, the sub-topics infographics, informative animation, interactive data visualization and informative environments.

Following a double-blind selection process based on submissions in the form of long abstracts, the contribution's authors presented their papers at the Conference and, after a further selection step by the conference's Scientific Committee, were invited to submit the final contributions that you will find in this volume.

COmmunicating COmplexity is the international Conference aimed at exploring languages, approaches and technologies to respond to the emerging need for making complex information accessible through design.

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La passione per le conoscenze