Aalto University
School of Engineering

Towards Sustainable Knowledge Ecosystem with Open Data, Co – creation and User Empowerment

SUSTAINABLE BUILDING CONFERENCE 2013 SB13 Graz

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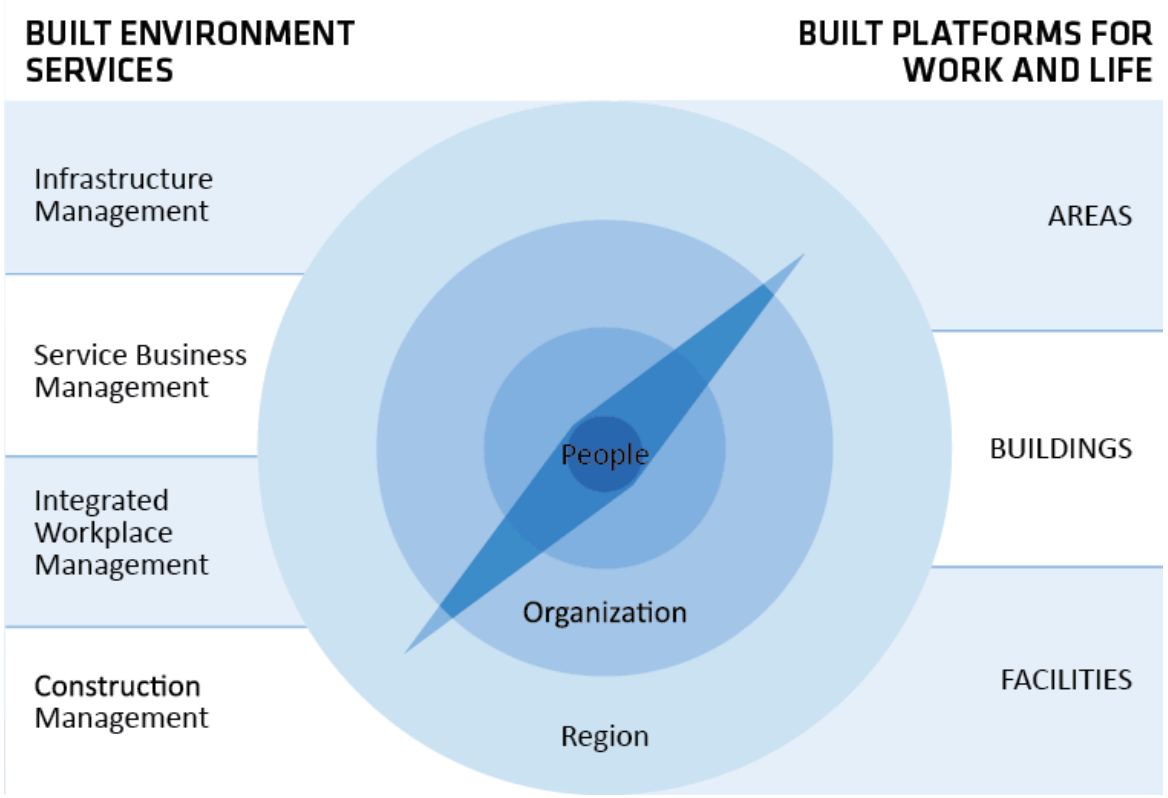
BES Research Group



- Build Environment Services
- Specializes in construction and real estate services business research.
- The focus is on the business relations between companies, workplace management, construction and real estate practices, life cycle and environmental management.
- Characterized by its interdisciplinary, close cooperation with business, domestically and internationally networked operations, as well as work-based dissertation research.
- The group has started its operations in the early 2000s by the senior researchers and now the scientific community connects about 15 researchers.

Agenda

- Purpose of the paper
- Knowledge creation
- User experience
- Data description
- Methods
- Case studies
- Results
- Conclusions

Purpose

Is to understand

- ✓ How the creation of meanings and knowledge can be supported

and

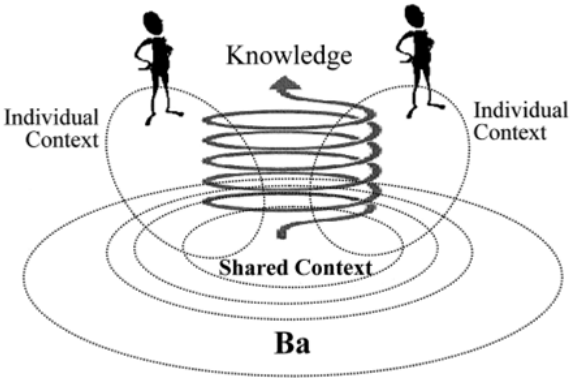
- ✓ what kind of services a city can develop for the users to support their environmental friendly decision making processes and behaviour

Knowledge creation

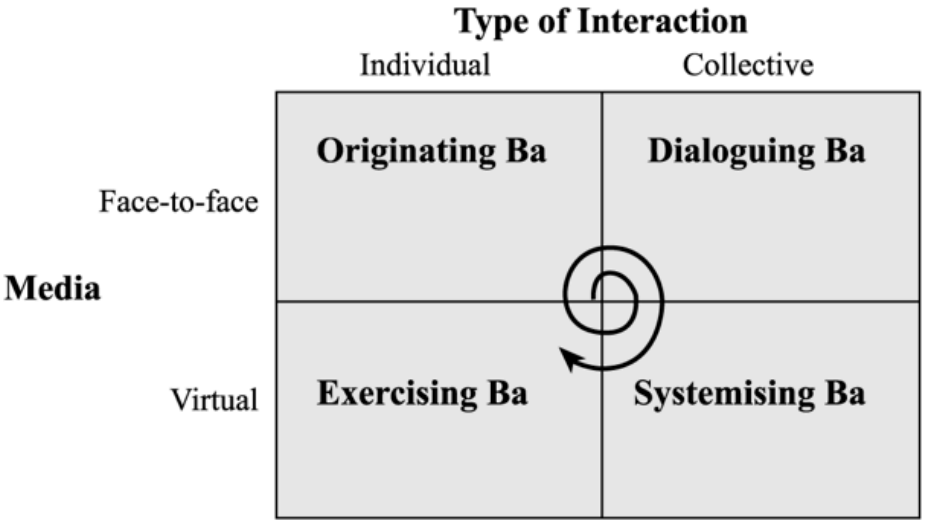
1. It is a process from tacit knowledge to explicit knowledge

2. It requires physical, social/mental and/or virtual ba

- Ba is a place where knowledge is shared



Nonaka, Toyama, & Konno, 2000, p. 14



Nonaka, Toyama, & Konno, 2000, p. 16

Data description

Two practical case studies are described by using document analysis, observations and focus group interviews. They demonstrate how public sector can through open collaboration provide the knowledge and power needed for sustainable user decisions.

One case study is representing the virtual interface for sustainable local energy system design, where traditionally separated information is gathered to one database.

The other one is a physical place, Urban Mill, for knowledge creation, which aims to provide a common platform for different stakeholders of local ecosystem. This co-working place offers a platform for city officials and researchers to co-create sustainable innovations.

Methods

Data was gathered by document analysis including

a) Blueprints
b) Documentation of the design phases
c) Administrational documents.

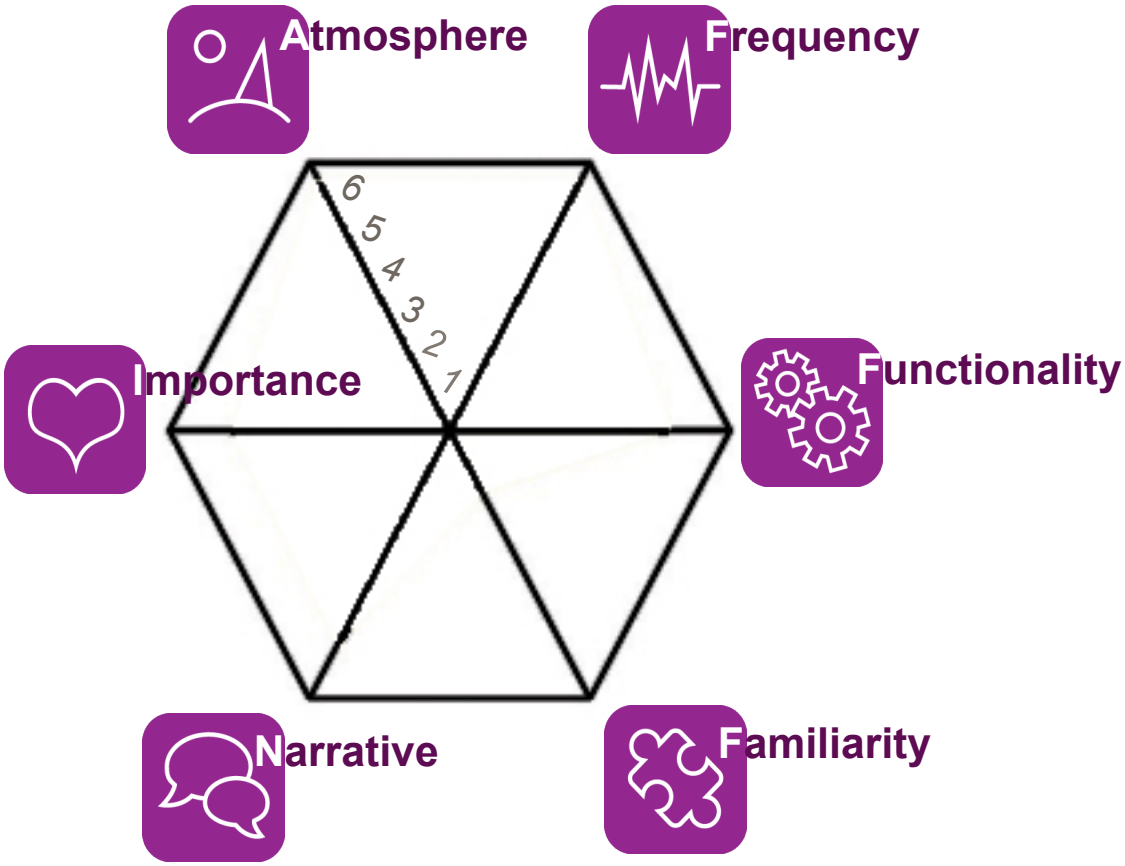
The goal of document analysis was creation of pre-understanding of the cases.

Additionally the data was gathered by interviewing both the people involved in the development of knowledge sharing venues and the users of the venues. The goal of this data gathering was to get user experiences connected to the venues. Data was also collected in combination with demonstration and use of the cases.

The data was analysed by using content analysis with predefined coding of six dimensions of user experience, Atmosphere, Frequency of time, Functionality, Familiarity, Narrativeness and Importance.

The framework is developed in order to investigate the user experience of places both in physical, virtual and social context.

Six dimensions of user experience.



Atmosphere

1 weak – 6 strong

Frequency of time

1 stable – 6 changing

Functionality

1 single use – 6 multi-use

Familiarity

1 difficult – 6 easy

Narrativeness

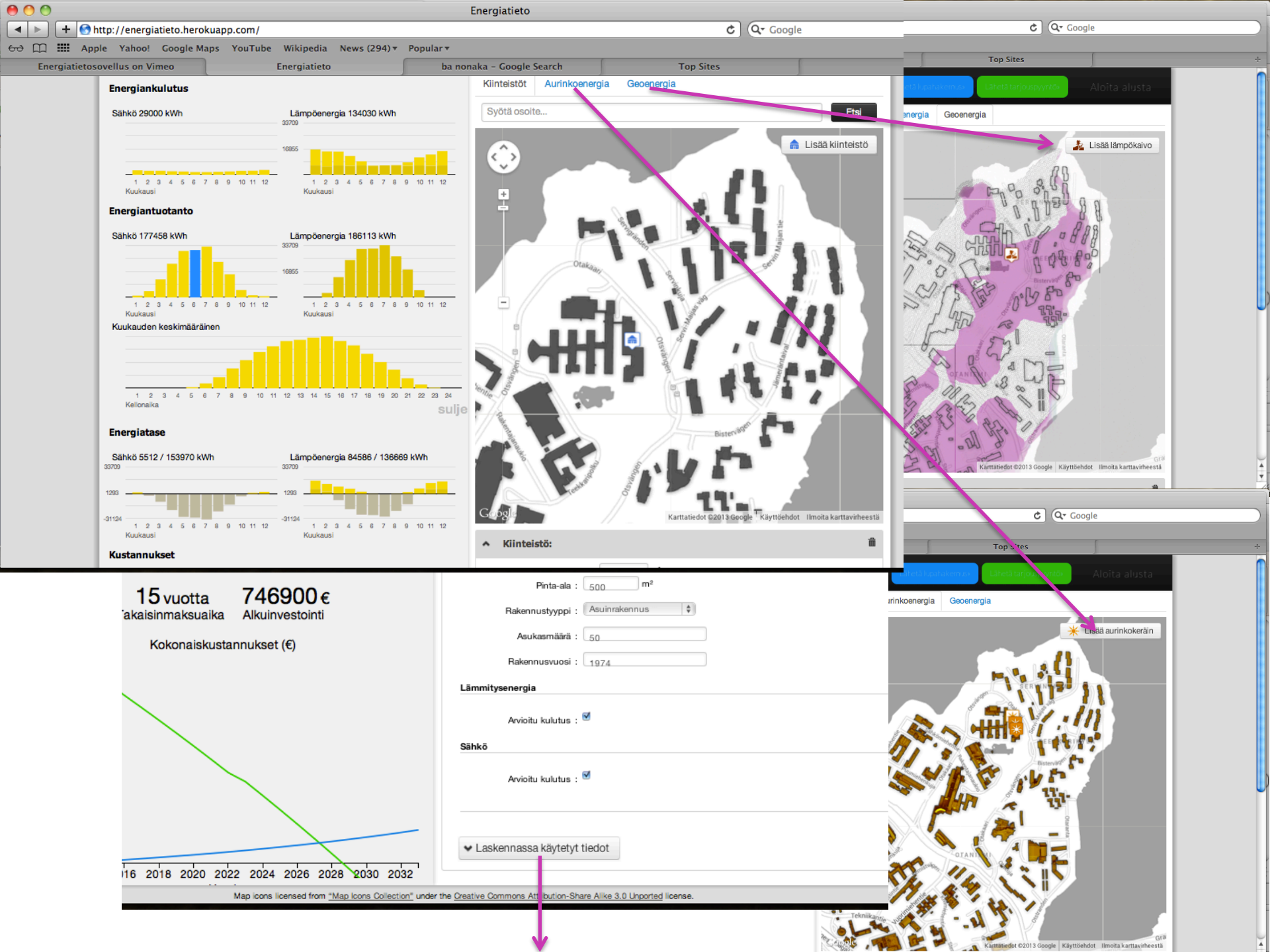
1 weak – 6 strong

Importance

1 non-memorable – 6 memorable

Case 1 Virtual BA

- The virtual interface for sustainable local energy system design
- Traditionally separated information is gathered to one database.
- The system aims to help users to have comprehensive facts in order to make their decisions concerning energy solutions.
- The integration of the geothermal map, the solar energy map and the weather data provides unique material.
- The virtual interface also contains a tool for estimating the hourly energy consumption of building stock.
- One intention is to demystify the planning of renewable energy by visualizing timing mismatch of energy production and consumption.
- The platform makes it possible to openly compare different solutions and to choose optimal solutions for energy production and consumption balancing.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Lämpöenergia 84586 / 136669 kWh
Kustannukset
Kiinteistöt
Aurinkoenergia
Geoenergia
Syötä osoite...
Etsi
Lisää kiinteistö
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Käyttöehdot
Ilmoita karttavirheestä
Kiinteistö:
Lisää lämpökaivo
Lisää aurinkokeräin
Aloita alusta
15 vuotta
Takaisinmaksuaika
746900 €
Alkuinvestointi
Kokonaiskustannukset (€)
2016 2018 2020 2022 2024 2026 2028 2030 2032
Pinta-ala : 500 m²
Rakennustyyppi : Asuinrakennus
Asukasmäärä : 50
Rakennusvuosi : 1974
Lämmitysenergia
Arvioitu kulutus :
Sähkö
Arvioitu kulutus :
Laskennassa käytetyt tiedot
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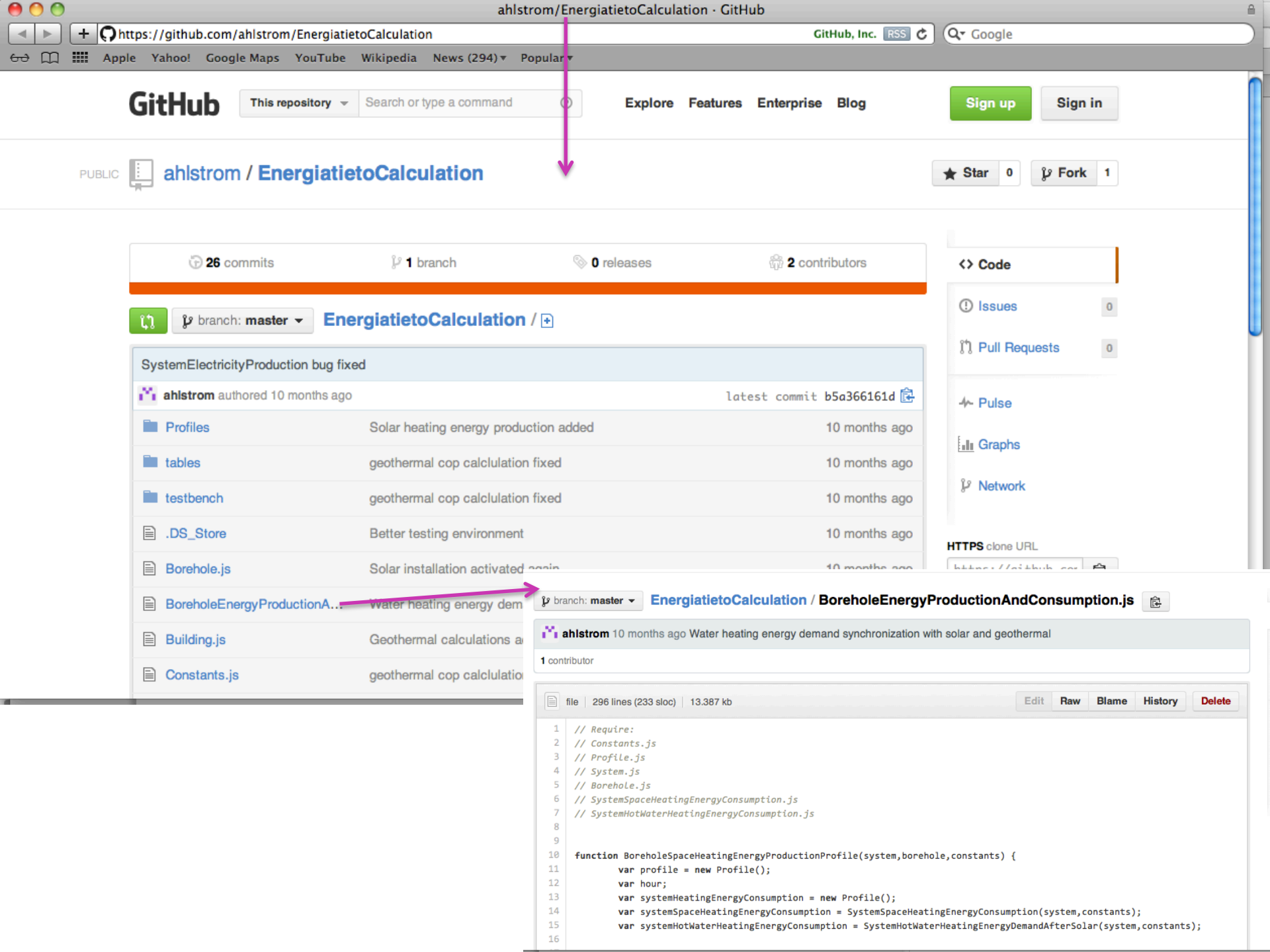
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Sign in
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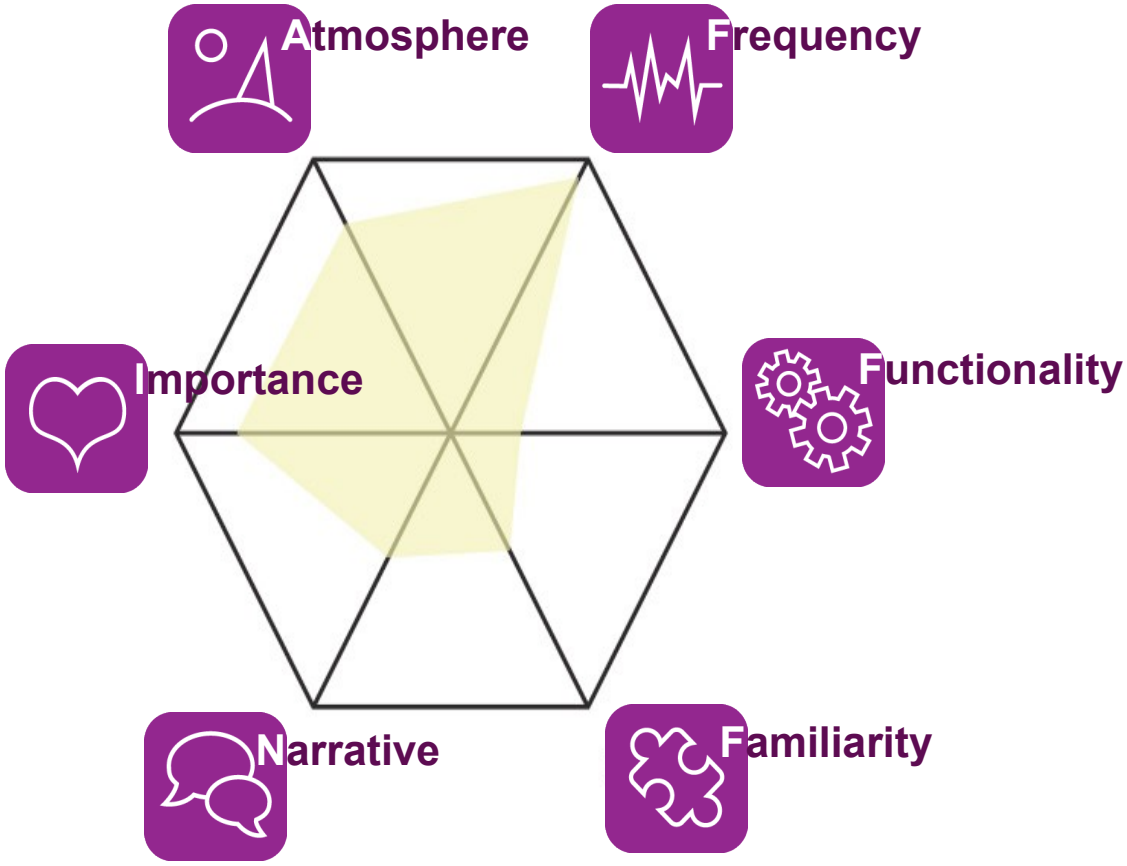
Star 0
Fork 1
26 commits
1 branch
0 releases
2 contributors
Code
Issues 0
Pull Requests 0
Pulse
Graphs
Network
HTTPS clone URL
branch: master
EnergiatietoCalculation /
SystemElectricityProduction bug fixed
ahlstrom authored 10 months ago
latest commit b5a366161d
Profiles Solar heating energy production added 10 months ago
tables geothermal cop calclulation fixed 10 months ago
testbench geothermal cop calclulation fixed 10 months ago
.DS_Store Better testing environment 10 months ago
Borehole.js Solar installation activated
BoreholeEnergyProductionA... Water heating energy dem
Building.js Geothermal calculations a
Constants.js geothermal cop calclulatio
branch: master
EnergiatietoCalculation / BoreholeEnergyProductionAndConsumption.js
ahlstrom 10 months ago Water heating energy demand synchronization with solar and geothermal
1 contributor
file 296 lines (233 sloc) 13.387 kb
Edit Raw Blame History Delete
1 // Require:
2 // Constants.js
3 // Profile.js
4 // System.js
5 // Borehole.js
6 // SystemSpaceHeatingEnergyConsumption.js
7 // SystemHotWaterHeatingEnergyConsumption.js
8
9
10 function BoreholeSpaceHeatingEnergyProductionProfile(system,borehole,constants) {
11 var profile = new Profile();
12 var hour;
13 var systemHeatingEnergyConsumption = new Profile();
14 var systemSpaceHeatingEnergyConsumption = SystemSpaceHeatingEnergyConsumption(system,constants);
15 var systemHotWaterHeatingEnergyConsumption = SystemHotWaterHeatingEnergyDemandAfterSolar(system,constants);
16

Case 1 Virtual BA analysed



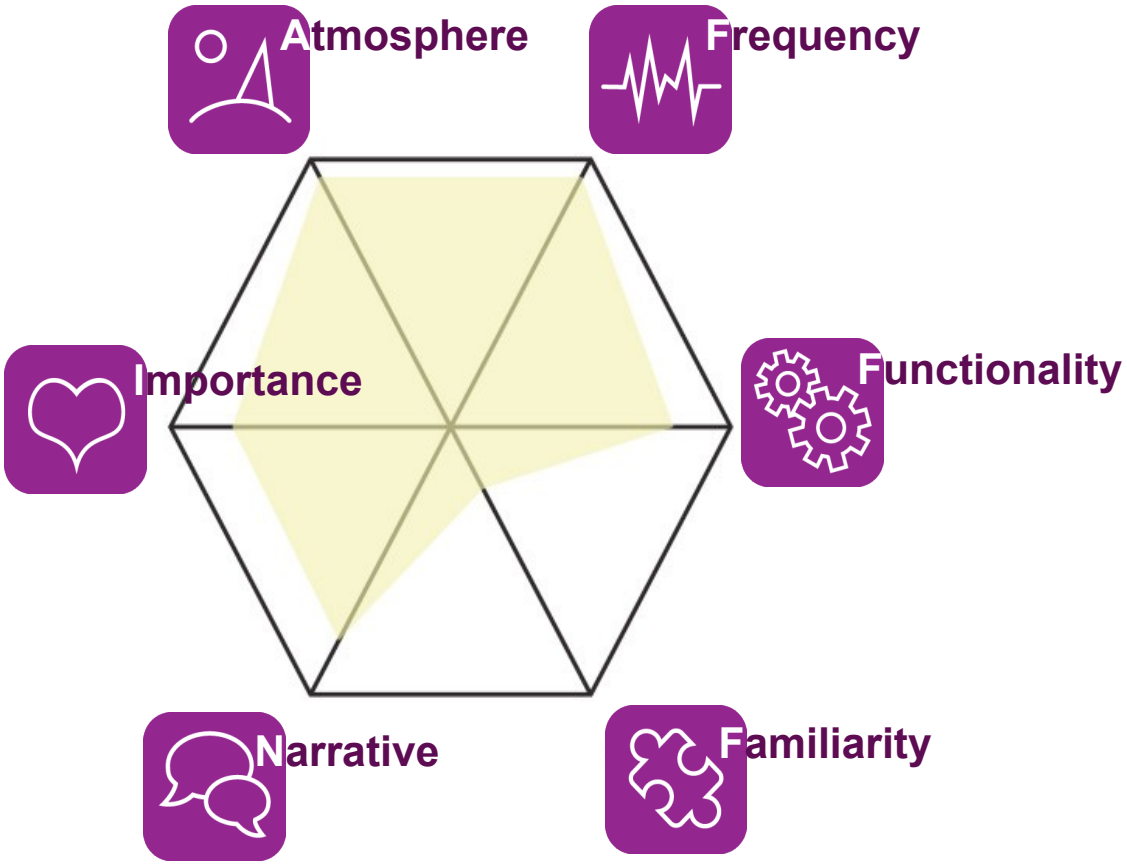
- Virtual platform is **significant** and important for users: it was experienced as memorable.
- It had strong **atmosphere** that was based on cognitive triggers
- The **frequency** and rhythm of use are changing while the content is changing.
- From the **functionality** point of view the virtual platform has a clearly defined use: energy system design.
- The virtual platform is lacking possibility to interaction.
- **Narrativeness** aspect is mostly lacking in the virtual platform, however the application prototype remembers the cached information so it forms a personal user continuum.
- Dimension of **familiarity** is low.

Case 2 Physical BA

- The physical place, Urban Mill is built up for knowledge creation,
- Common platform for different stakeholders of local ecosystem.
- The co-working place offers a platform for city officials and researchers to co-create sustainable innovations.
- It is a platform for open collaboration. There is no absolute control of the collaboration and no hierarchal leadership.
- It provides a concrete place, space and identity for the joint actions
- The space is flexible and can be transformed for different purposes. It defines itself more as a service than as a concrete facility.


active life
Metsä
Name: Anna
"There is no place like home"
ply
Aalto PRO – Ihmislähtöinen rakennettu ympäristö

Case 2 Physical BA analysed



- Urban Mill is **significant** and important for users: it were experienced as memorable.
- The **atmosphere** is strong: holistic sense-environment of partly rough space.
- Urban Mill is changing all the time and so is also its **frequency**.
- From the point of view of **functionality** dimension Urban Mill is offering a multiuse platform.
- From the **narrative** point of view, Urban Mill was an empty test laboratory. By branding the place step by step and filling the place with different activities e.g. by evolving student project growing in the psychical environment. The recycled furniture and dynamic atmosphere provides inspire both for an individual and collective memory.
- The **familiarity** is low

Results

To conclude the analysis:

- Importance reflects to proposition that the platforms are memorable – this strengthens the relationship between the platform and the user. It can be seen as a seed for the commitment and trust.
- Atmosphere is strong in both cases: one can consider if it has consequences for different types of users – the strong atmosphere is not self evidently positive or negative, but can exclude some user segments.
- The changing nature of the platform was one of the third common dimensional factors. The dynamics might has some effects to the willingness to commit to the platform – the changing nature can also be connected to the phase of platforms: they change due to the fact that the concepts are on their embryonic phase.
- Dimension of familiarity is low in both cases. The interview results indicated that the platforms were not easy to use. The familiarity can be developed by increasing the guidance and signs and care in both virtual and physical interfaces of co-creation platforms.

Conclusions

- The results indicate that the sustainable and environmental friendly behaviour can be supported with platforms, which provide positive user-experience, open data and social collaboration.
- In order to support sustainable behaviour the user centric approach is not only about designing sustainable solution but the more significant factor is to provide processes, which empower the users to make their own decisions.
- The comprehensive and shared knowledge is one of the most important elements of these processes.
- The empowering processes are the small initiatives towards sustainability strategies as the two case platforms indicated.


Have a good BA
Thank You!