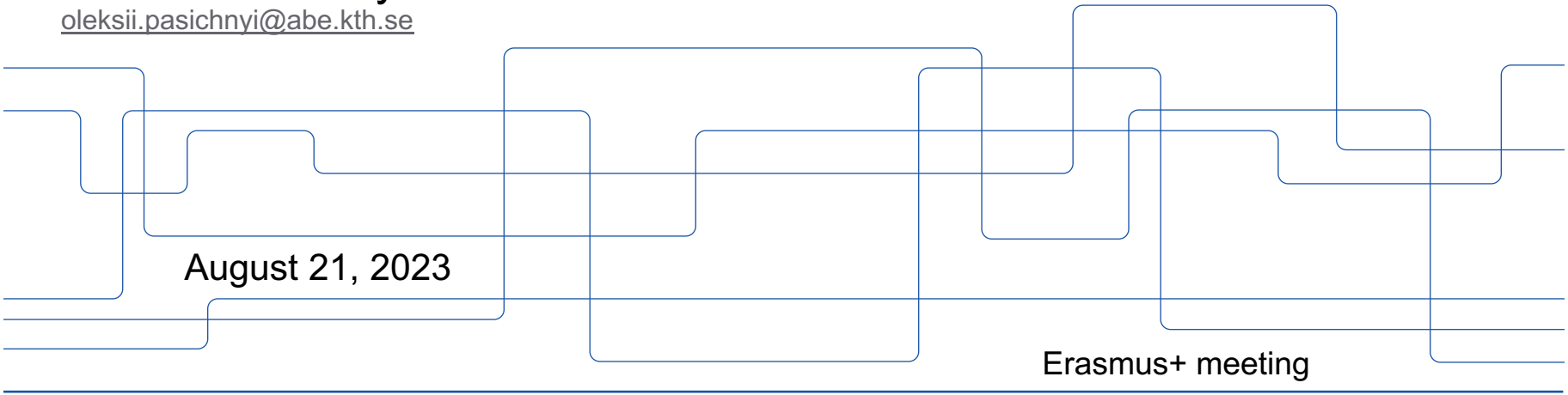
Innovation in education & research for smart sustainable cities

Oleksii Pasichnyi
oleksii.pasichnyi@abe.kth.se



August 21, 2023

Erasmus+ meeting

HELLO!

To foster sustainable urban transitions
through collaborative processes
informed by analytics and ICT

UrbanT

Urban Analytics
and Transitions

- applied mathematics
- sustainability indicators
- strategic planning
  for heating sector
- urban analytics

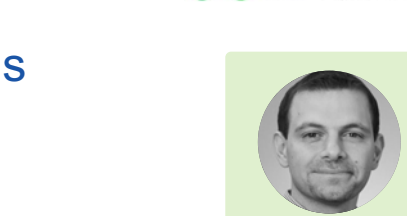
Stockholm

Kyiv

Mariupol'

Urban Analytics and Transitions

We foster sustainable urban transitions through collaborative processes informed by analytics and ICT


Hossein Shahrokni


Olga Kordas


Gabriella Dóci


Sacha Thibault


Oleksii Pasichnyi


Kateryna Pereverza


Olena Tatarchenko


New PhD student in participatory energy modelling to join in fall 2023

Division of Resources, Energy and Infrastructure /REI

Department of Sustainable Development, Environmental Sciences and Engineering /SEED

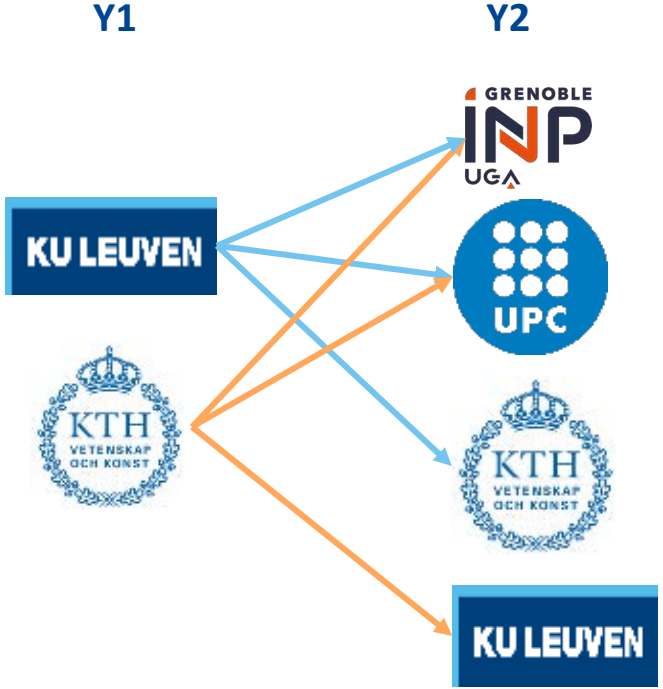
School of Architecture and Built Environment /ABE

Royal Institute of Technology /KTH

KIC InnoEnergy Joint MSc Programme “Energy for Smart Cities”


Olga Kordas


Olena Tatarchenko



Specialization

ICT and communication for Smart Grid and Smart Cities, Distributed Generation

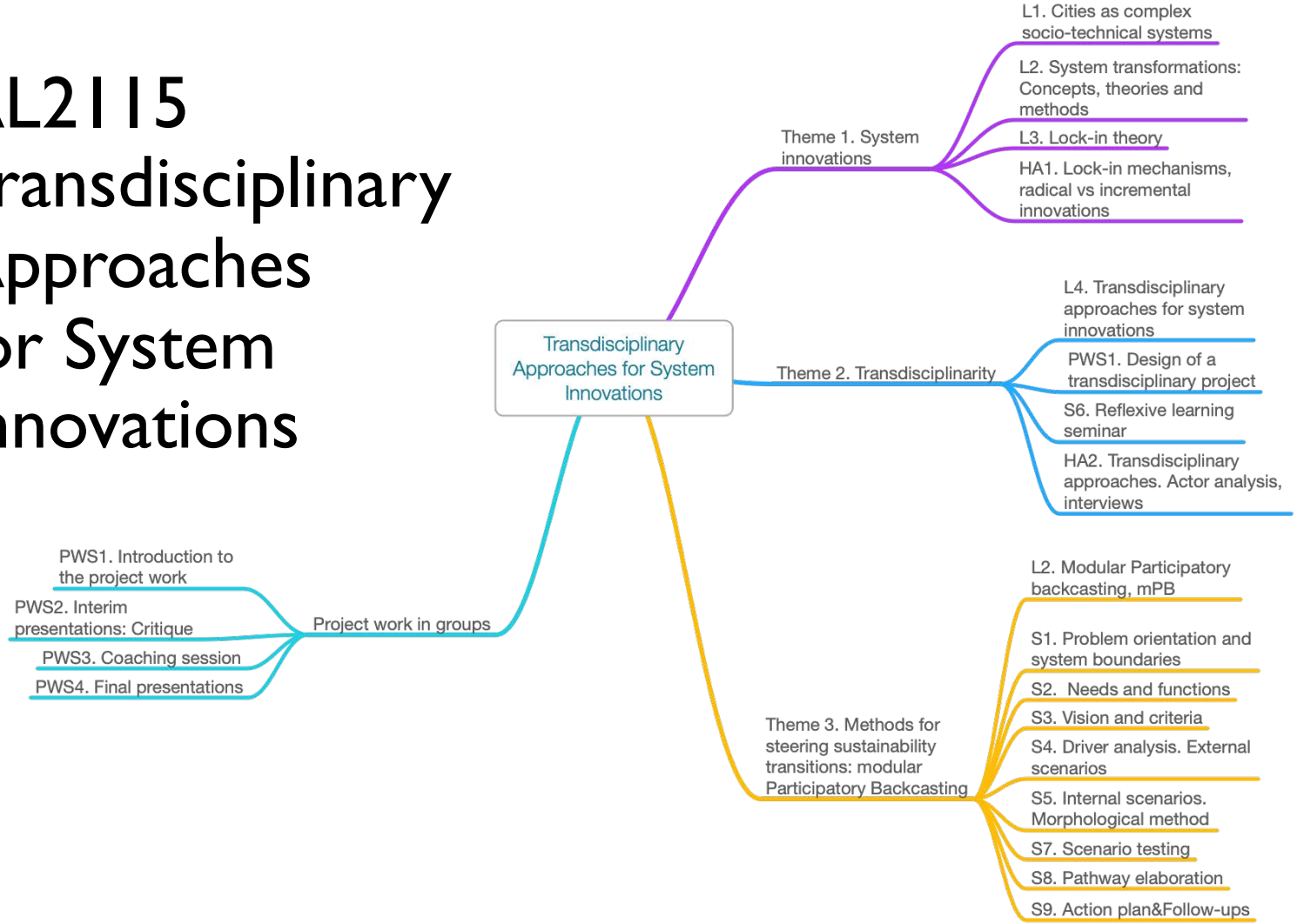
Control and Automation for the Efficient Use of Energy. Energy Efficiency in Buildings/Industry, Energy Management,Economics and Energy Markets

Energy, Urban Economics, Sustainable Development, Project Management and Business

Energy in the City Environment including buildings, transportation, smart distribution systems

AL2115 Transdisciplinary Approaches for System Innovations

Kateryna Pereverza

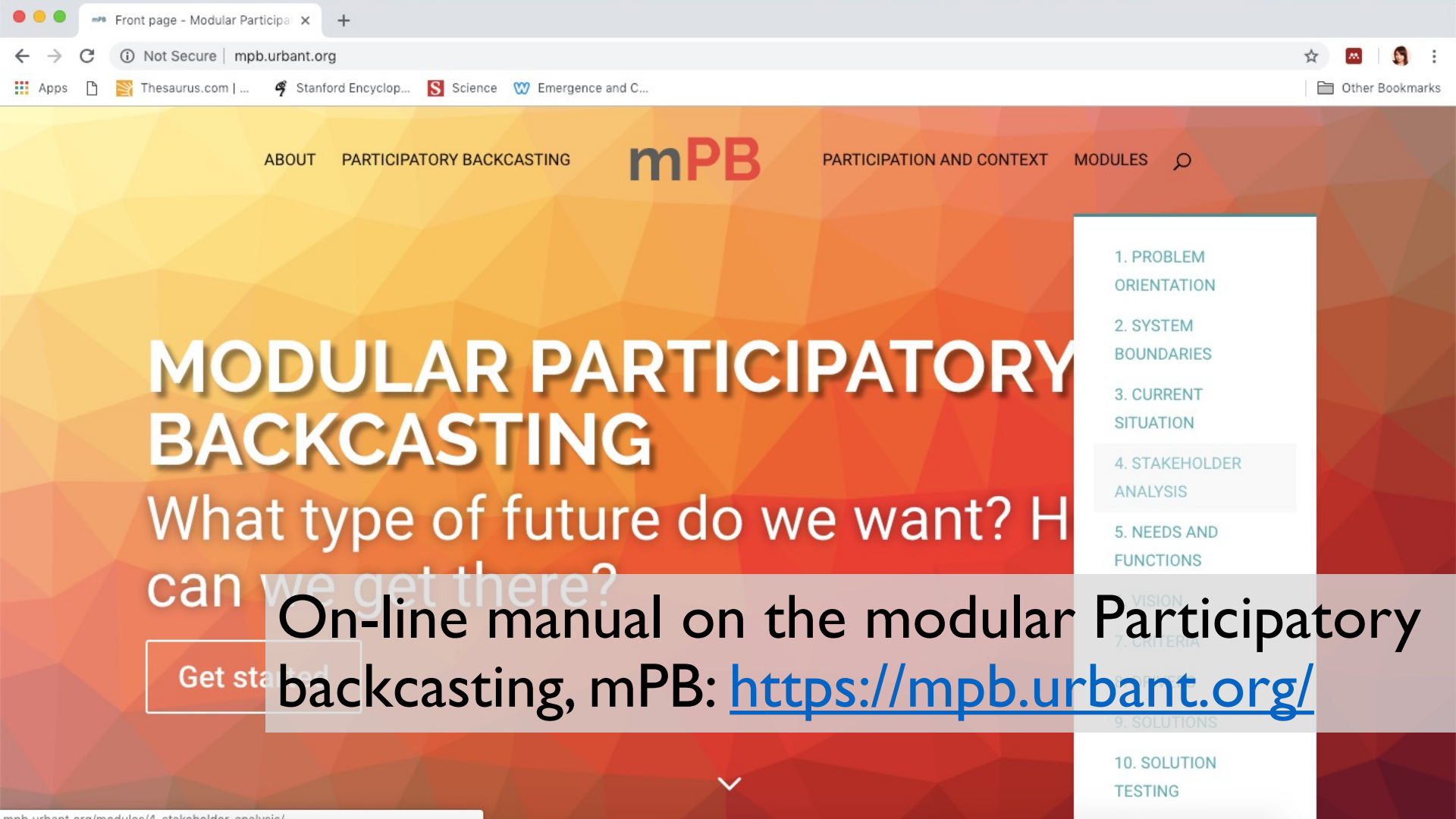


Transdisciplinary design

- Ensure reflexivity – add learning loops in the process!
- Learn from each other knowledge and capitalize on the diversity of backgrounds in your group when working on each module of the mPB.
- Design a socially robust strategy, by including knowledge and perspectives of various stakeholder groups.
- Ensure solving a societal problem and following the research method in your project.

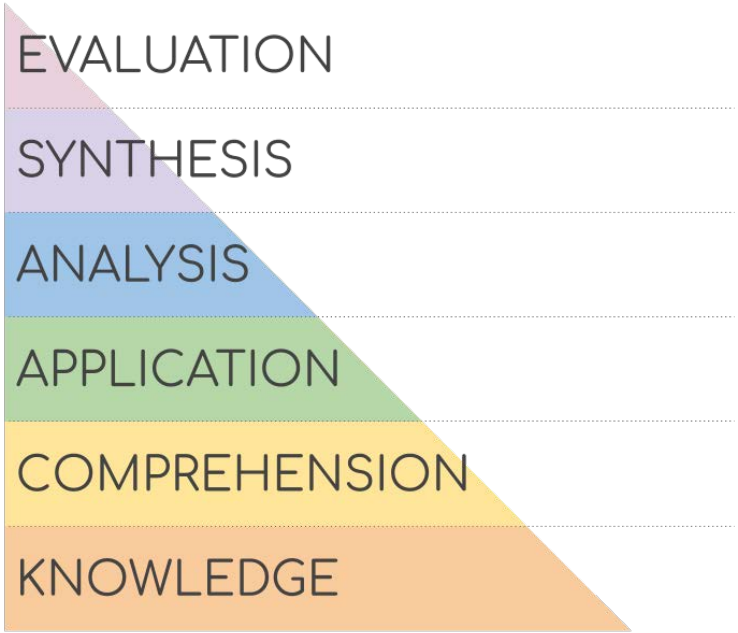
TOPIC OF THE PROJECT WORK IN 2022

LOW-CARBON TRANSITIONS IN SKELLEFTEÅ



On-line manual on the modular Participatory backcasting, mPB: https://mpb.urbant.org/

Some theoretical backgrounds



Bloom, B. S.; Engelhart, M. D.; Furst, E. J.; Hill, W. H.; Krathwohl, D. R. (1956). Taxonomy of educational objectives: The classification of educational goals. Vol. Handbook I: Cognitive domain. New York: David McKay Company.

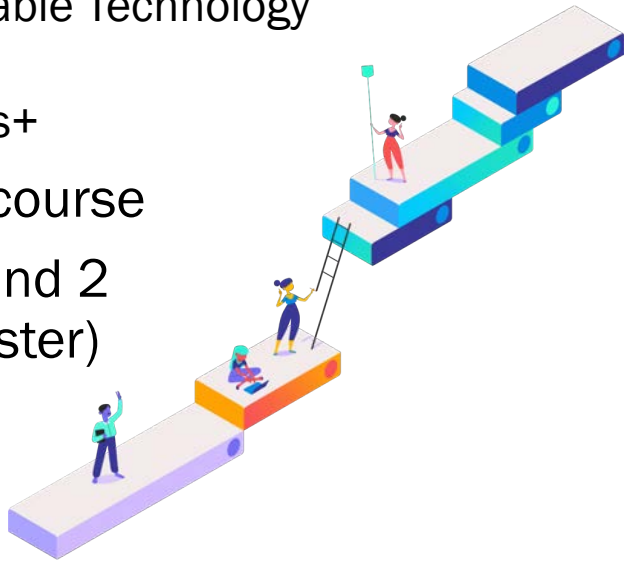
Biggs, John B.; Tang, Catherine Kim Chow (2011). Teaching for quality learning at university: what the student does. Maidenhead: McGraw-Hill. ISBN 9780335242757.

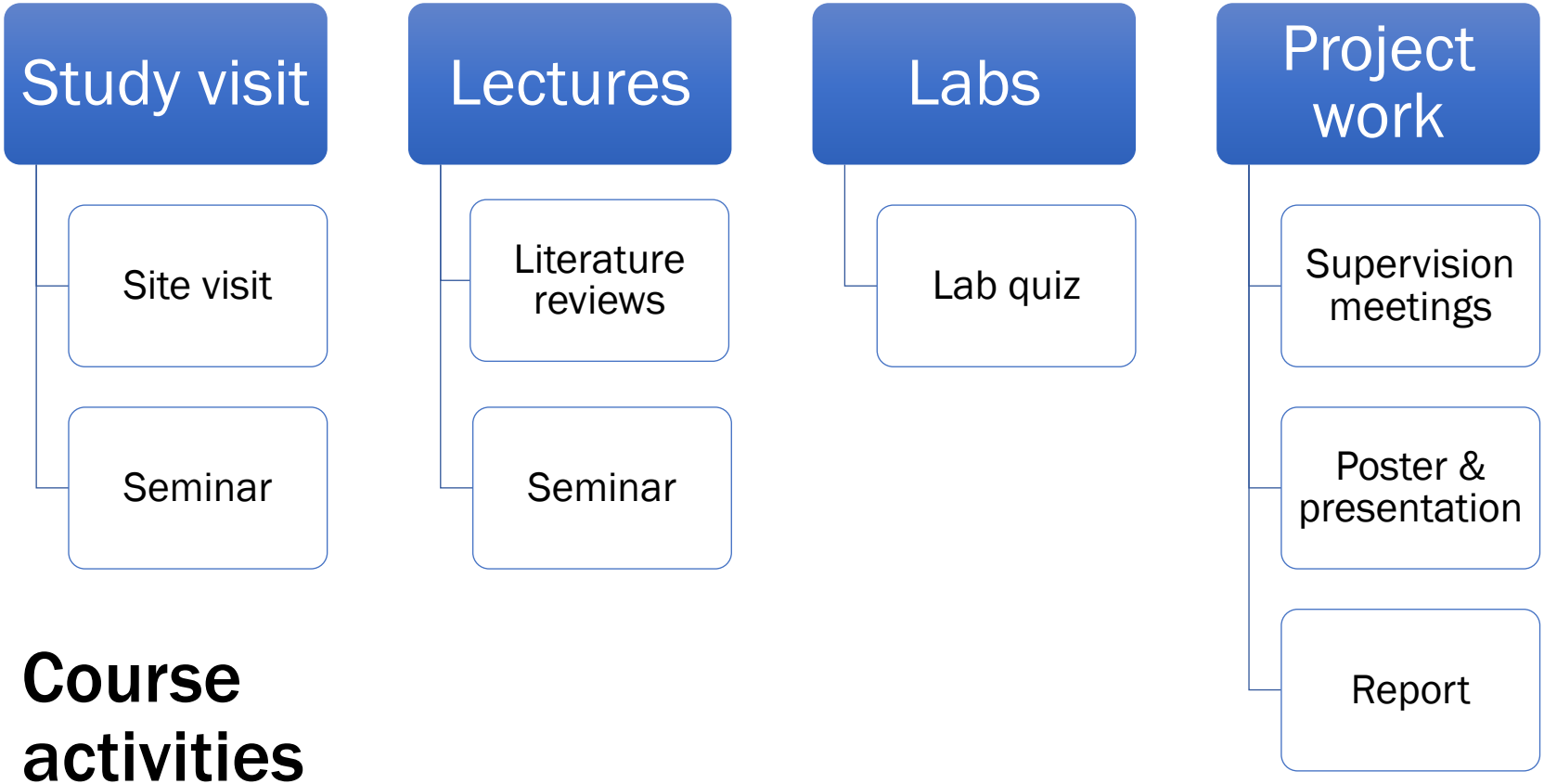
Challenge-based learning

- CBL guide
- https://www.challengebasedlearning.org/project/cbl-guide/

Smart cities
and climate mitigation strategies

- MSc students
  - Energy for Smart Cities
    KIC Innoenergy
  - Sustainable Technology
    KTH
  - Erasmus+
- 7.5 ECTS course
- Period 1 and 2
  (fall semester)





Course activities

Ecosystem

Teamname: _____

Date: _____ Version: ____

Instructions

Businesses are part of a larger ecosystem. In early stages it is valuable to discover the ecosystem around your business. An ecosystem can exist of institutions, services, communities and users. Fill out the template using the questions to help you explore your business' ecosystem.

Students

- What do you want the user to achieve?
- What is their goal?
- What do they need to do/to know/ to feel?
- What does the user know/feel do right now?
- Write down for each item:
  - What shifts do you need to support?
  - Who or what supports or prevents these shifts?

Teachers

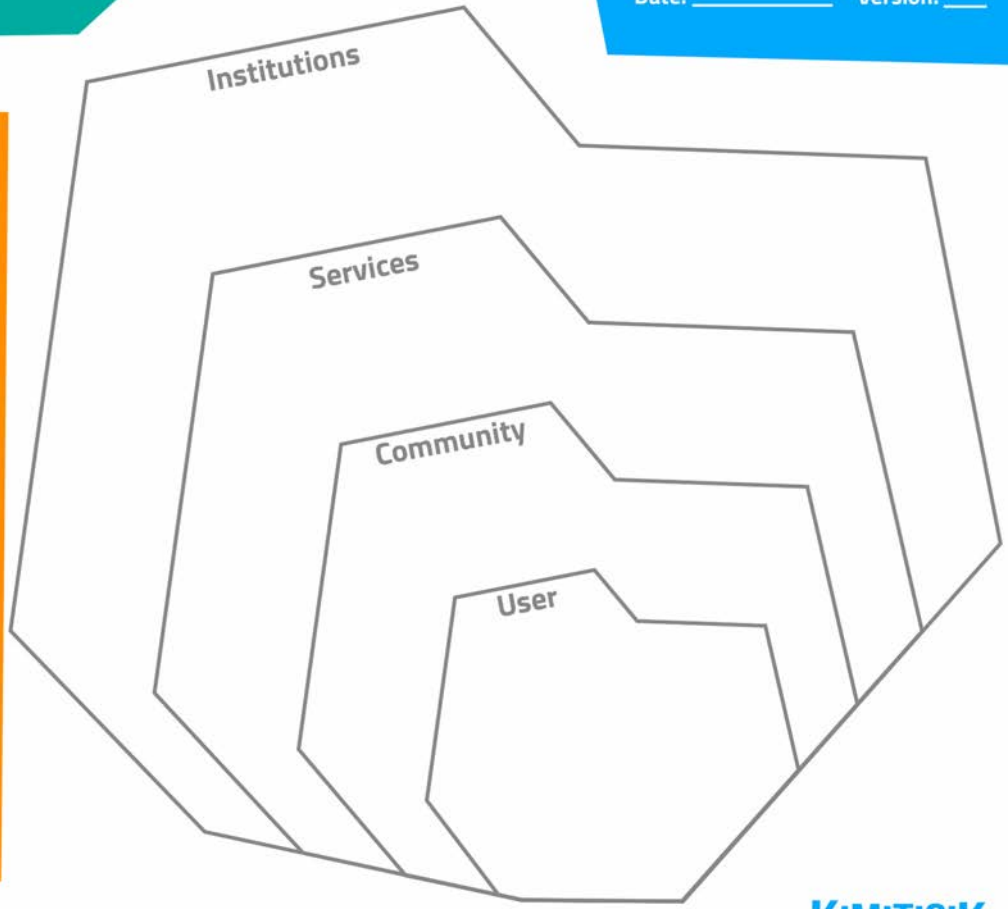
- What does the environment /social network of the user look like?
- Which individuals/groups have a significant impact on the user?
- Write down for each group:
  - In what ways do they block or support the user?
  - Who has control/what is the power dynamic
  - Is the group a supporter or skeptic regarding the user?

Environment

- What resources are available to the user?
- What services does the user need to achieve their goal?
- Write down for each service:
  - What is the quality of the service?
  - What problems occur with accessing the service
  - Who are the service providers?
  - What challenges do the services face?
  - What shifts are required for this service?

Institutions

- What systems and policies influence the users rights?
- What freedoms does the user need to achieve their goal?
- Write down for each freedom/right:
  - What barriers does the user experience accessing freedom?
  - Is there unequal acces to the right/freedom?
  - Which systems and policies support this right?
- Tackling what constraints should be considered for this challenge?



KIMITISIK

Ecosystem

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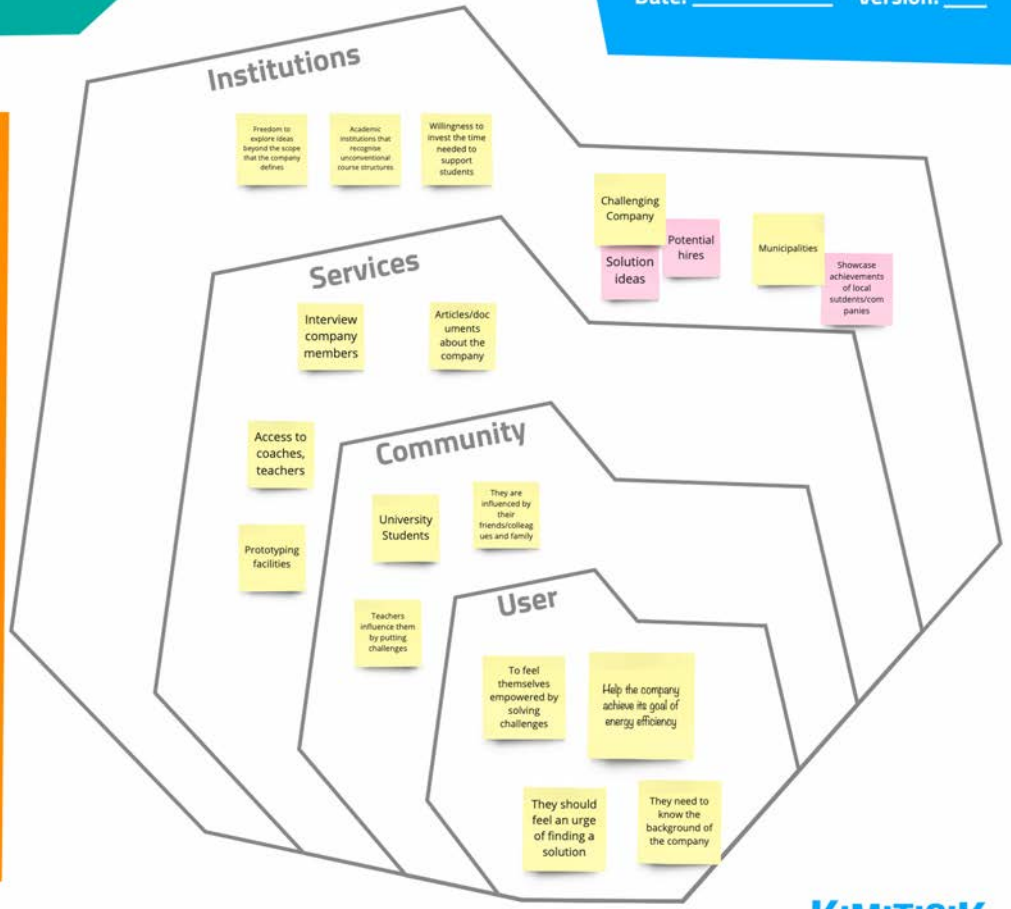


KIMITISIK

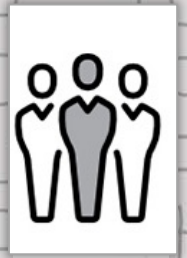
Source: https://upload.wikimedia.org/wikipedia/commons/3/30/Stockholm_February_2013_05.jpg

QUEST FOR ENERGY EFFICIENCY

ENERGY UTILITIES

BUILDING OWNERS & MANAGERS

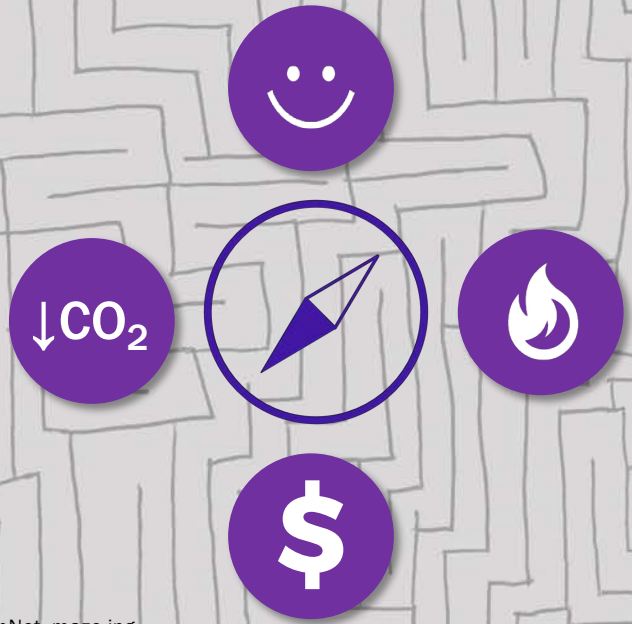
ENERGY SOLUTION COMPANIES



PEOPLE

CITIES

STATE AUTHORITIES



Source: https://commons.wikimedia.org/wiki/File:Amazement_AmazemNet_maze.jpg

Source: https://upload.wikimedia.org/wikipedia/commons/3/30/Stockholm_February_2013_05.jpg

Source: https://upload.wikimedia.org/wikipedia/commons/3/30/Stockholm_February_2013_05.jpg

KTH VETENSKAP OCH KONST

UrbanT

Stockholms stad

Uppsala kommun

L&T

EQUA

stockholm exergi

ELLEVIO

Sjöstadsföreningen Hammarby Sjöstad

ELECTRICITY

IQ Samhällsbyggnad

Energimyndigheten

Source: https://upload.wikimedia.org/wikipedia/commons/3/30/Stockholm_February_2013_05.jpg

Stockholm Royal Seaport
(Norra Djurgårdsstaden)

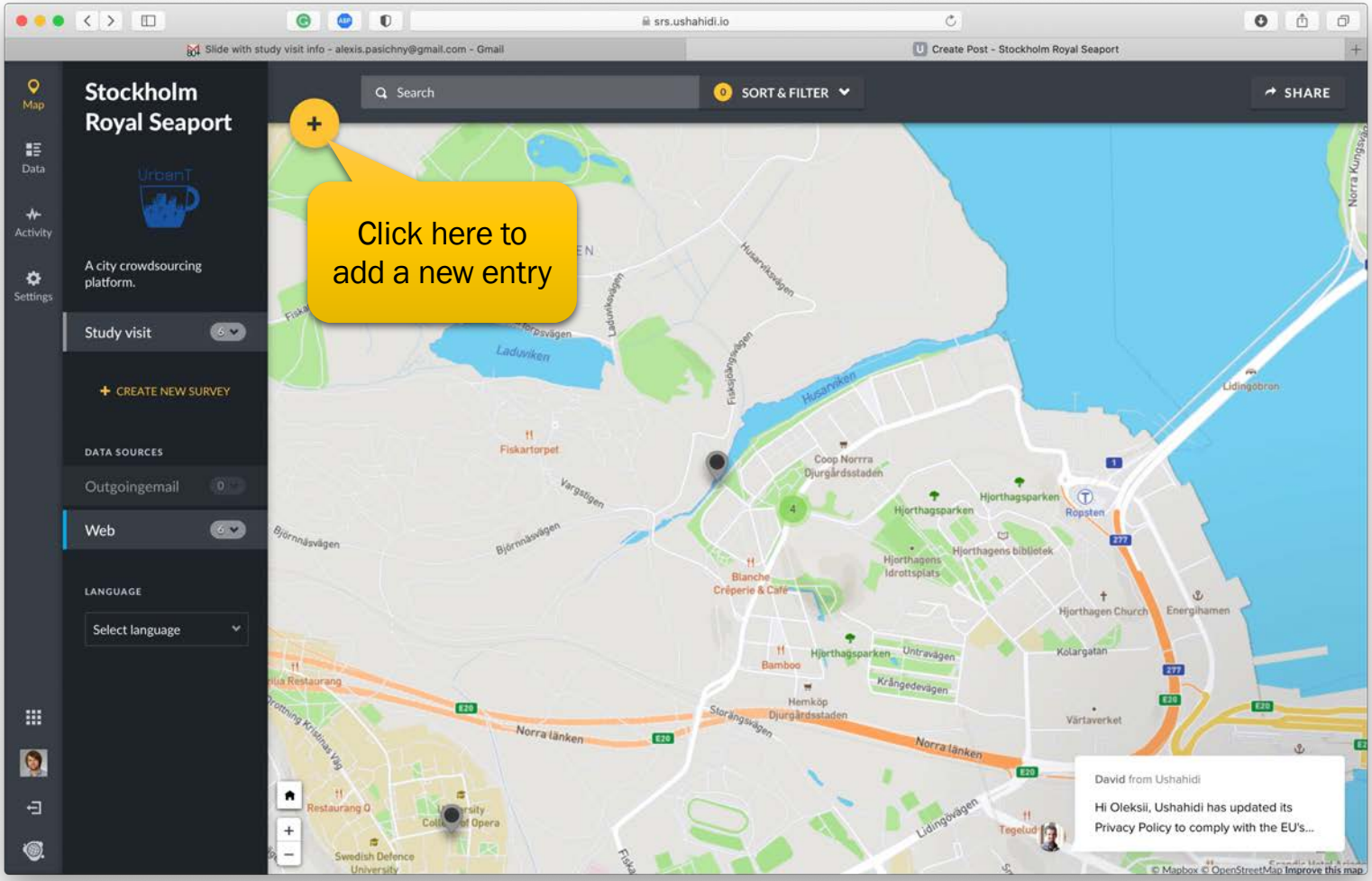
Study visit

- Deadline for crowdsourcing
  - October 21, 23:59
- Discussion seminar
  - November 02, 13:00 – 17:00

CROWDSOURCING APP
- https://srs.ushahidi.io

MINIMUM REQUIRED PER STUDENT
- 5 solutions
- 2 problems
- 1 question

Foto: Lennart Johansson/Stockholms stad.

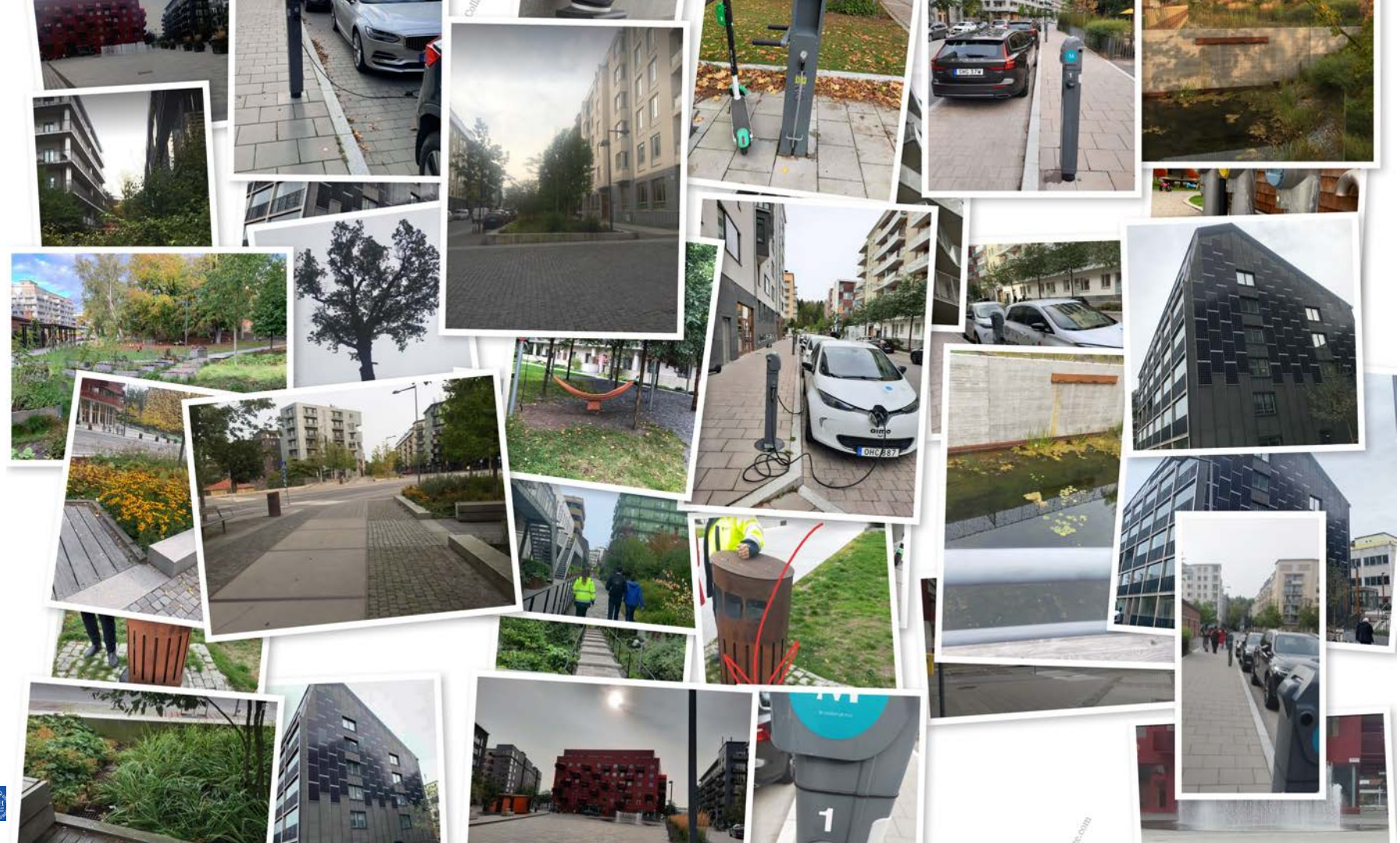

srs.ushahidi.io
Slide with study visit info - alexis.pasichny@gmail.com - Gmail
Create Post - Stockholm Royal Seaport
Map
Data
Activity
Settings
Stockholm Royal Seaport
A city crowdsourcing platform.
Study visit
+ CREATE NEW SURVEY
DATA SOURCES
Outgoingemail
Web
LANGUAGE
Select language
Search
SORT & FILTER
SHARE
Click here to add a new entry
David from Ushahidi
Hi Oleksii, Ushahidi has updated its Privacy Policy to comply with the EU's...
© Mapbox © OpenStreetMap Improve this map

155 entries

97 solutions

38 problems

20 questions



Stockholm Exergi

Study visit

Tell me and I forget,
teach me and I remember,
involve me and I learn.

Xunxi

Project work

Final project presentations & feedback from supervisors
December 12

Projects kick-off
September 16

Projects intro
September 09

Intermediate project review
October 13

Project work

Projects intro
September 09

Group proposals submitted
September 15

Projects kick-off
September 16

Project plan submitted
September 22

Intermediate project review
October 13

Final project presentations & feedback from supervisors
December 12

Poster submission
December 07

Final project reports are submitted
December 19

Project work

Projects intro
September 09

Group proposals submitted
September 15

Projects kick-off
September 16

Project plan submitted
September 22

Supervisor feedback on project plan
September 23

Intermediate project review
October 13

Group meetings with supervisors
November 8

External coaching
November 21

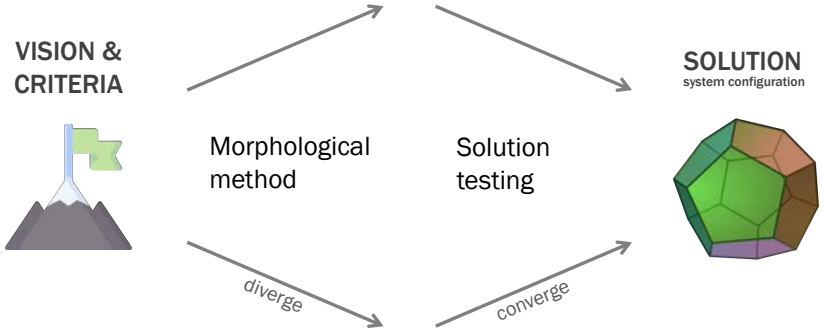
Feedback from peer groups
December 02-08

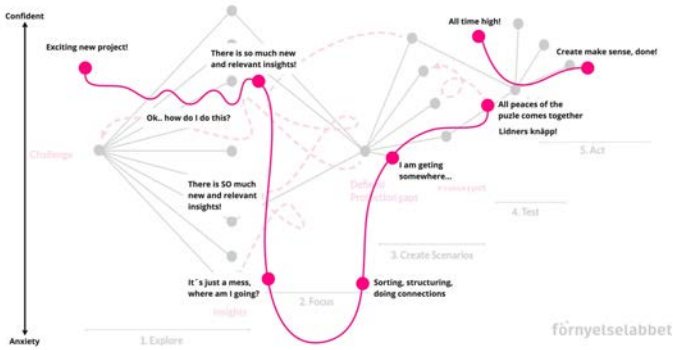
Poster submission
December 07

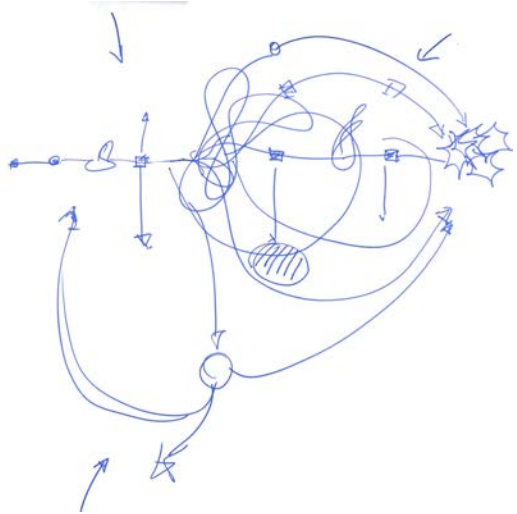
Final project presentations & feedback from supervisors
December 12

Final project reports are submitted
December 19

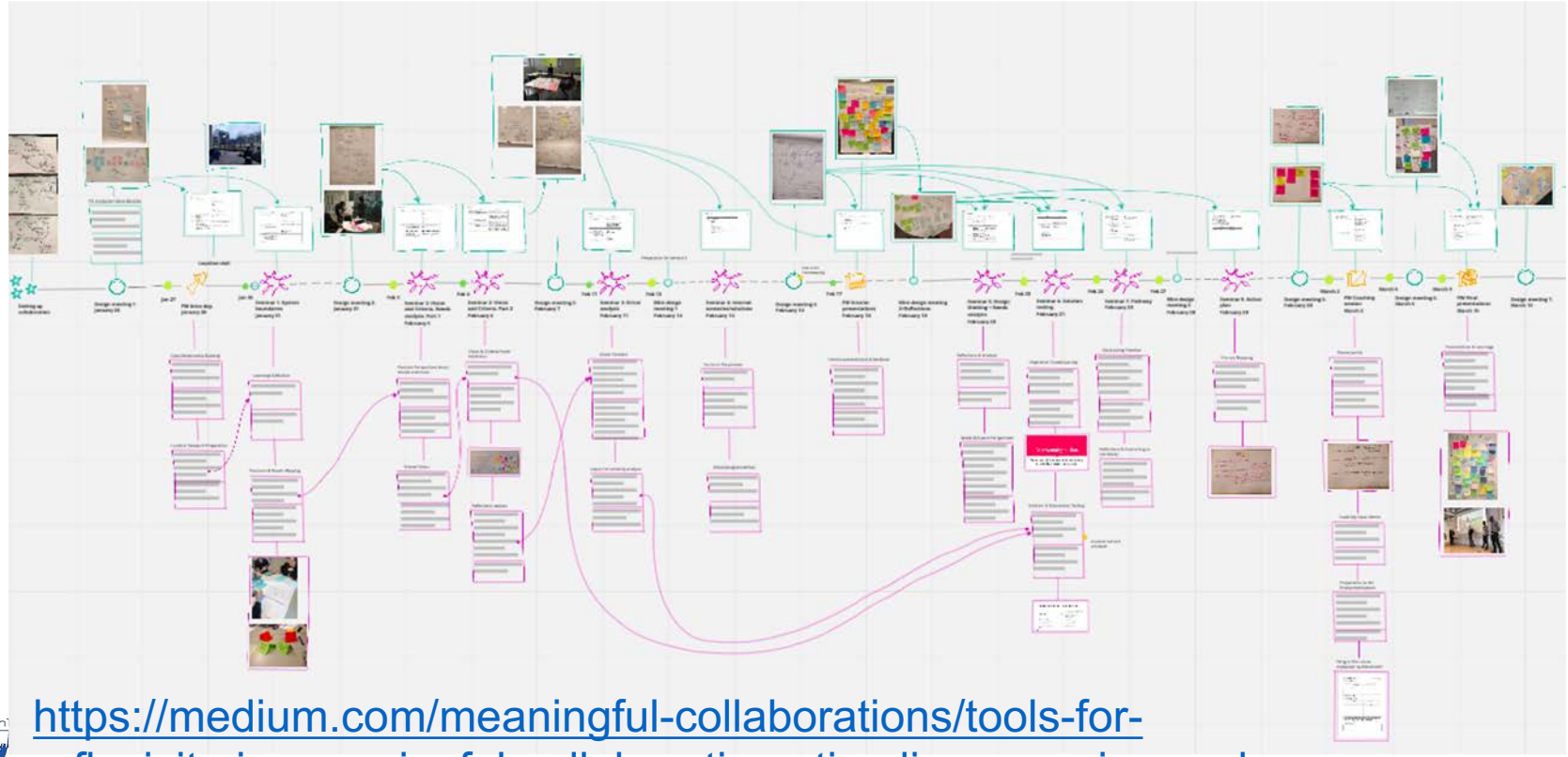
Remember about the nature of the mPB process!







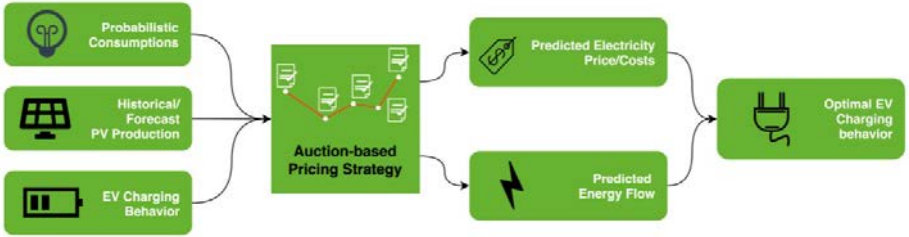
Example of a process documentation on Miro



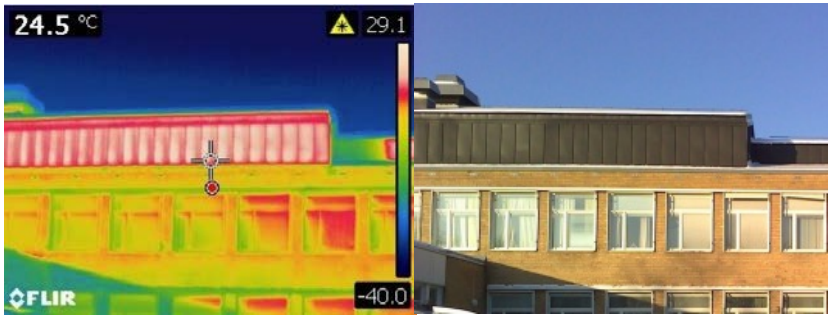
https://medium.com/meaningful-collaborations/tools-for-reflexivity-in-meaningful-collaborations-timeline-mapping-and-

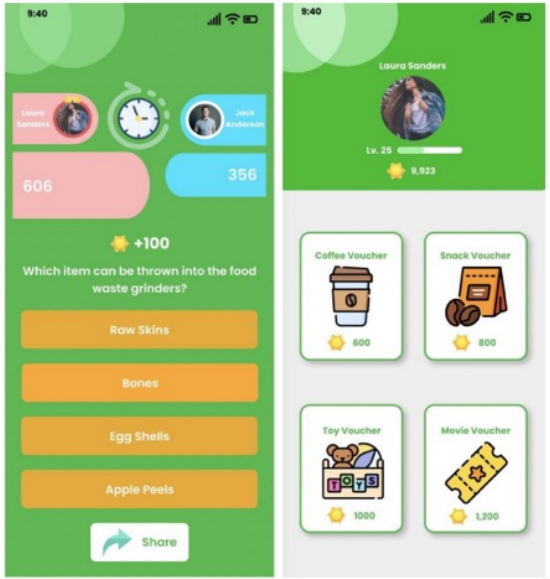
Examples from the previous years

The impact of flexible EV Charging on a P2P Microgrid



Energy Performance & Retrofitting of Celsiusskolan





Creating engaging content to optimize the residential usage of the food waste grinder in The Stockholm Royal Seaport

Project areas

1. Waste dashboard in Tableau for LocalLife (AM + DE)
2. Decreasing the share of incinerated plastic waste (AM + DE)
3. Understanding waste generation and improving waste feedback (AM + DE)
4. Smart grids' design in refugee camps (JMS)
5. Decentralized technologies (solar home systems, lanterns, improved cookstoves) for energy access in refugee camps (JMS)

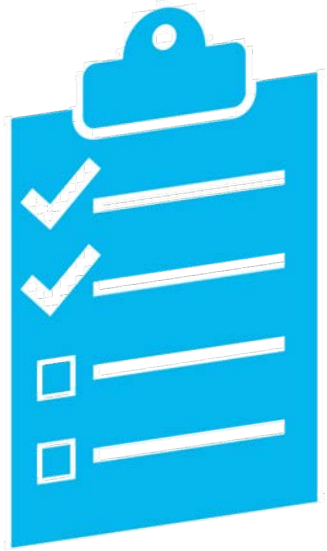
6+9. Technologies for smart and sustainable refugee reception in European cities + Digital communities for a better future for displaced populations (OP + JMS)

7. Urban analytics for the climate transition of buildings (OP)

~~8. Chatbot for assessment of climate action projects by SDG targets (OP)~~

10. Open urban data in Sweden - challenges and opportunities (OP)

Grading criteria



- Project management and organisation
- Proactivity
- Contribution
- Written report
- Team presentation

Proposed rules for group formation

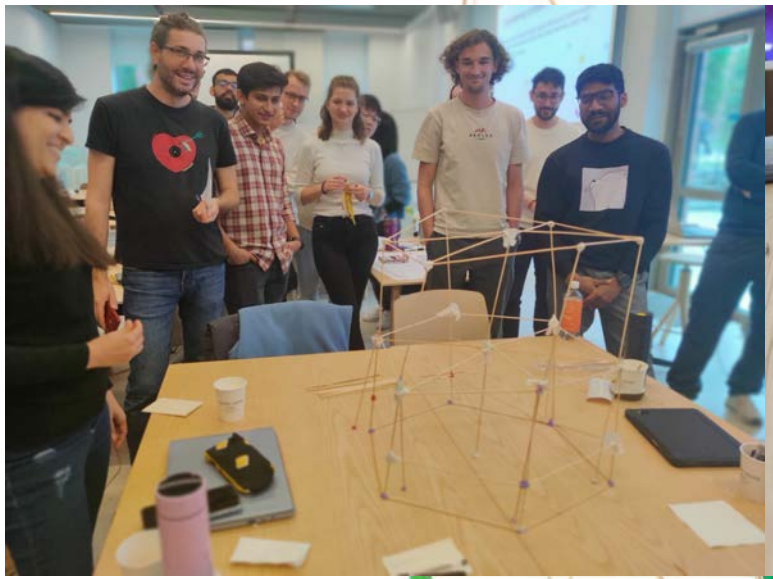
A project group should be

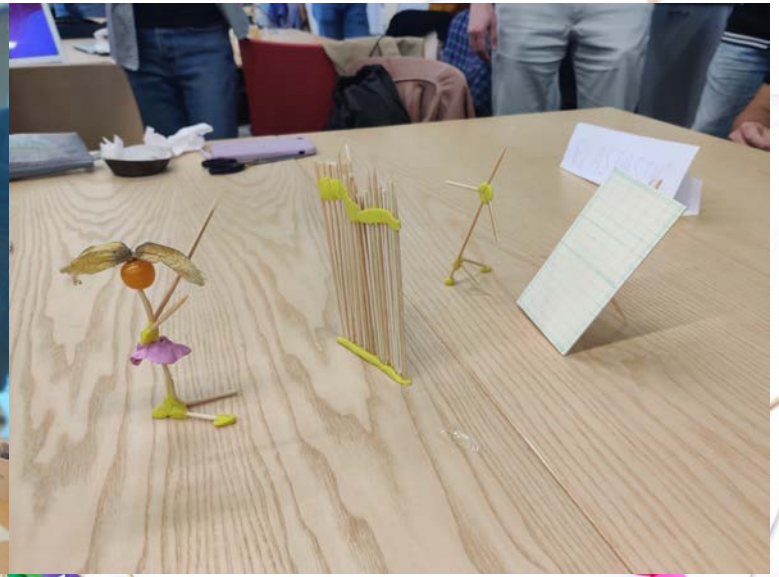
- Number of students 4-5
- Multi-gender
- Multiple countries of origin
- Multiple study programs
- Multiple study year

- Group switch
  - Deadline - September 20

Engineering competition

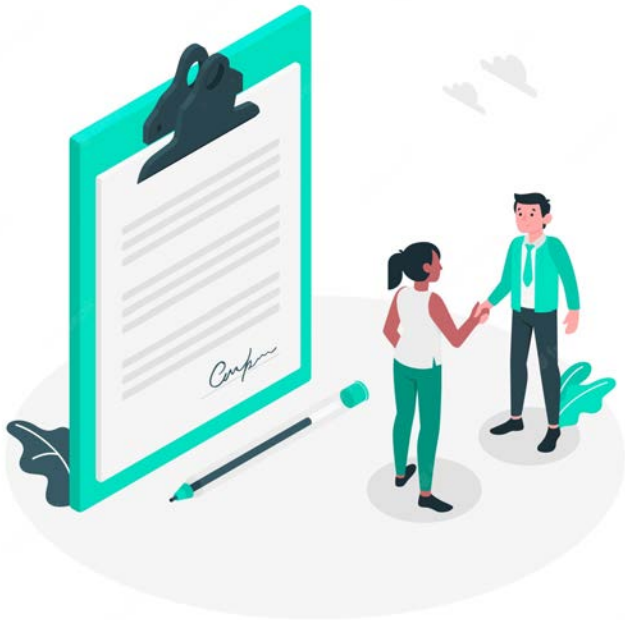
- Your group should create a figure that would communicate a certain phenomenon from this course (lectures, study visit)
- Time – 20 minutes



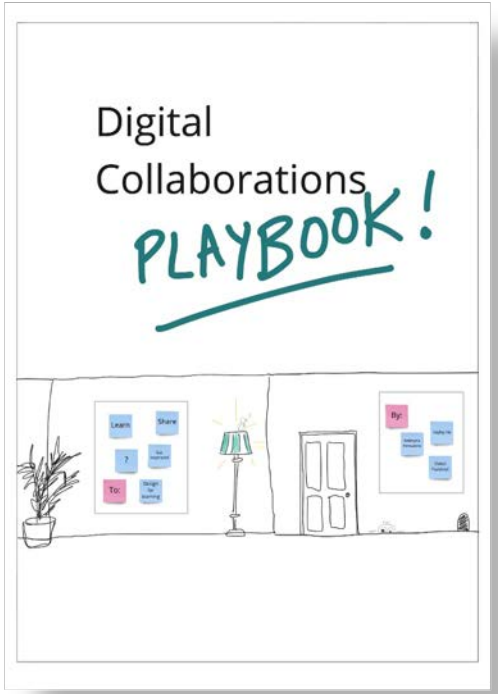


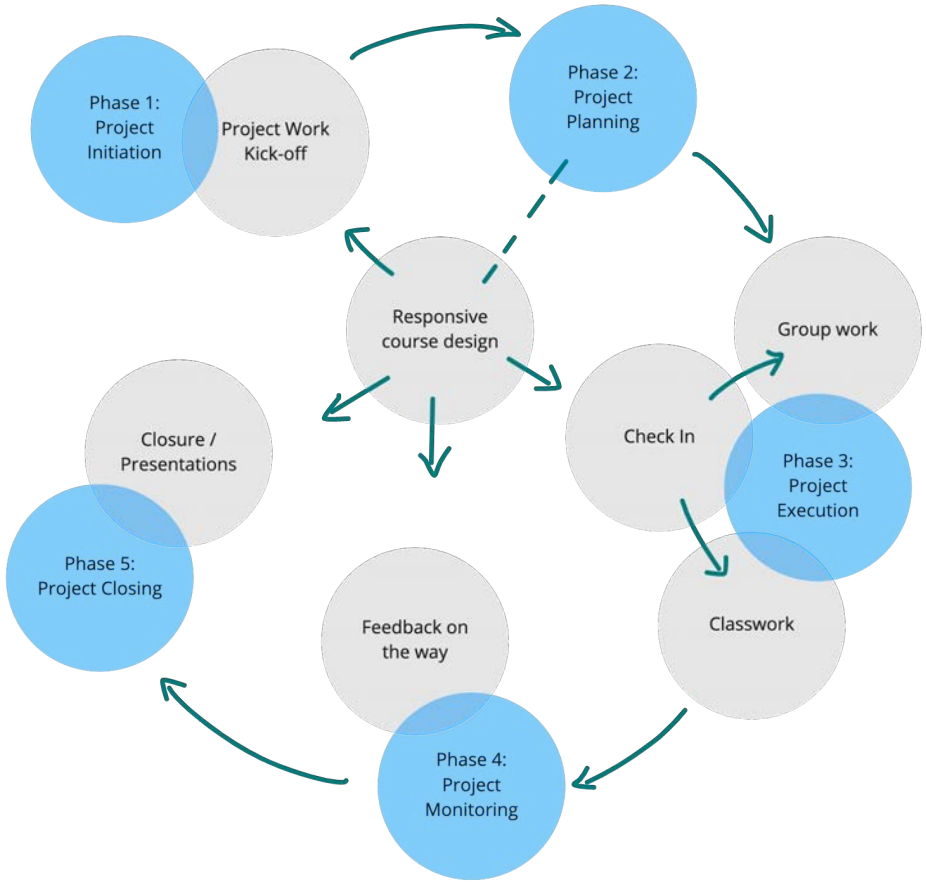
Group agreements

1. How do we plan project group meetings (time and place) in order to make sure everyone can attend?
2. What should a group member do if she/he is sick and cannot attend a planned meeting?
3. How do we document project meetings and what should be included?
4. Where do we save notes from project meetings and other project material, so that all group members can access them?
5. How do we ensure that the group is prepared for supervision sessions?
6. How do we ensure that interim and final deliverables are prepared in time?
7. How do we ensure that the workload is evenly and fairly distributed among project group members?
8. How should the group handle if one member is not handling her/his agreed tasks in a responsible way, or if collaboration in the group is not functioning well in some other aspect?



Digital collaborations playbook





https://miro.com/app/board/o9J_l8SIMYM=/

MSc thesis

Corporate

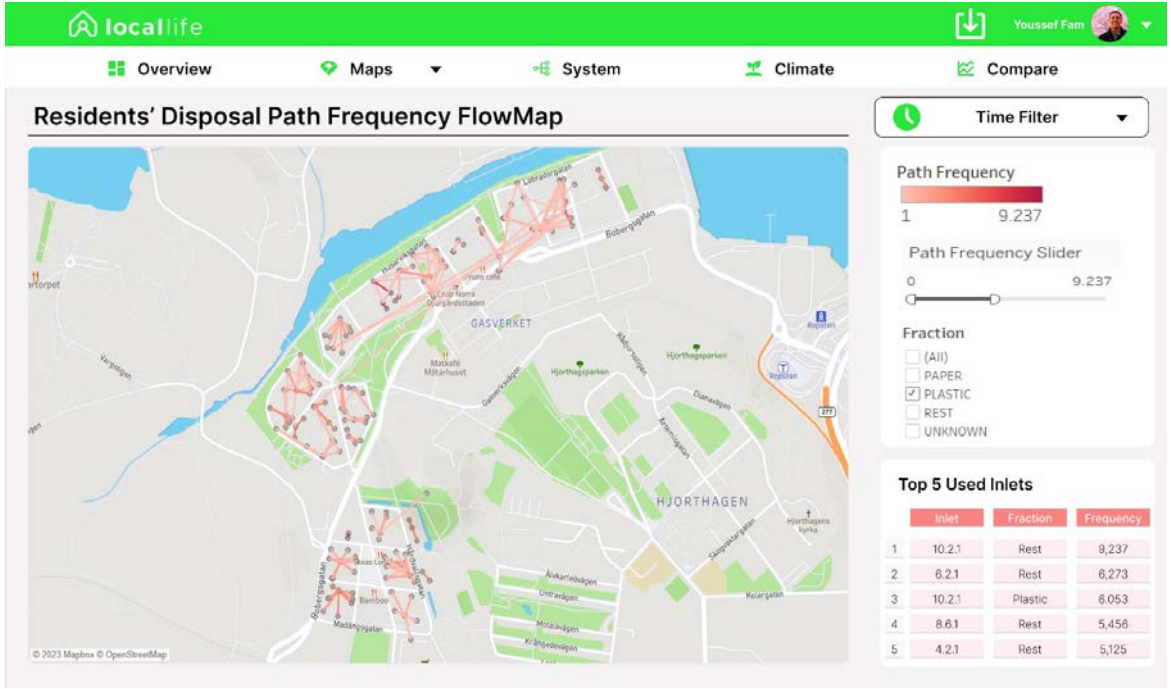
https://kth.powerappsportals.com

Research

Repository

http://www.diva-portal.org

Design and Development of a Tableau Dashboard for Smart City Waste Management



Sustainability transitions of mobility system in Skellefteå: Designing mobility hubs as a system innovation

The master thesis is proposed in connection to a project “Climate-neutral cities and communities 2030 - Skellefteå”. The project aims at strengthening capacities in the city to steer transformations for climate-neutrality in different sectors and systems. Mobility hubs are envisioned as a system innovation with a potential to trigger cross-sectorial collaborations and enable citizens engagement in the design and decision-making processes. The project will contribute to setting up such a collaborative design process. Specificity of the cold climate in the city will be considered and the resilience of mobility hubs and their network in view of future uncertainties and potential threats related to climate change and security will be explored using scenario planning methods.

Thank you for your attention. Questions?

@KTHUrbanT