Top Research Questions for Empirical Studies in Visualization

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MY #1 QUESTION:

WHICH VISUALIZATION VALUES SHOULD EMPIRICAL STUDIES TARGET?

COMMONLY TARGETED VALUES

- Efficiency
  - Time to x…
  - Memorability
- Effectiveness
  - Correctness of answers / decisions
  - Knowledge / insights gained
- Subjective metrics
  - Usefulness
  - Usability
  - Satisfaction
  - Preference
  - Confidence in answers / decisions

DATA PHYSICALIZATIONS

“A data physicalisation (or simply physicalization) is a physical artifact whose geometry or material properties encode data”

Yvonne Jansen, Pierre Dragicevic, Petra Isenberg, Jason Alexander, Abhijit Karnik, Johan Kildal, Sriram Subramanian, Kasper Hornbæk. **Opportunities and Challenges for Data Physicalization**. CHI 2015 - Proceedings of the SIGCHI Conference on Human Factors in Computing Systems. ACM, 2015.

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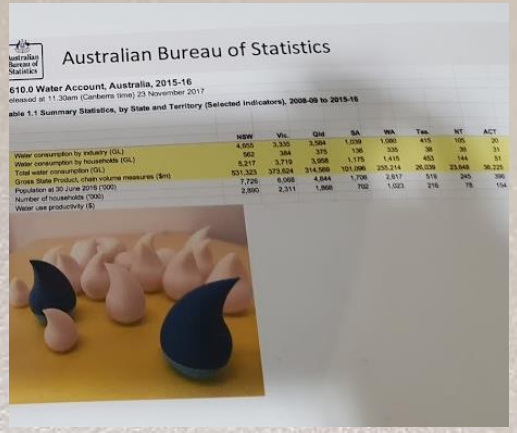

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Self-Reflection and Personal Physicalization Construction

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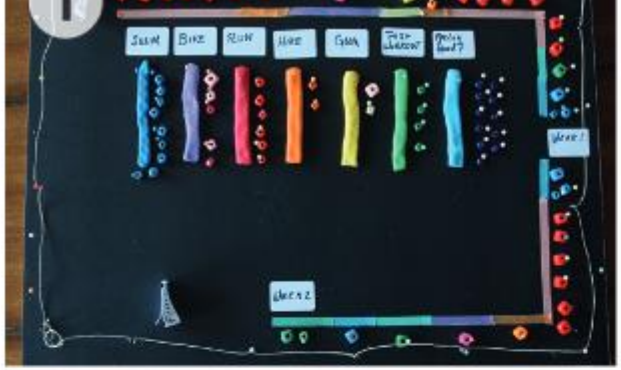
ABSTRACT
Self-reflection is a central goal of personal informatics systems, and constructing visualizations from physical tokens has been found to help people reflect on data. However, so far, constructive physicalization has only been studied in lab environments with provided datasets. Our qualitative study investigates the construction of personal physicalizations in people's domestic environments over 2–4 weeks. It contributes an understanding of (1) the process of creating personal physicalizations, (2) the types of personal insights facilitated, (3) the integration of self-reflection in the physicalization process, and (4) its benefits and challenges for self-reflection. We found that in constructive personal physicalization, data collection, construction and self-reflections are deeply intertwined. This extends previous models of visualization creation and data-driven self-reflection. We outline how benefits such as reflection through manual construction, personalization, and presence in everyday life can be transferred to a wider set of digital and physical systems.

ACM Classification Keywords
H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous
Author Keywords
Self-Reflection; Constructive Visualization; Personal Data

INTRODUCTION
"Active, persistent, and careful consideration of any be-

foster reflection. But even millennia before these research fields existed, people have created and reflected on physical representations of data (i.e., *physicalizations* [28]; see [15]), to track, for example, menstrual cycles [52], or personal accomplishments [20]. The manual construction of personal visualizations using simple physical building blocks persists until today (e.g., Hunger's Lego time tracking physicalization [23]). The constructive visualization paradigm [25] is promising for supporting self-reflection as it fosters active engagement with the data and draws on simple and familiar actions and materials [25], rather than requiring learning and navigating interface components [51]. However, so far, the manual construction of visualizations has not been studied in a personal context. Previous empirical studies were conducted in lab environments with test datasets.

To address this gap, we have investigated how people manually construct physicalizations of their own data and within their personal environment over a 2–4 week period. Our main goal is to gain an in-depth understanding of how constructive physicalization approaches are applied in personal contexts. Our analysis reveals details about how people approached the creation of their physicalizations and suggests that this process allows for personal reflections that are deeply intertwined with the manual construction. From this first exploration of physicalization construction in a personal context, we contribute (1)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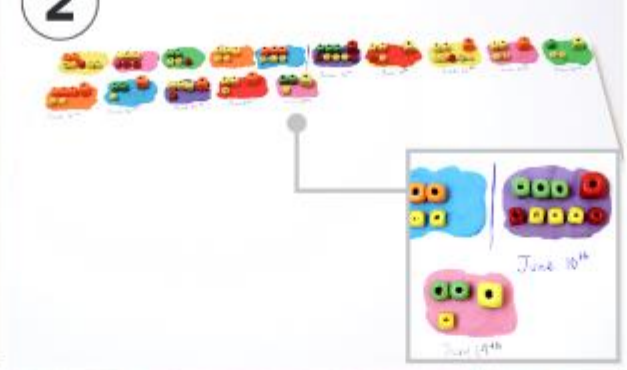
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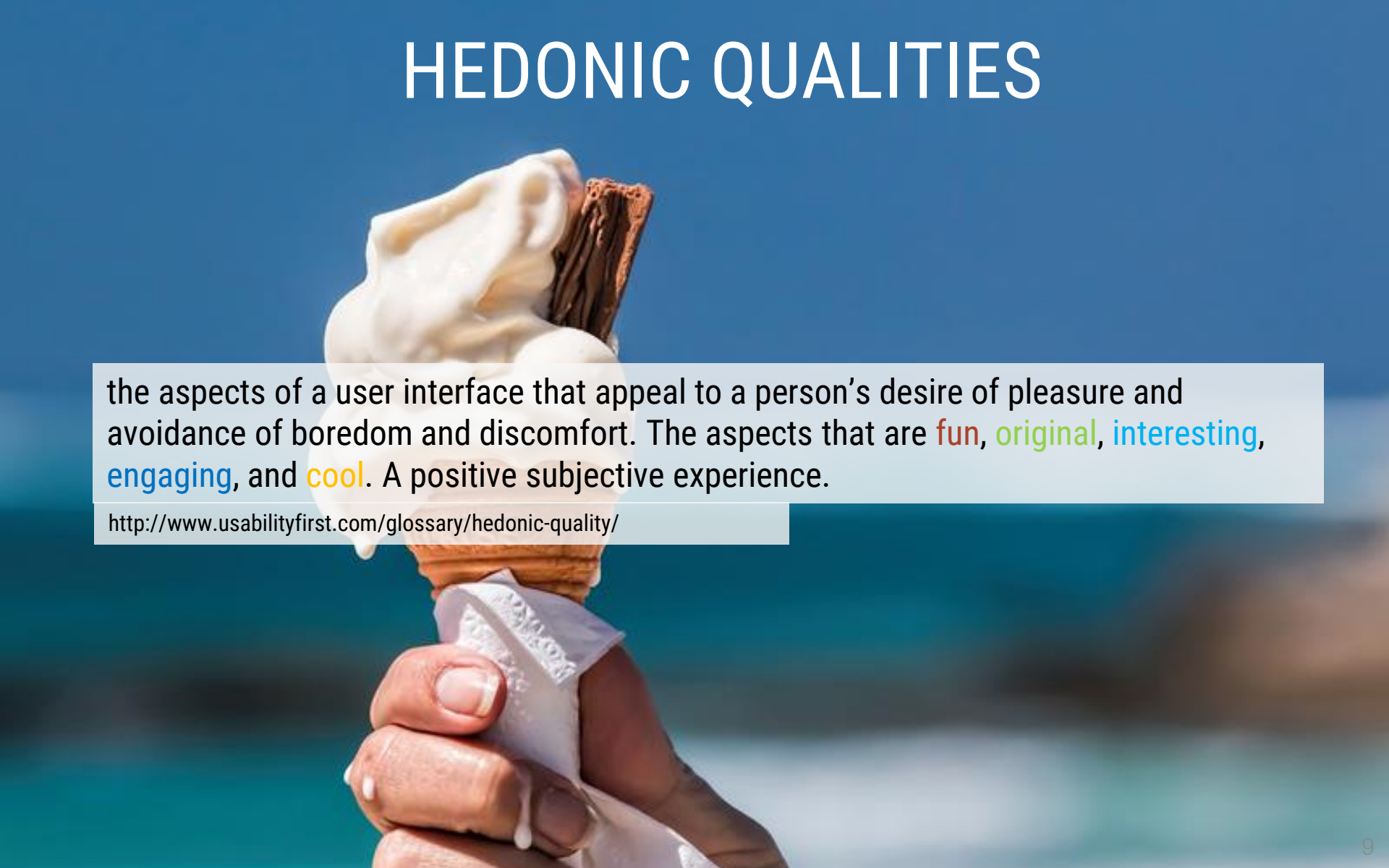
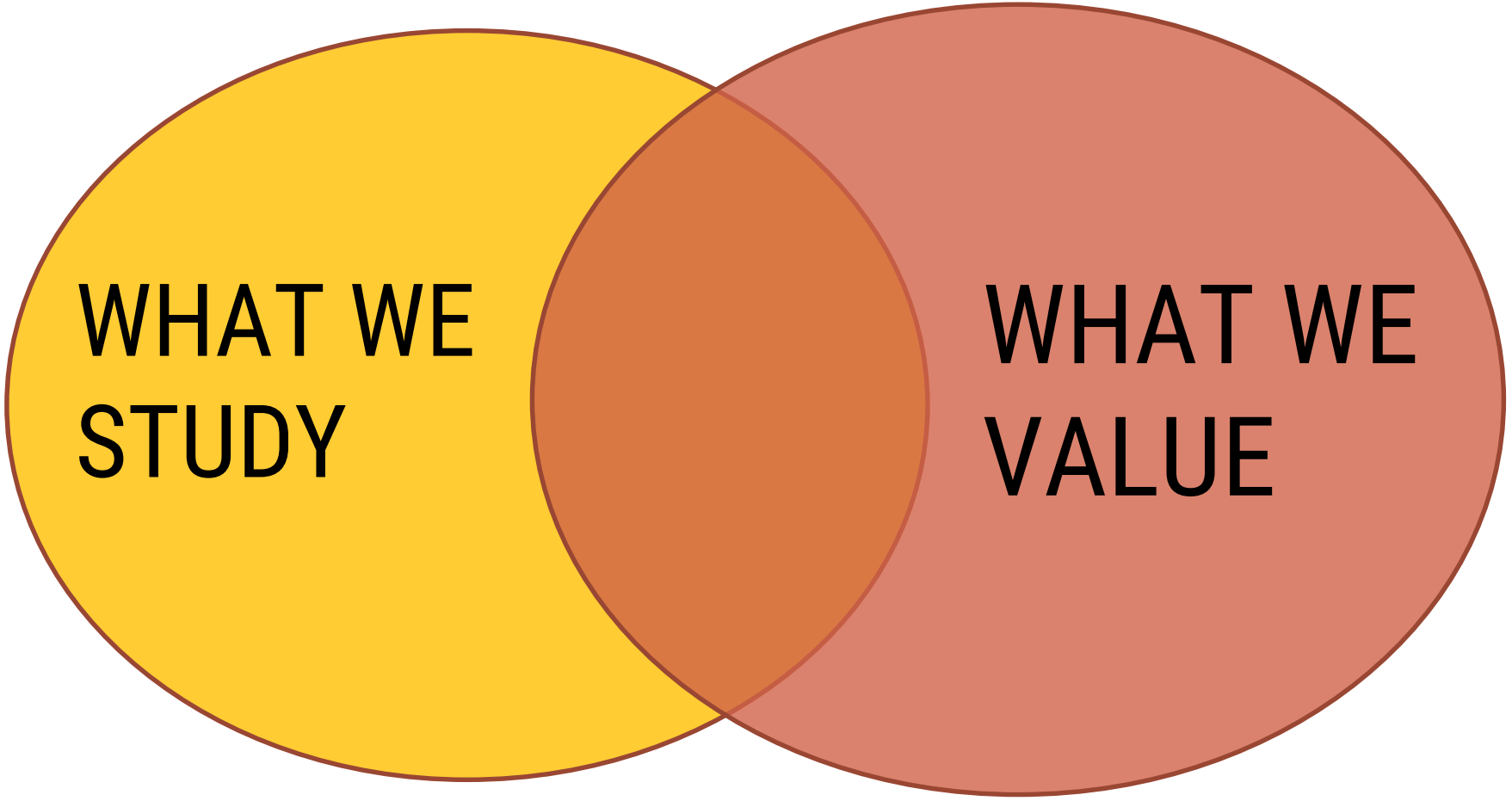
HEDONIC QUALITIES



the aspects of a user interface that appeal to a person's desire of pleasure and avoidance of boredom and discomfort. The aspects that are fun, original, interesting, engaging, and cool. A positive subjective experience.

http://www.usabilityfirst.com/glossary/hedonic-quality/

HOW DO WE PLACE VALUE ON DATA REPRESENTATIONS THAT ENGAGE PEOPLE ON A PHYSICAL AND EMOTIONAL LEVEL?


WHAT WE STUDY
WHAT WE VALUE

WE NEED BROADER UNDERSTANDING OF VISUALIZATION VALUE

USABILITY STUDY

USER STUDY

CONTROLLED EXPERIMENT

ETHNOGRAPHIC OBSERVATION

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WE NEED TO (STILL) WORK ON ACCEPTED METHODS TO RECORD & COMMUNICATE BROADER VALUE