Our methodology for environmental assessment of CSE initiatives

Michael Søgaard Jørgensen
- and the other researchers in the AAU team

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Methodological Approach

LCA in combination with Social Practice Theory:

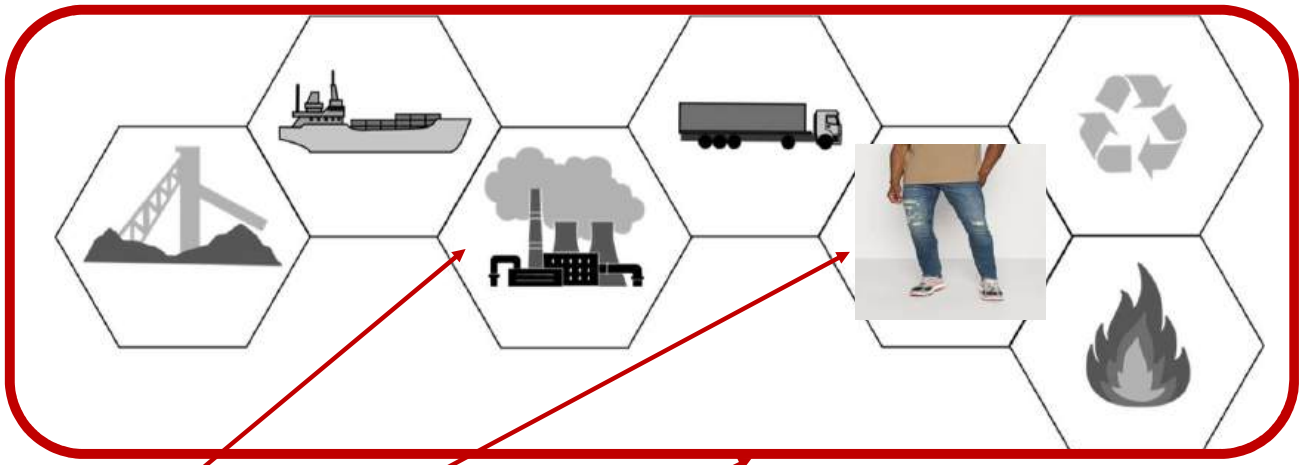
- **Life Cycle Assessment (LCA):** LCA can be used to assess the environmental impacts of local Circular and Sharing Economy (CSE) initiatives.
  - **It is here we get an understanding of the impact and effects of the initiatives.**

- **Social Practice Theory:** Social practice theory complement LCA by providing insights into how CSE initiatives influence citizens' social practices and behaviors.
  - **It is here we understand how participation in CSE initiatives affects consumption patterns, waste generation, transportation choices, and other aspects of everyday life.**

Why Life Cycle Assessment (LCA)?

Life cycle perspective: Applying a focus on the **embedded** environmental impacts in a product or material =>
LCA: Assessment of environmental impacts of a product, process, or service throughout its entire life cycle.

This assessment considers all stages of a product's life, from raw material extraction and processing through manufacturing, distribution, use, repair , and end-of-life handling in terms of reuse. disposal or recycling.

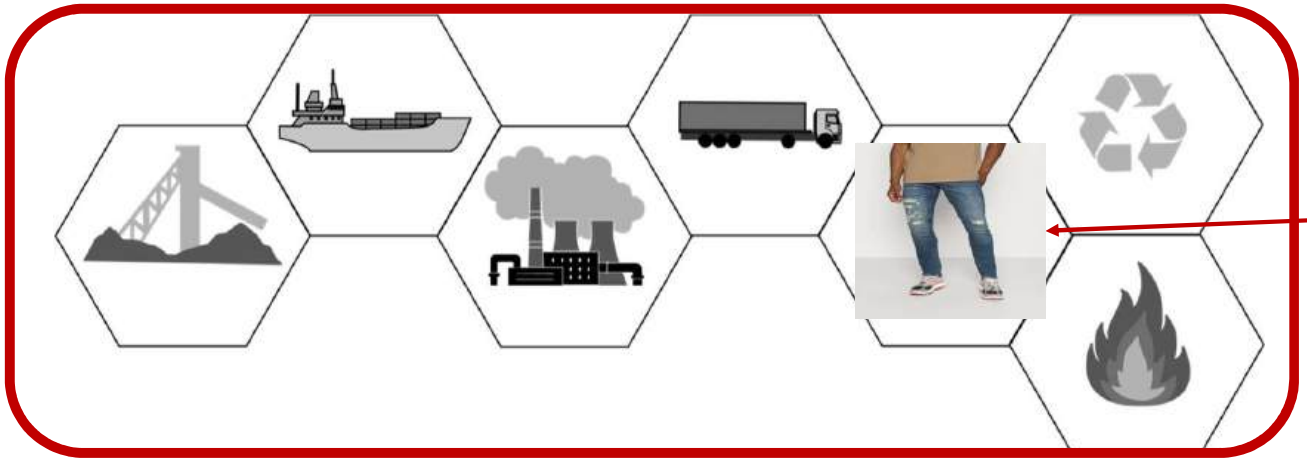


Different environmental strategies:
Point source => product => life cycle (=> size of consumption)

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If those jeans are repaired, we assume they substitute procurement of a new pair of jeans

Different environmental strategies:
Point source => product => life cycle => size of consumption

Overall approach to the environmental assessments

- **What** is changing?
- For **how many** persons and/or for how big amount (kilos, pieces) of products?

- **Why** is the change happening?
- **How** was it made possible?

Topics and data in focus in the environmental assessments

- Product and material flows
  - Products being reused, repaired and recycled.
  - Products/materials/tools being used throughout the initiatives.
- Operational data
  - What mechanisms makes the initiatives work?
  - Number of visitors, employees and other relevant beneficiaries.
- Waste related data
  - Current disposal knowledge and practices.
  - Waste management operations.
- Infrastructure and facilities for the initiative
  - What infrastructure sustains the service of the initiative?
  - Which physical places are required for the initiatives to be successful?
- Transportation
  - How are the products/material being transported?
  - How are the beneficiaries (visitors, employees etc.) being transported? What are their transportation practices?
- Social Practice Data
  - What practices are involved?
  - How are they changing as part of the initiative?
  - How are they interlinked?

Case: Nomales in Latvia

- Local hub for the reuse of construction materials and selected household items.
- A second – more accessible – exchange point at **Vietalvas iela 5** within a waste sorting facility in Riga (March 2025).

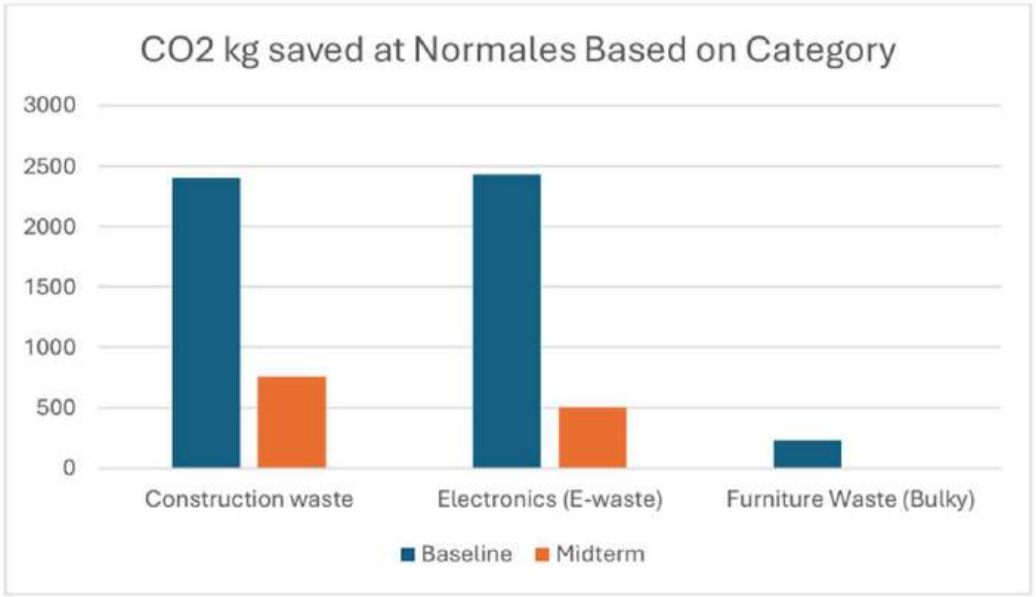


Figure 31: CO_2 kg saved at Normales

Calculating environmental benefits of reuse

Waste stream*	**Sum of weight (kg)****	**CO_2 – footprint per Kg. according to ***	**Total sum of CO_2 footprint (kg)**
Construction waste	8218,5	0,292	2399,802
Electronics (E-waste)	184,2	13,2	2431,44
Furniture Waste (Bulky)	285,95	0,802	229,3319
Total	8688,65	-	5060,5739

* Numbers and waste stream categorization; source: Executive summary of waste analysis by Metabolic, n.d.

** Source: Nomales24_with_classification (excel sheet), n.d.

Table 7: Baseline CO_2 Impact of Normales

Case: Repair Cafés in Denmark

- Four case cafés: **Valby, Sydhavn, Frederiksberg, Østerbro**
- Material for midterm: Interviews and participant observation, material flow tracking

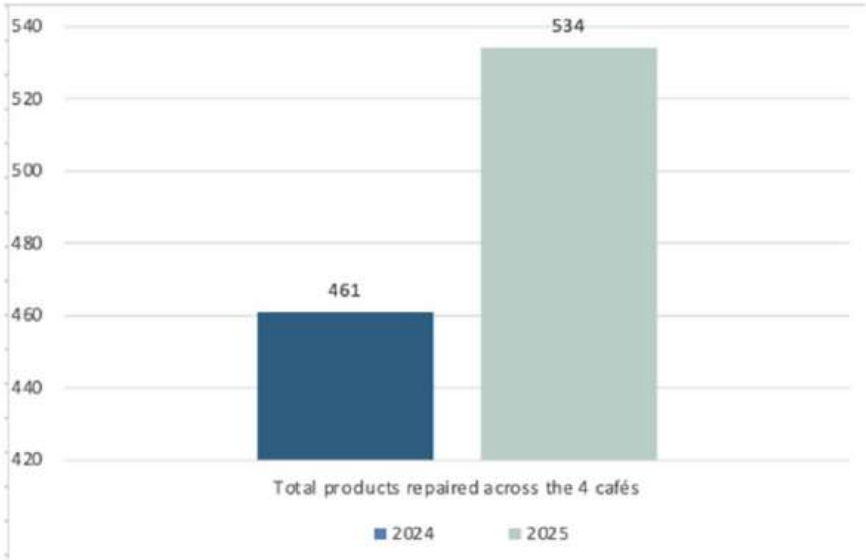


Figure 28: Total repairs across the 4 repair cafés (2024 vs. 2025)

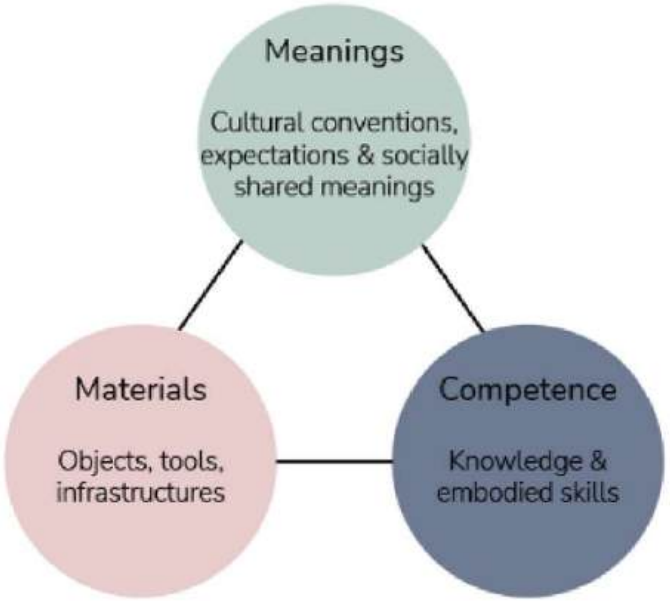
Elements of a practice

Shove et al. (2012) present a three elements emphasize the components of a practice: materials, competence, and meanings.

Meanings: cultural conventions, expectations, and socially shared meanings constitute the element of meanings.

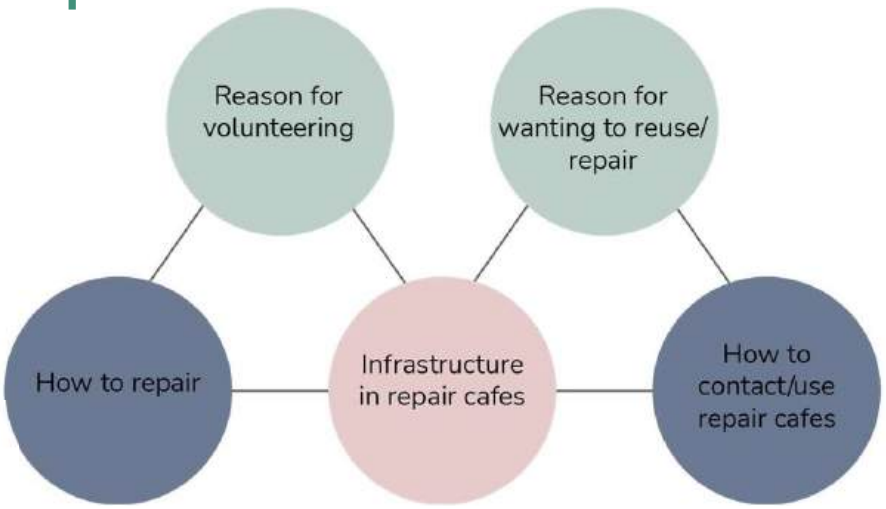
Materials: objects, tools, and infrastructures constitute the element of materials.

Competencies: knowledge and embodied skills constitute the element of competence.

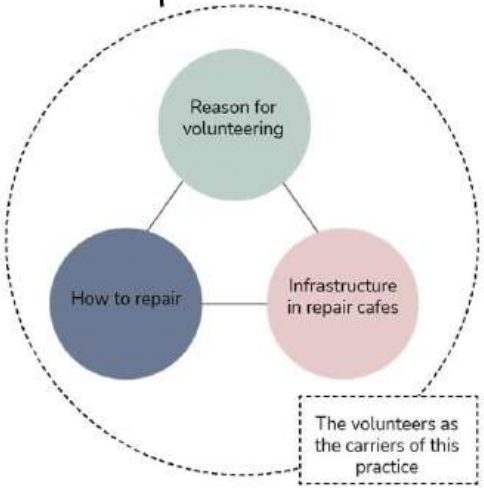


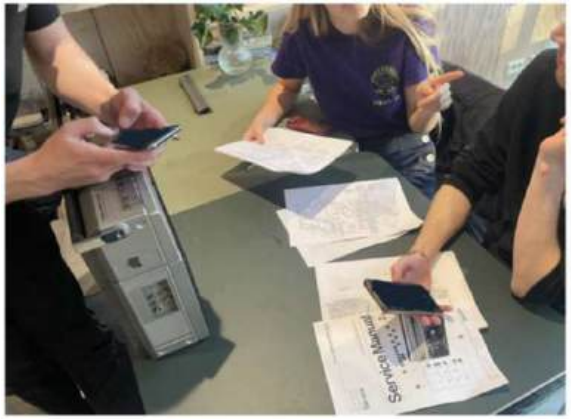
Example with Repair Cafes

Different carriers of the practices

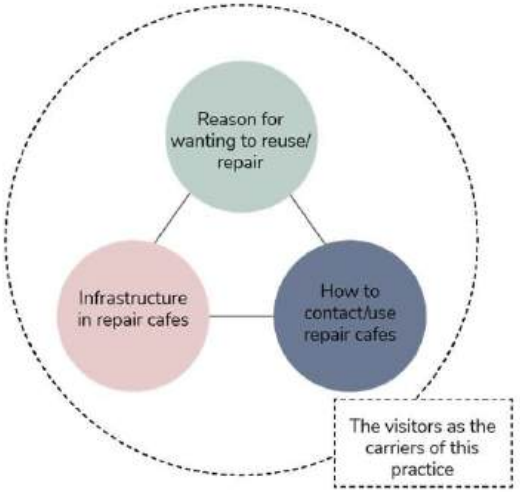


The practice of repairing products



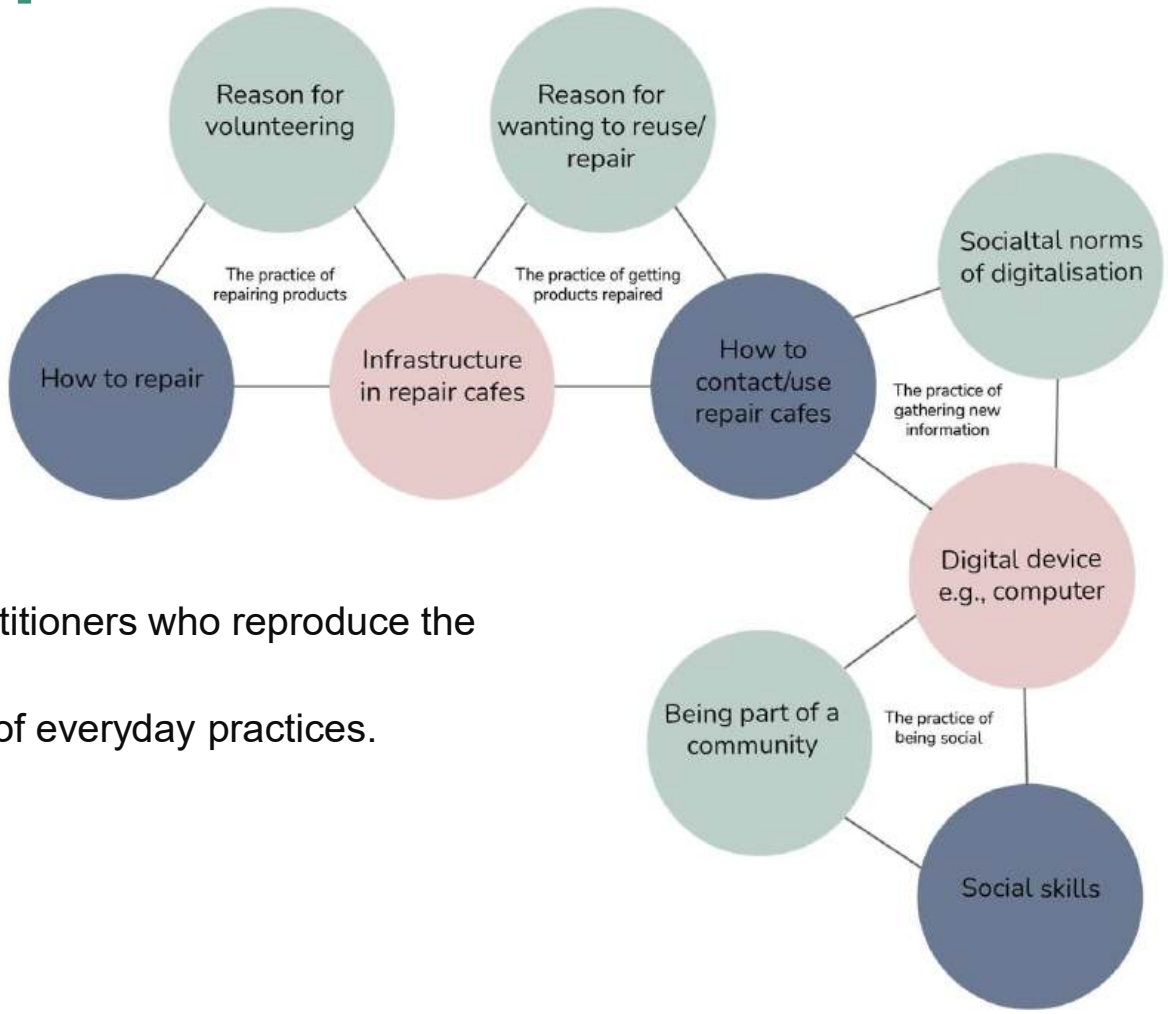


The practice of getting products repaired



Supplementary

Example with Repair Cafes



The emphasis is on the actions of practitioners who reproduce the practices in which they engage.

The practices are inter-linked in bundles of everyday practices.

Data collection methods (1)

In-depth interviews (data collection through instructed, semi-structured interviews conducted with stakeholders in all 4 countries)

Participant observation (data collection through research notes from the collaborative research process)

Participatory workshops (data collection through research notes from the participatory workshops)

Measurements of goods/material flows for environmental impact assessment

Data collection methods (2)

Life Cycle Inventory (LCI) Data Collection: For the LCA component, data on resource use, emissions, and waste generation can be collected through databases, literature reviews, and expert consultation.

Mapping Resource Flows: Mapping resource flows within the local hubs. This involves tracing the movement of products and materials from extraction and production to consumption and disposal/recycling.

Secondary Data Analysis: Secondary data sources, such as government statistics, industry reports, and academic literature, can provide additional context and background information on societal trends, infrastructure, and policy frameworks relevant to the CSE initiatives.

Environmental assessments of initiatives during the TransScale project

Time perspective: A minimum of 2 weeks pr. assessment (baseline, midterm and final) must be used to collect the (same) data. The collection period will make it possible to compare the three assessments within each initiative over time → important to be consistent in methodology

Baseline Assessment: Map baseline resource flows and conduct interviews to identify current social practices and environmental impacts in different hubs.

Midterm Assessment: Map midterm resource flows and identify changes in social practices through interviews and surveys to assess environmental potentials and challenges.

Final Assessment: Map changes from baseline and midterm, and identify future environmental potentials from scaling CSE initiatives, coordinating with policy analyses to understand broader implications.

QUESTIONS/DATA

DATA TYPE	QUESTIONS
Product/material flow	What are the specifications (composition, dimensions, packaging) of products and materials sold or reused within the initiative? What are the quantities of products sold and materials used at the initiatives over a specific period? How many items and materials are diverted from public recycling centers to the shops over a specific period? What are the quantities and types of waste generated and what disposal methods are used (recycling, landfill, etc.)? What are the details on the packaging materials and storage containers used in initiatives?
Operational data	What is the energy and water consumption within the operations? What are the details of the operational setup, including opening hours, number of visitors, and service rates? What energy sources are used for lighting, heating, and other resources (e.g. water) within the shops and units? What are the details of unit operations, including inventory management and storage capacity? What is the volume and types of beneficiaries using the initiatives. What collaborations exist with private operators for refurbishment, wasted, stock-up and/or other operations?
Waste	What are the current disposal methods for waste generated at and by the initiatives? What is the quantitative data on the amount and types of waste at various stages of the supply chain (production, distribution, consumption)? What are the waste management practices in place, such as waste collection frequency and separation initiatives? What data exist on past waste management projects and flows?

DATA TYPE	QUESTIONS
Infrastructure/building	What are the details of infrastructure in shopping centers and warehouses, including whether it was built or refurbished for the purpose, and what building materials, construction methods, and maintenance practices were used? What ongoing maintenance or expansion is needed for the infrastructure? What are the refurbishment details of market infrastructure, including building materials, construction methods, and maintenance practices? What are the details of the infrastructure supporting food sharing units, including facilities for food storage, distribution, and collection? What is the availability and accessibility of infrastructure resources (e.g., refrigeration facilities, transportation networks)?
Transportation	What transportation modes are used by vendors and visitors to access the initiatives? What transportation distances and modes are used for product deliveries to the initiatives? What are the transportation distances and modes used for transporting employees? What transportation modes and distances are used by visitors to access the initiatives?
Social Practice Data **(apart from what is already gathered in WP2)**	What are the purchasing behaviors, preferences, and attitudes toward sustainability among visitors and vendors? What are the purchasing behaviors, preferences, and attitudes toward reuse among visitors and participants? What (if any) feedback and engagement metrics are related to initiatives promoting circular economy principles? What (if any) feedback and engagement metrics are related to community engagement?

Social Practice Theory:
Practice-as-Performance vs. Practice-as-Entity

Social Practice Theory talks about an analytical distinction between practice-as-performance and practice-as-entity.

Practice-as-performance could include the actions of citizens engaging in repair centers or sharing resource centers (can be observed)

Practice-as-entity includes the broader cultural and infrastructural context that supports these behaviors (need interviews and analytical inference)

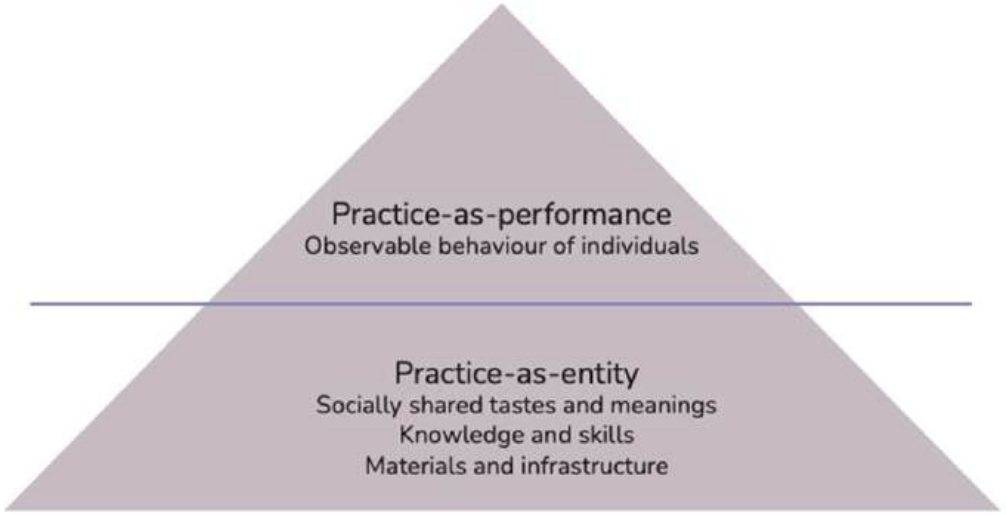


Figure: Practice-as-performance vs. Practice-as-entity