



Delft University of Technology

## Editorial

### Data-centric design: data as a human-centred material

Bourgeois, Jacky; Funk, Mathias; Gould, Sandy J.J.; Kurze, Albrecht

#### DOI

[10.3389/fhumd.2025.1674782](https://doi.org/10.3389/fhumd.2025.1674782)

#### Publication date

2025

#### Document Version

Final published version

#### Published in

Frontiers in Human Dynamics

## Citation (APA)

Bourgeois, J., Funk, M., Gould, S. J. J., & Kurze, A. (2025). Editorial: Data-centric design: data as a human-centred material. *Frontiers in Human Dynamics*, 7, Article 1674782. <https://doi.org/10.3389/fhumd.2025.1674782>

## Important note

To cite this publication, please use the final published version (if applicable). Please check the document version above.

## Copyright

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

## Takedown policy

Please contact us and provide details if you believe this document breaches copyrights. We will remove access to the work immediately and investigate your claim.



## OPEN ACCESS

EDITED AND REVIEWED BY  
Peter David Tolmie,  
University of Siegen, Germany

\*CORRESPONDENCE  
Jacky Bourgeois  
✉ J.Bourgeois@tudelft.nl

RECEIVED 28 July 2025  
ACCEPTED 11 August 2025  
PUBLISHED 29 August 2025

CITATION  
Bourgeois J, Funk M, Gould SJJ and Kurze A  
(2025) Editorial: Data-centric design: data as a  
human-centred material.  
*Front. Hum. Dyn.* 7:1674782.  
doi: 10.3389/fhumd.2025.1674782

COPYRIGHT  
© 2025 Bourgeois, Funk, Gould and Kurze.  
This is an open-access article distributed  
under the terms of the [Creative Commons  
Attribution License \(CC BY\)](#). The use,  
distribution or reproduction in other forums is  
permitted, provided the original author(s) and  
the copyright owner(s) are credited and that  
the original publication in this journal is cited,  
in accordance with accepted academic  
practice. No use, distribution or reproduction  
is permitted which does not comply with  
these terms.

# Editorial: Data-centric design: data as a human-centred material

Jacky Bourgeois<sup>1\*</sup>, Mathias Funk<sup>2</sup>, Sandy J. J. Gould<sup>3</sup> and  
Albrecht Kurze<sup>4</sup>

<sup>1</sup>Industrial Design Engineering, Delft University of Technology, Delft, Netherlands, <sup>2</sup>Industrial Design,  
Eindhoven University of Technology, Eindhoven, Netherlands, <sup>3</sup>School of Computer Science and  
Informatics, Cardiff University, Cardiff, United Kingdom, <sup>4</sup>Faculty of Computer Science, Chemnitz  
University of Technology, Chemnitz, Germany

## KEYWORDS

human-computer interaction (HCI), human-centred design (HCD), human-data  
interaction, subjective inquiry, designing with data

## Editorial on the Research Topic

### Data-centric design: data as a human-centred material

The digitalisation of our societies has made data ubiquitous, capturing the behaviors of individuals through their interactions with products, services, and systems. As design and HCI researchers increasingly integrate data throughout human-centered and participatory design processes, the highly dynamic nature of behavioral data reveals its deep interconnection with people, their behaviors, and experiences. Data-Centric Design leverages data as material for subjective inquiry—an entry point to better understand human dynamics through deeper reflection in research and design processes. This Research Topic aims to collect emerging, illustrative projects from the community, share the messiness of research and design processes with data, and surface good practices for effective and responsible data use. This need emerged from the guest editors' engagement in a series of Special Interest Group (SIG) meet-ups (Gomez Ortega et al., 2023) and workshops (Lee-Smith et al., 2023) at the ACM conference on Human Factors in Computing Systems (CHI).

The four papers in this Research Topic exemplify diverse approaches to data as human-centered design material, each offering unique perspectives on how data transforms design processes and stakeholder relationships. They are a selection from a broader set of contributions from the community who gathered at the Data-Centric Design Symposium<sup>1</sup> in December 2023 in Delft (NL).

Rout et al. present “One tree matters: reflections on data as a design material in urban forestry”, exploring how visual and spatial data from drone-mounted sensors can inform urban forest design. Through interviews with urban forestry experts examining prototype data visualizations, they demonstrate how combining point cloud data with anthropological theories (particularly Ingold's concepts of “Life of Lines” and “Imagining for Real”) can bridge analytical and cultural perspectives. Their work highlights how data physicalisation can make abstract ecological information tangible, enabling stakeholders to explore energy-consuming habits and identify opportunities for change.

<sup>1</sup> Data-Centric Design symposium website: <https://datacentricdesign.org/symposium.html>.

Gómez Ortega contributes “*Sensitive data donation in practice: unforeseen challenges and lessons learned*”, offering critical reflections on implementing data donation across three case studies involving menstrual tracking logs, speech records, and physical activity data. This auto-ethnographic account reveals practical challenges in data donation processes, from parsing changing data structures to supporting donors in exploring their own data. The work emphasizes the importance of transparency, data minimization, and empowering participants to set boundaries around their sensitive data (Gómez Ortega et al., 2024).

Özge Ağça presents “*Tangible consumption data landscapes of teenagers*”, demonstrating how physical data mapping can increase teenagers’ awareness of energy consumption. Through workshops in which participants created physical models that represent their home energy use, the study shows how tangible interaction with data enables young people to recount consumption patterns and envision behavioral changes. The integration of questionnaires, layout drawings, and three-dimensional data landscapes illustrates how multiple data representations can support different levels of engagement and understanding.

Raviselvam et al. explore “*Rollercoasters and research: applying data-enabled design to a semi-public context*”, documenting the challenges of implementing Data-Enabled Design (DED) (Funk et al., 2024) in an amusement park setting. Through a two-week design workshop with student researchers, they identify how the open nature of semi-public spaces affects data collection practices, stakeholder engagement, and the balance between quantitative and qualitative approaches. Their findings highlight the importance of contextual immersion and the challenges of technical implementation in dynamic environments.

These articles collectively demonstrate that data as design material requires careful consideration of context, participants, and representation methods. A striking connection across all contributions is the emphasis on making data tangible and accessible to non-experts. Whether through physical models (Özge Ağça), interactive visualizations (Rout et al.), donation platforms (Gómez Ortega), or contextual probes (Raviselvam et al.), each approach seeks to bridge the gap between abstract data and lived experience. The papers also highlight an array of approaches to collaboration, moving from data subject to data participant. While Gómez Ortega emphasizes individual agency in controlling personal data, Raviselvam et al. focus on collective experiences in public spaces. Özge Ağça’s work with teenagers highlights generational perspectives on data engagement, while Rout et al. demonstrate professional stakeholder involvement in interpreting environmental data. Overall, these are practical examples relating to emerging data mindsets and philosophies from data humanism (Lupi, 2017) to data feminism (D’ignazio and Klein, 2020) and data locality (Loukissas, 2019).

Several practical yet critical challenges emerge from this Research Topic. First, the ethical infrastructure of research institutions clashes with these approaches to research. Gómez Ortega’s experiences with institutional review boards and changing data formats highlight the need for more flexible ethical frameworks that can accommodate exploratory data work while protecting participants. How can we develop an ethical infrastructure that supports innovation while ensuring responsible data practices? Second, along with the high effort and contextualization comes the challenge of scale and transferability:

While these studies demonstrate successful applications in specific contexts, questions remain about scaling data-centric approaches. Can methods developed for urban forestry be transferred to other environmental contexts? How do approaches designed for semi-public spaces adapt to private or fully public settings? Third, these papers highlight challenges around technical accessibility. The tension between sophisticated data collection tools and the need for accessible, low-tech alternatives appears throughout these papers. How can the field develop toolkits that balance technical capability with broad accessibility, particularly for communities with limited resources? Finally, the issue of power dynamics around data representation becomes more apparent. The choice of data representation, whether physical, visual, or interactive, fundamentally shapes participation and understanding. Future work must critically examine how different representations include or exclude stakeholders and how power dynamics influence data interpretation and use.

These contributions demonstrate that data-centric design is not just about collecting and visualizing data but about creating meaningful encounters between people and data that can inspire reflection, understanding, and action. As the field evolves, maintaining this human-centered focus while addressing technical, ethical, and contextual challenges will be essential to realize the transformative potential of data as design material.

## Author contributions

JB: Writing – original draft, Writing – review & editing. MF: Writing – review & editing. SG: Writing – review & editing. AK: Writing – review & editing.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Generative AI statement

The author(s) declare that no Gen AI was used in the creation of this manuscript.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

## Publisher’s note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

## References

- D'ignazio, C., and Klein, L. F. (2020). *Data Feminism*. MIT press.
- Funk, M., Lövei, P., and Noortman, R. (2024). *Designing with Data, Data-Enabled and Data-Driven Design*. Cham: Springer, p. 1–32.
- Gómez Ortega, A., Bourgeois, J., and Kortuem, G. (2024). “Sensitive data donation: A feminist reframing of data practices for intimate research contexts,” in *Proceedings of the 2024 ACM Designing Interactive Systems Conference, DIS '24* (New York, NY: Association for Computing Machinery), 2420–2434.
- Gomez Ortega, A., Lovei, P., Noortman, R., Toebosch, R., Bowyer, A., Kurze, A., et al. (2023). “Sig on data as human-centered design material,” in *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems, CHI EA '23* (New York, NY: Association for Computing Machinery), 1–3.
- Lee-Smith, M. L., Benjamin, J. J., Desjardins, A., Funk, M., Odom, W., Oogjes, D., et al. (2023). “Data as a material for design: Alternative narratives, divergent pathways, and future directions,” in *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems, CHI EA '23* (New York, NY: Association for Computing Machinery), 1–5.
- Loukissas, Y. A. (2019). *All Data are Local: Thinking Critically in a Data-Driven Society*. Cambridge: MIT Press.
- Lupi, G. (2017). *Data Humanism: The Revolutionary Future of Data Visualization*. Available online at: <https://www.printmag.com/article/data-humanism-future-of-data-visualization/> (Accessed January, 2025).