Social informatics

PA181 S:SME

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If human society was an organism…

…what would computer science be?

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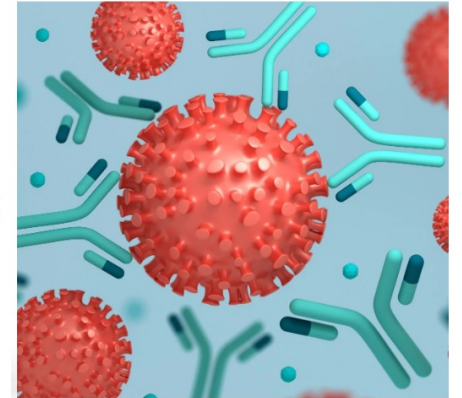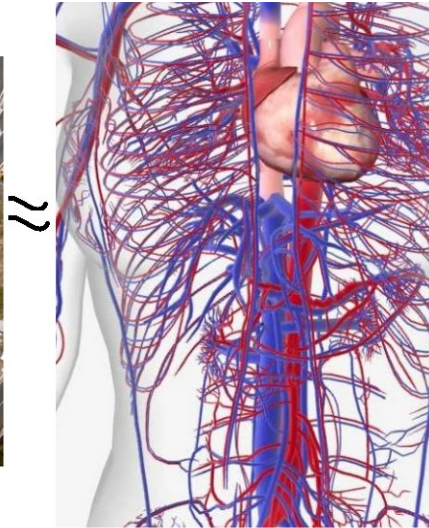
…what would computer science be?

if human society was an organism, and transportation can be compared to vessels, what would computer science be?

If we view human society as an organism and transportation as its vessels, we could compare computer science to its nervous system.

- Processing information
- Reading data from sensors
- Facilitation of response to stimuli, changing environment, etc.

Computers and society

- In USA 1960', people were afraid that computers will take over their jobs
- What will be the consequences?
- What will people do with their free time??
  - Compare: Nowadays vs. ChatGPT

- Computers started to be used in more domains in human society (organizations, medicine, education…)

"I think there is a world market for maybe five computers."
> Thomas Watson, chairman of IBM, 1943.

"The world potential market for copying machines is 5000 at most."
> IBM, to the eventual founders of Xerox, saying the photocopier had no market large enough to justify production, 1959.

What is social informatics about?

- Social informatics refers to the interdisciplinary study of the
  - design
  - uses
  - and consequences

  of information technologies that take into account their interaction with institutional and cultural contexts
    - ICT does not exist isolated from social contexts
    - People shape the design of ICT
    - ICT shapes the way how think and act

Some challenges with ubiquitous ICT

- ICT may be discriminative in terms of social class or gender
    - May poor people afford (paid) SW?
    - Gender-neutral Design
        - IT is male dominated → "masculine" SW design / "male aesthetic"

Male Set:

$$\left\{ \begin{array}{l} Professional \\ Grayscale \\ Condensed \end{array} \right\}$$

Female set:

$$\left\{ \begin{array}{l} Conversational \\ Color \\ Widescreen \end{array} \right\}$$

Some challenges with ubiquitous ICT

- Impact on social interaction
- Some aspects may be improved, but with some downsides…
  - It may be easier to be in touch with friends on-line
    - However, we might be less willing to meet in person

  - Coordination is easier with shared calendar
    - We must keep calendar up-to-date

  - New enterprise SW brings better organizational profit
    - More stress for employees, procrastination, impact on productivity

  - Social media help us to be in touch…
    - Idealization vs. reality
    - Depression, impact on self-esteem
    - Privacy issues

ICT and social transformation?

- ICT may change social relationships, but the rate of change is usually slow
- ICT usually does not offer new options, but change existing practice
- New technologies usually make work more effective, does not change them substantially…
  - What about AI?
- Transformation towards service-oriented market

Application of social informatics

- ICT shall make things easier, not more complicated
- To design a system well, we must understand how people work
- Systems are often design without involvement of the typical end-user
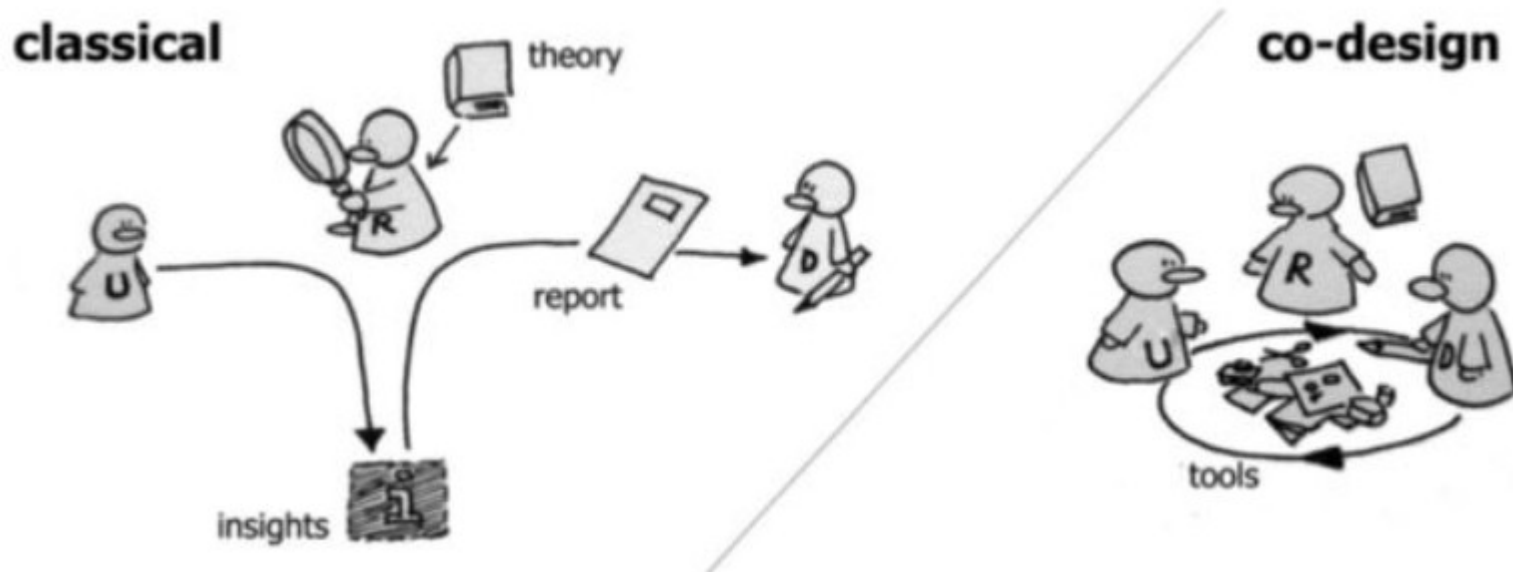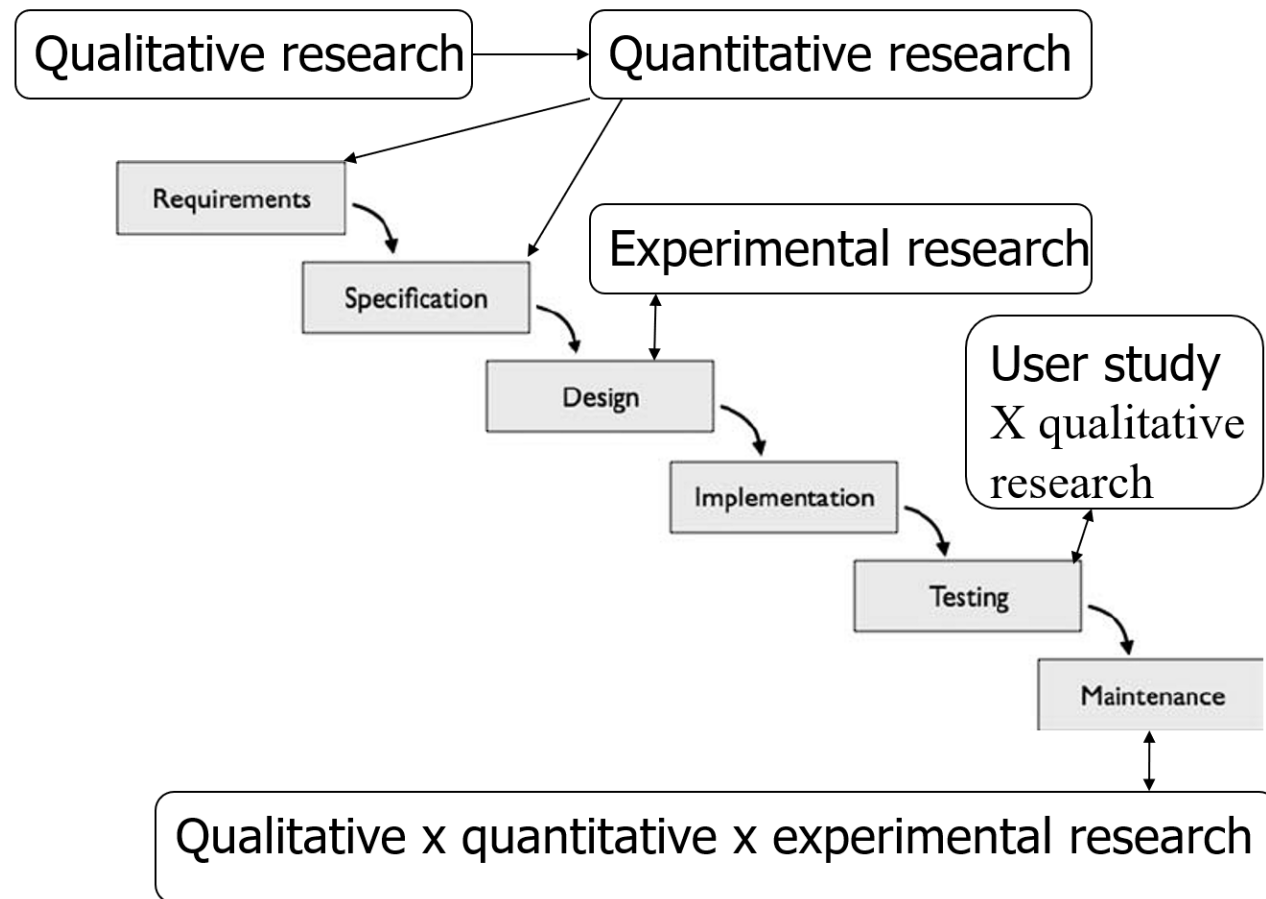
Participatory design

- Combines IT systems design and ethnographic research
- Be part of the (end-user) group, understand their daily tasks, needs and challenges
- Reflect that into design, involve end-users in all stages of development
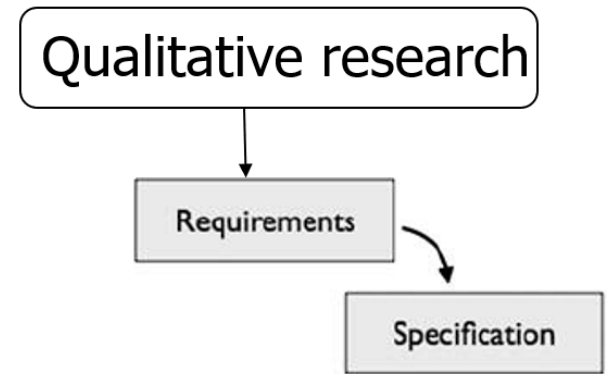
Participatory design – case study

Patient at home

Visiting nurse

Doctor

IT Specialist
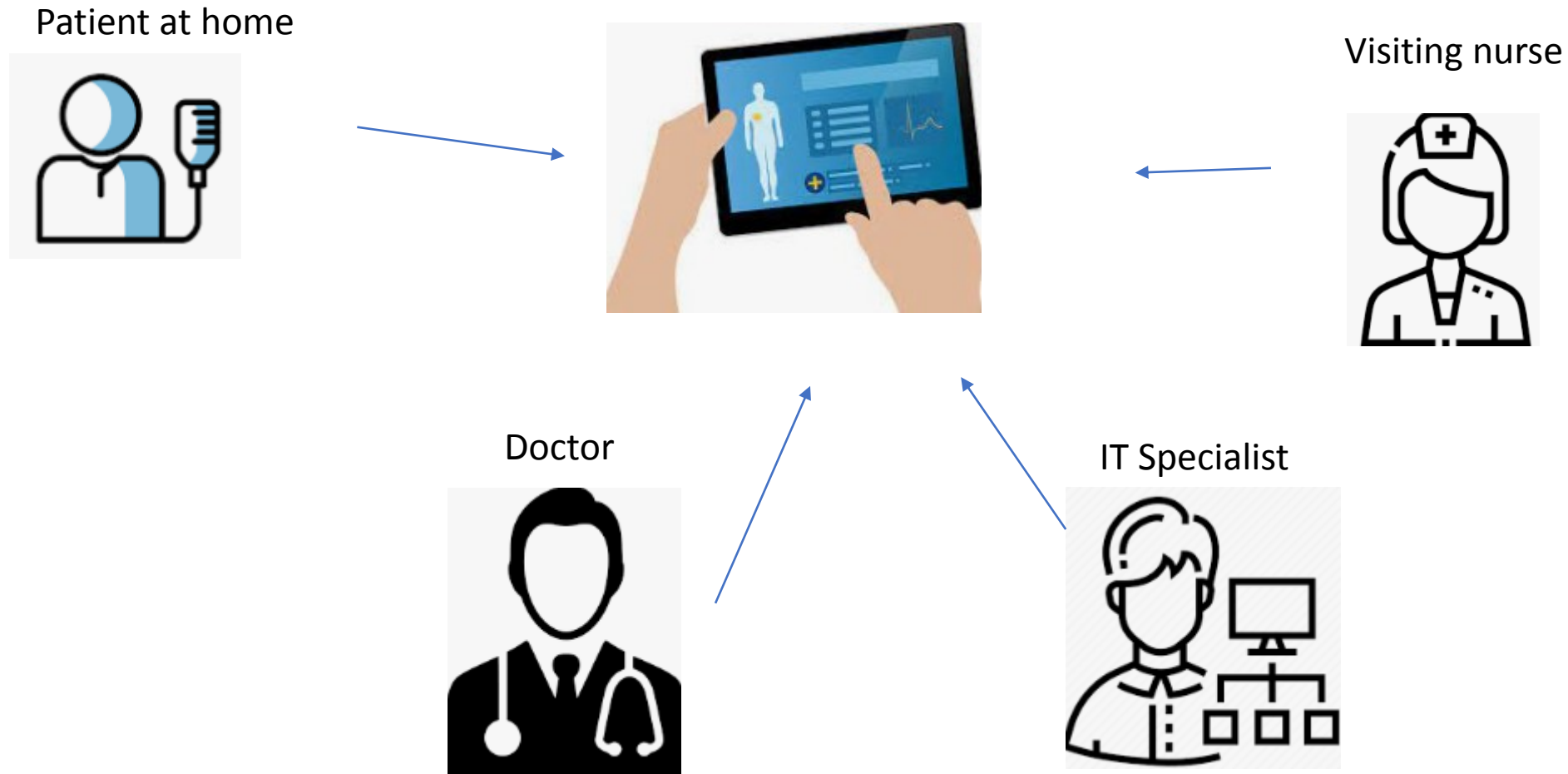
User involvement in SW delivery

Qualitative research

- Small sample of respondents
- Typically interviews or focus groups which are recorded, transcribed and analyzed
- High amount of information – deep and details
- High validity x low reliability
- Methods of coding and analyses (thematic analyses etc.)

Qualitative research

Qualitative research → Requirements → Specification

- Questions (e.g.):
  - What are needs and requirements of users?
  - Why could they use the SW?
  - What could be their motivations?
  - What kind of functions they need?
  - Are there differences in patterns of needs between different users?
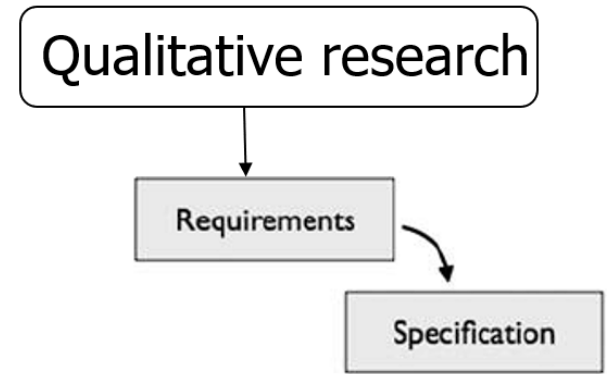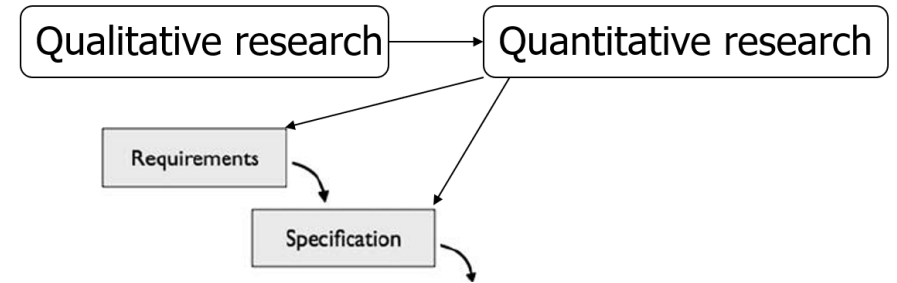
Quantitative research
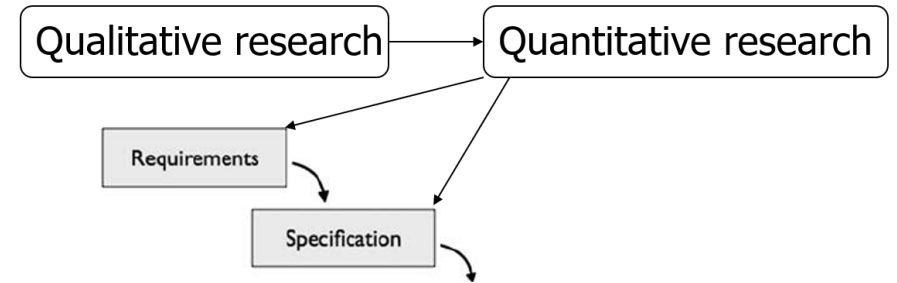
- "Larger" sample of respondents (what is enough?)
- Typically a survey (online survey), depends on population
- Questions = low and limited amount of information
- Low validity x high reliability
- Methods of sampling, theory of asking questions, data cleaning, methods of data analyses
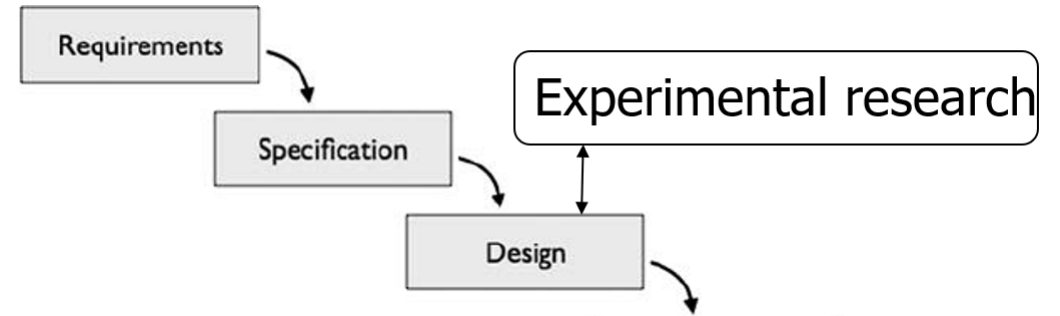
Quantitative research

- Questions (e.g.):
  - How many people could use the SW?
  - What is most important for them?
  - Which of functions are highly needed?
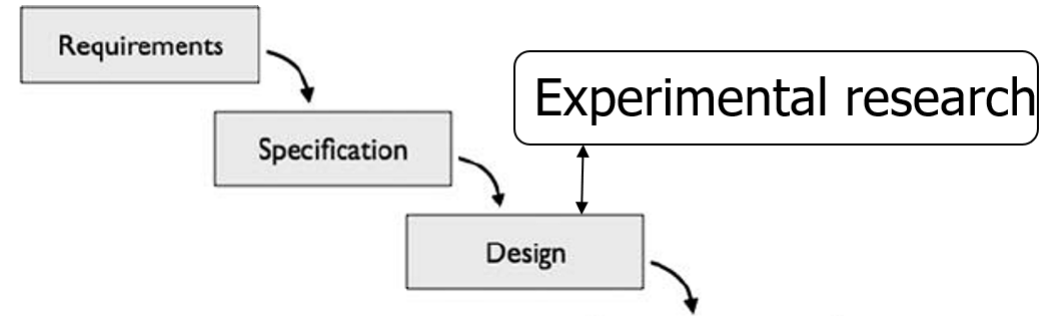 - Which functions are needed for which types of users?
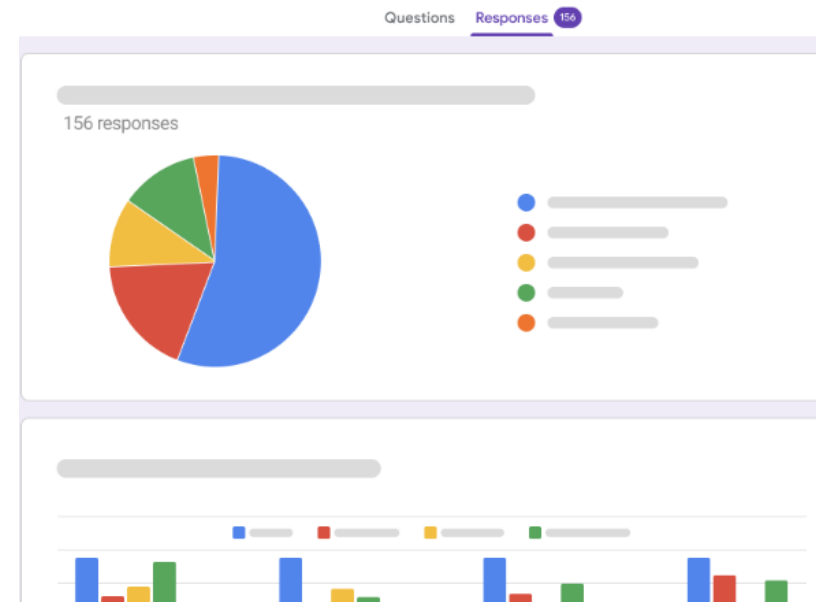
Experimental research

- Limited amount of respondents
- Experimental design – testing different variants of design (or screens, texts, functions …)
- Questions = low and limited amount of information

Experimental research

Requirements

Specification

Experimental research

Design

- Questions (e.g.):
  - What is the best (most user friendly?) design?
  - How is the design impacting behavior (decisions) of users within the SW?
  - How are different users behaving within different SW designs?

PROTOTYPING
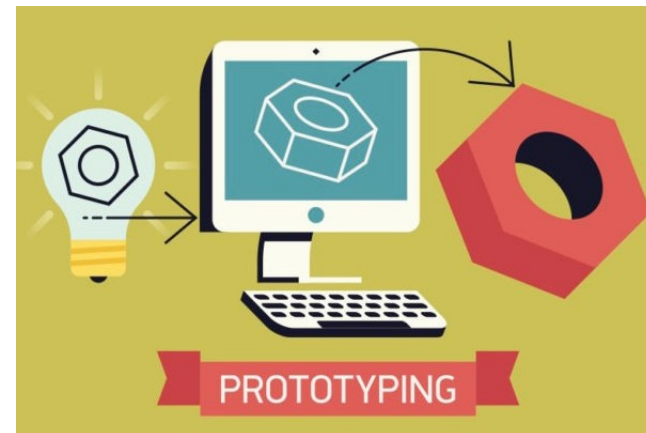
Collaborative systems

- allow multiple users to work together on a common task

- real-time, regardless of their physical location

- designed to facilitate communication, coordination, and teamwork

Collaborative systems - core dimensions

- ***Awareness***: individuals working together need to be able to gain some level of shared knowledge about each other's activities

- ***Articulation work***: cooperating individuals must be able to partition work into units, divide it amongst themselves and, after the work is performed, reintegrate it

- ***Appropriation*** (or tailorability): how an individual or group adapts a technology to their own particular situation; the technology may be appropriated in a manner completely unintended by the designers

Collaborative systems – research questions

- What are the most effective ways to support collaboration among users in different contexts and domains (business, healthcare...)?

- How to accommodate systems to users with different needs or levels of technical expertise?

- How to promote knowledge sharing, creativity, or innovativeness through system design?

- How can be emerging technologies like AI, VR or blockchain, used to enhance collaboration?

Social computing

- Platforms connecting large quantities of users to
  - Share knowledge (Wikipedia)
  - Share trends or news (social media)
  - Solve optimization problems ("swarm intelligence")
    - Navigation (Waze)
    - Supply & Demand – "gig economy" (Wolt, Uber, AirBnB…)
    - Reviewing products, restaurants, services, sellers …
    - Typically, more users = better profit for everyone

- vs collaborative systems – smaller teams, task-oriented
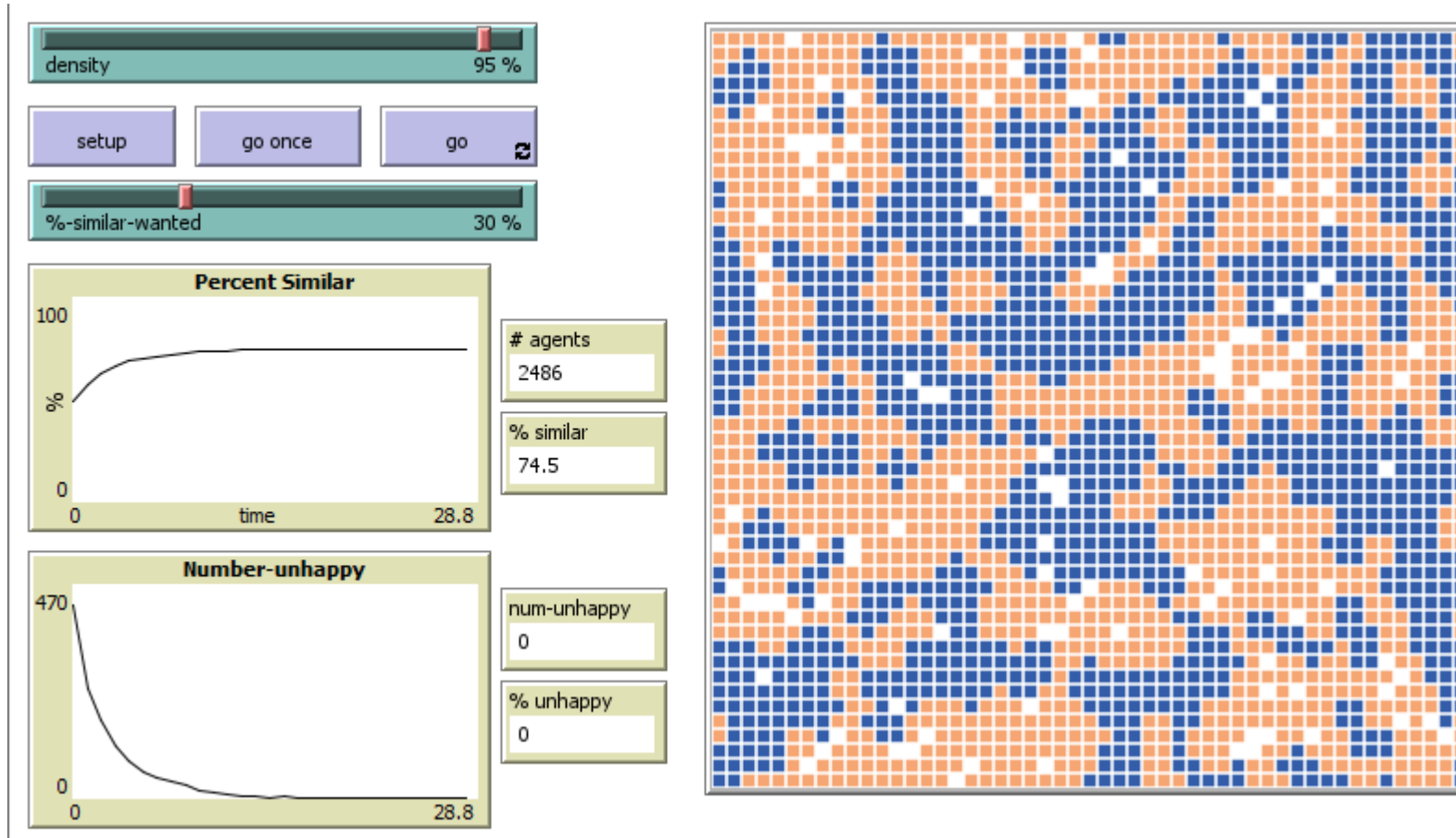
Computational social science

- Using computer tools (and knowledge of complex systems) to gain better insight into social problems
  - social network analysis
  - modeling and simulation
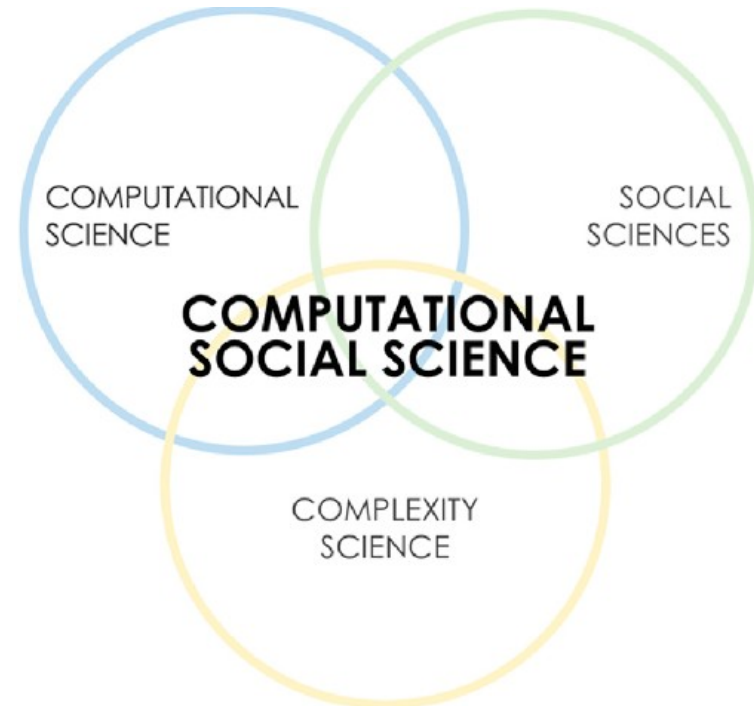
Network analysis of Czech actors' cooperation
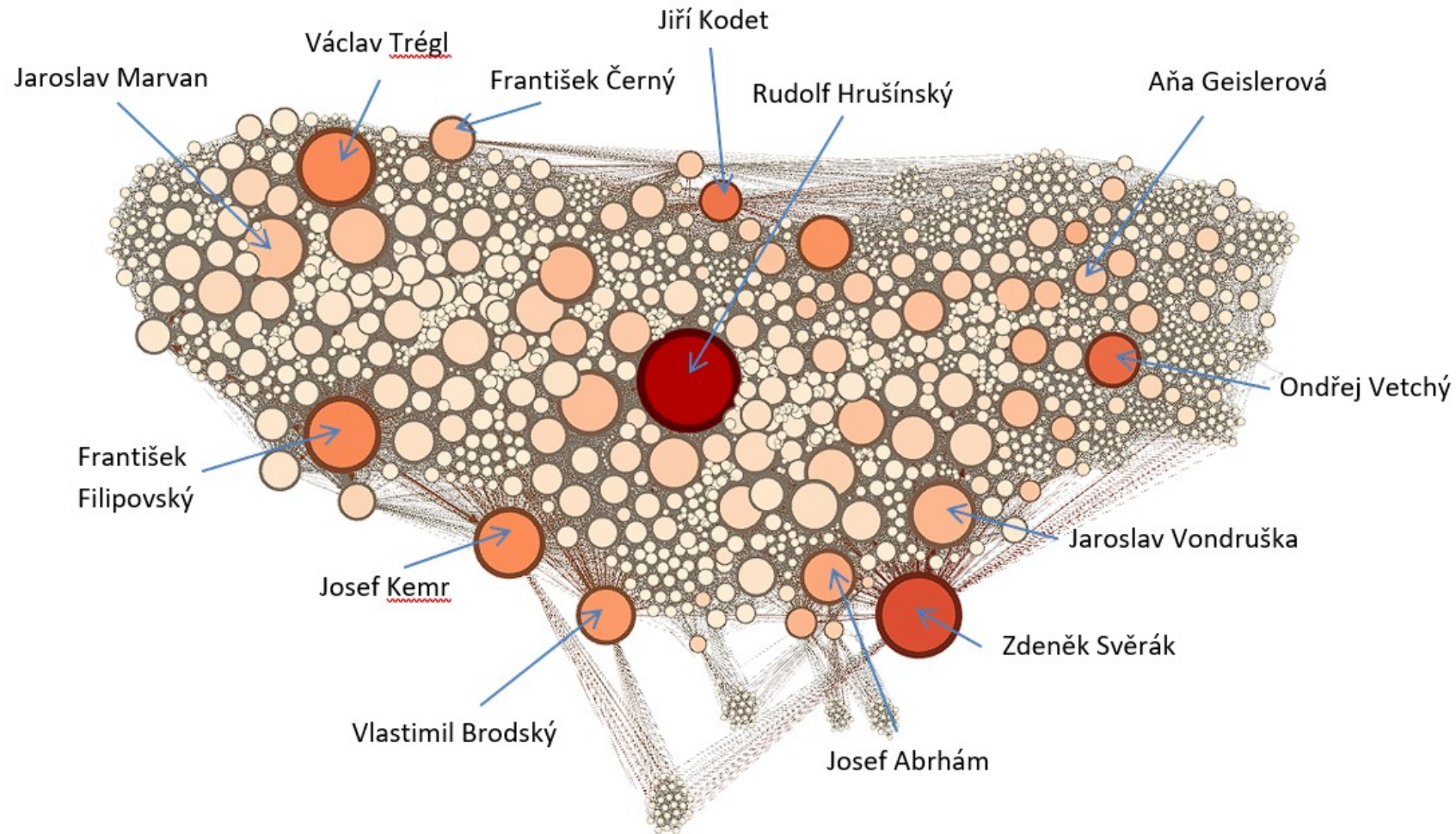
Modeling & Simulations in NetLogo

Assistive technologies

- Designing SW/HW solutions to help users with special needs
- Hearing / Visual / Movement disabilities
- Challenge:
  - small target audience for specific SW
  - good "market research" + requirements analysis needed

- Examples:
  - Automatic video captioning
  - Read-out-loud features in specific contexts (e.g., ROL + map + gps → pedestrian navigation)
  - Speech-to-text

Psychoinformatics

- Up to 80 % of population have experienced major depressive episode in their life

- Some people do not want to (or can't afford to) see a therapist

- Some people might just want to improve their quality of life
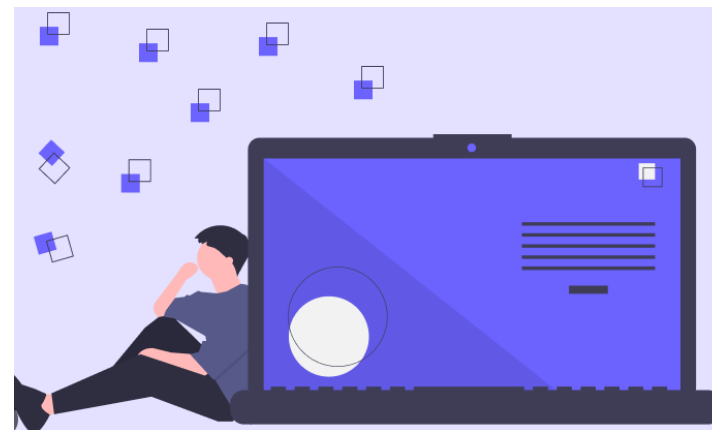
Psychoinformatics

- Apps
  - Mood tracking
  - Personal Journals
  - Dream Diary
  - Mindfulness / Relaxation & Mediation techniques practice

- Using machine learning in (mental) healthcare
  - Identification of diagnose from symptoms (might not be even detectable by humans)
  - Chatbots

… and numerous other approaches!

Thanks for your attention