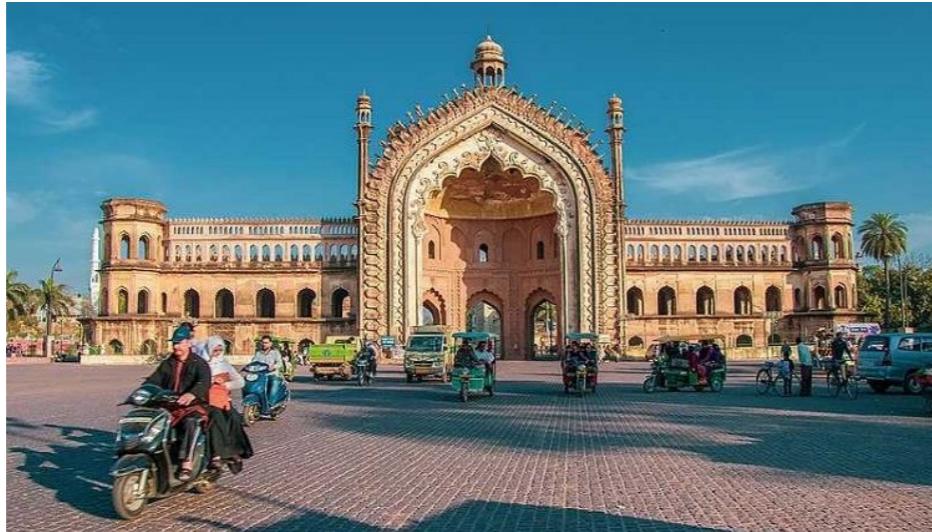


Week 1: Design Analytics

Welcome and Introduction

A bit about me ...



Lucknow, India



Lausanne, Switzerland



EPFL, Switzerland



Fribourg, Switzerland

A bit more about me



Collaborative Systems



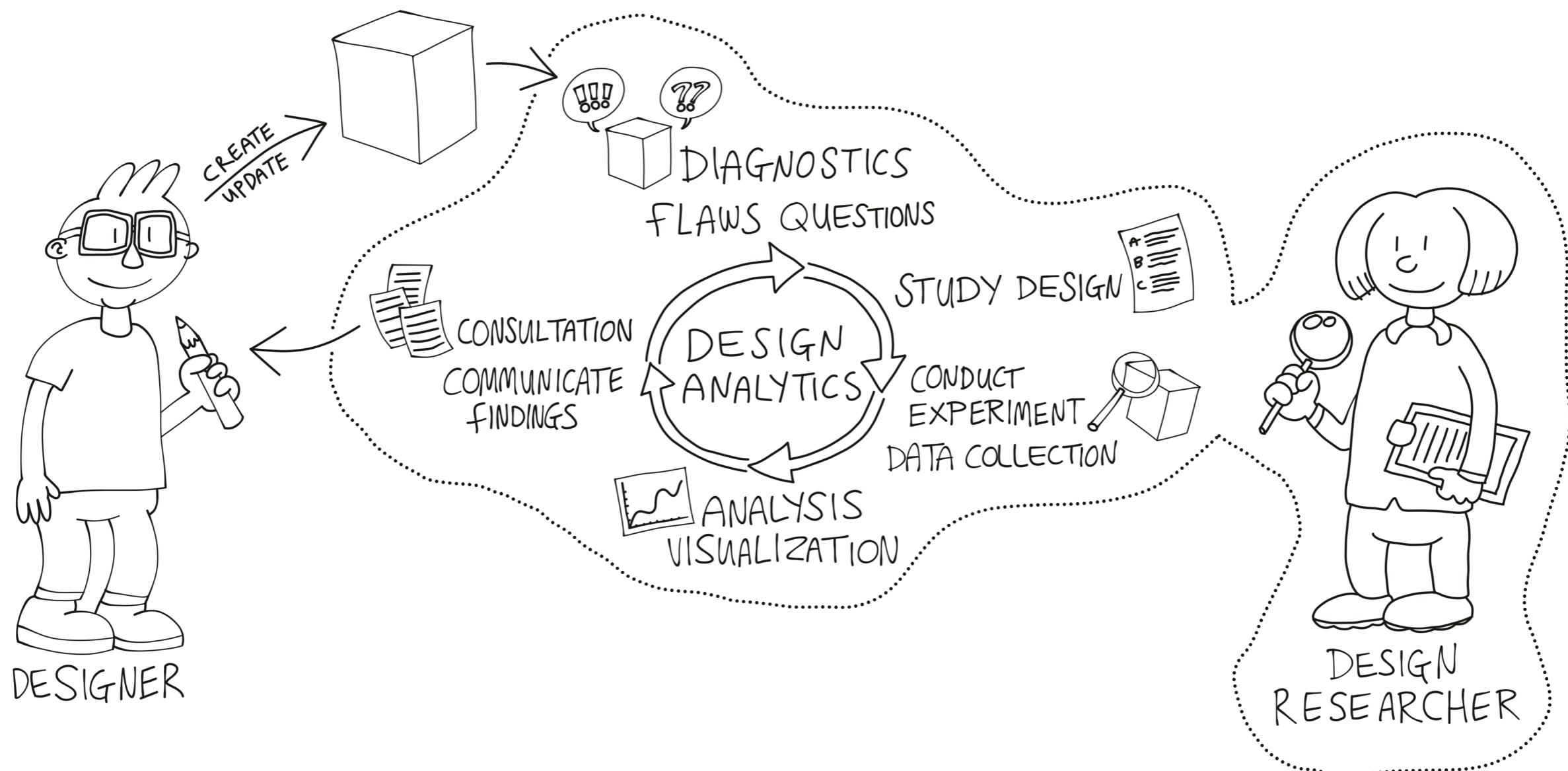
Proxemic Sensing



Communicating AV's Intent

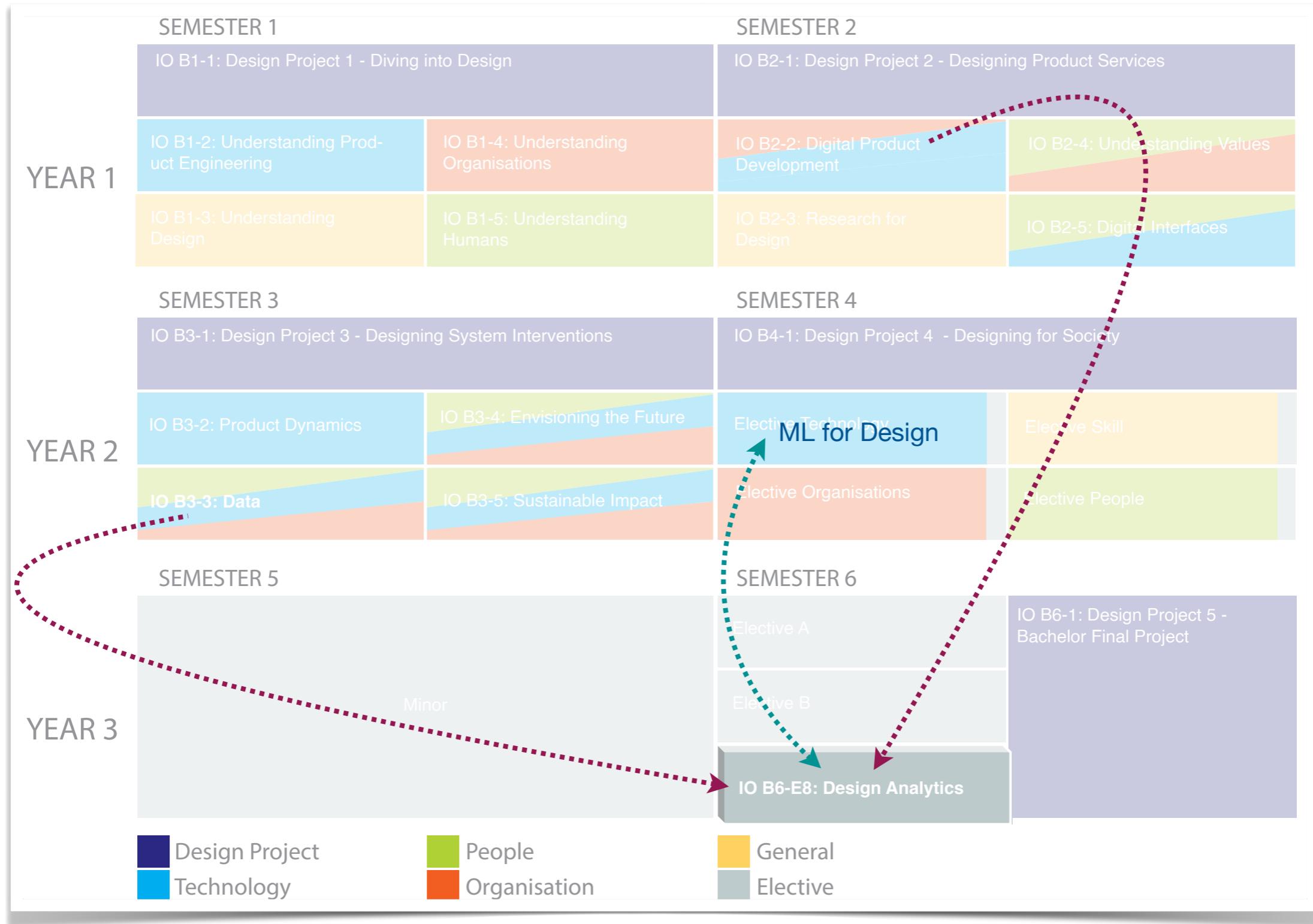


Gaze Tracking

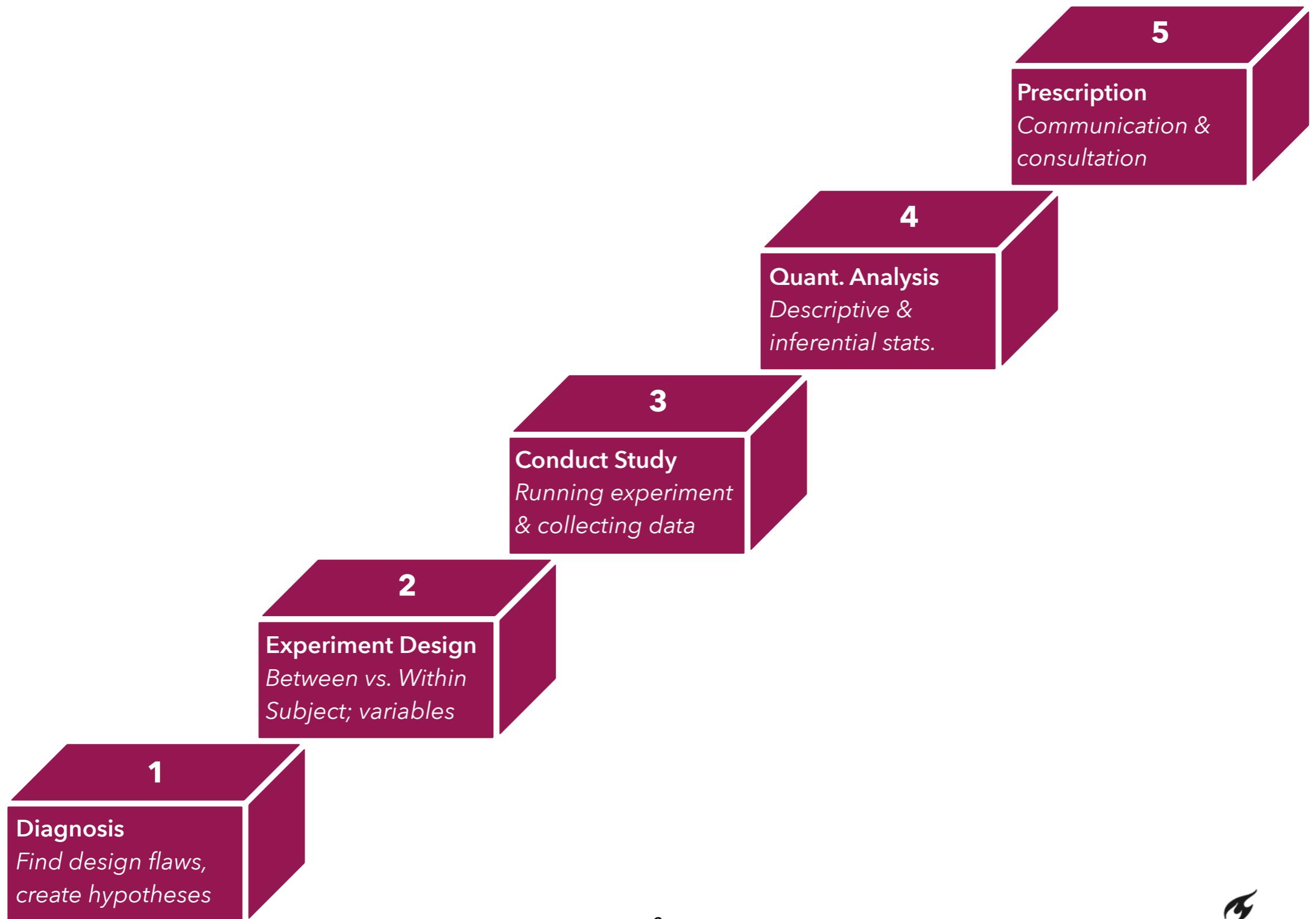


The focus is on **improving existing designs** for the **next design iteration**.

How does it fit in the curriculum?



Design Analytics Pipeline (DAP)



Design Analytics Team

Teachers &
Thematic Coaches



Himanshu



Ugur



James

Design Brief
Owners



James



Samuel



Wo

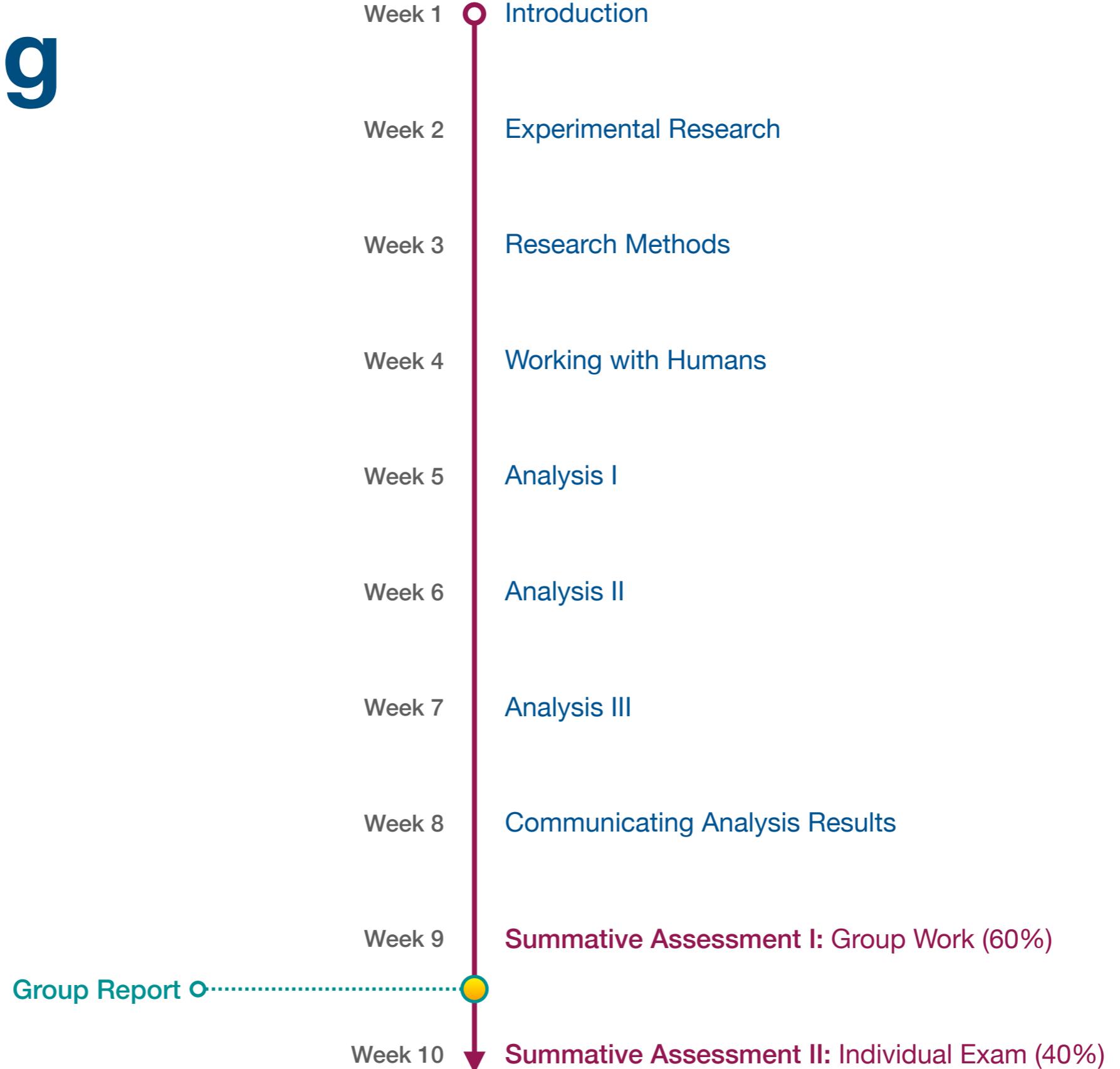


Ruben

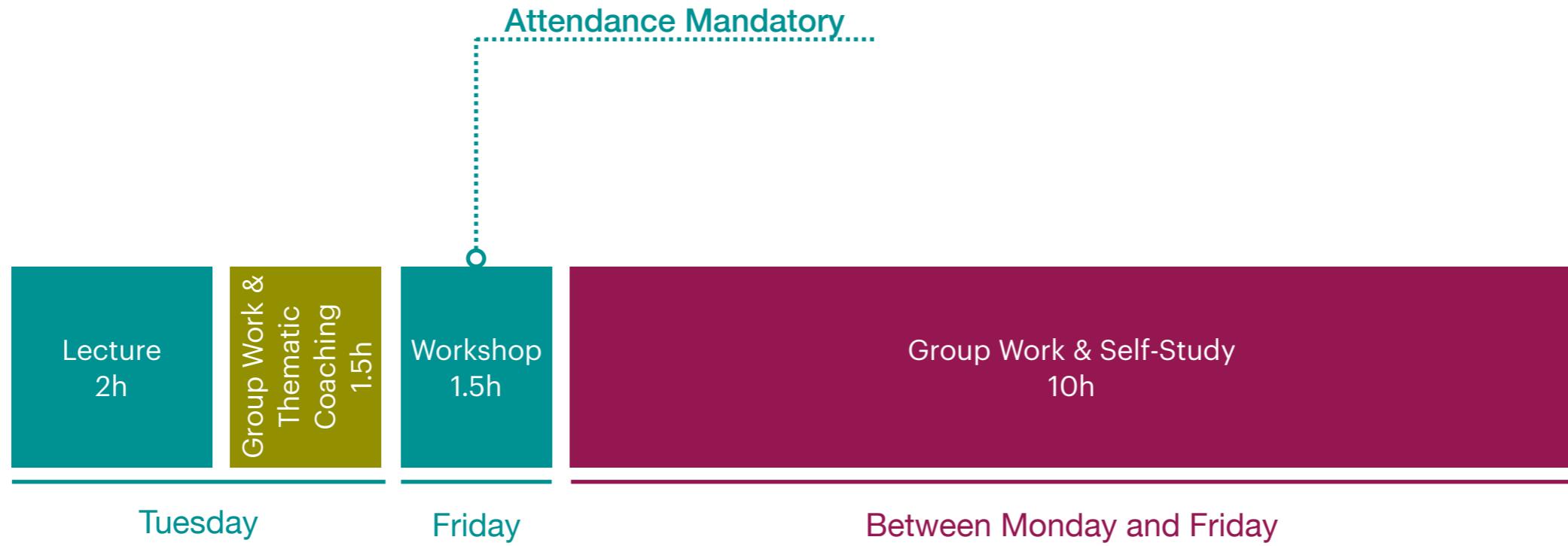


Vasileios

Planning



Weekly Study Management

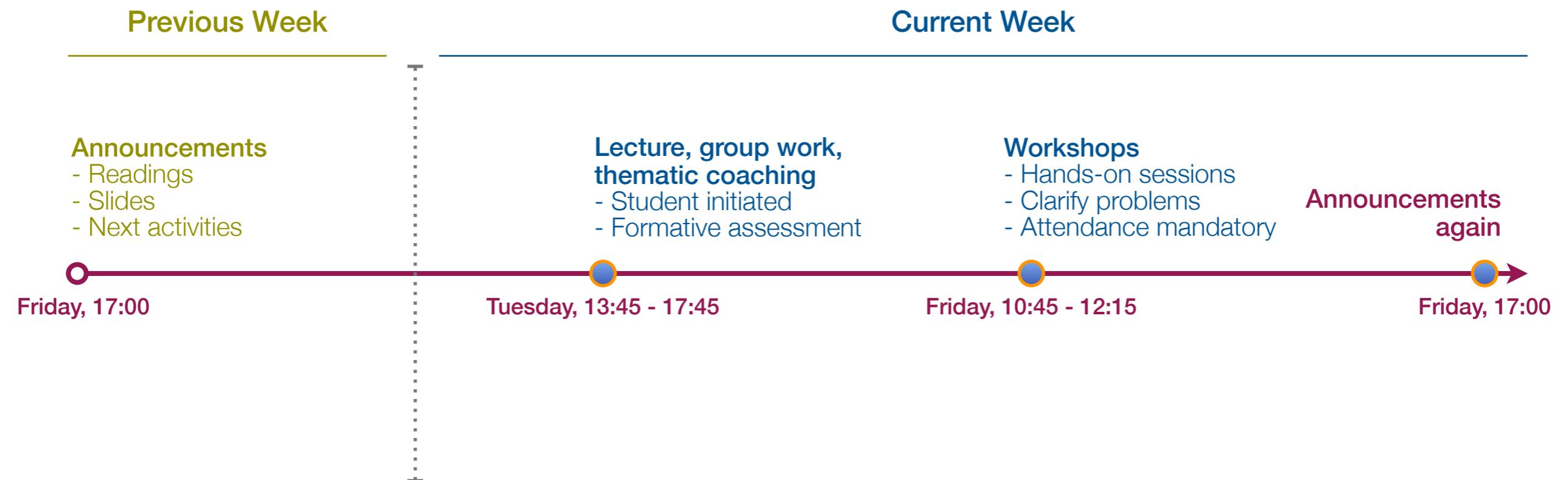


Announcements on Brightspace, **every Friday at 17:00**

Thematic Coaching

-
- Moment of formative assessment
- Initiated by the group and/or student
- Related to the course content (weekly module) and not the project (design brief)
- Complemented with hands-on workshops on Fridays
- Coaching is for the whole class and not for individual groups
- Please notify the coordinator if you would be absent
-

Weekly Activities



Course Website



design-analytics.github.io

Brightspace



Announcements

Welcome to Design Analytics

Posted 31 January, 2024 12:00

Dear students,

Welcome to the *third* edition of Design Analytics.

The first lecture will be held on **February, 13th 2024 from 13:45–15:45 in Pulse Hall 8**. The lecture will be held **in-person**.

Following the lecture, we will have a group work and thematic coaching session in Pulse Hall 8.

While we are setting up the course for you, please go through the following steps:

- Review the [course website](#) where we will share the preparatory materials, slides, and mock assignments (to help you prepare for the final exam).
- We will setup a checklist for each week to make sure that you are up-to-date with all the required tasks and activities. For the first week, you can find this checklist in the [Activities Section](#) of course content ([Content > Activities > Tasks for Week 1](#)). Please go through them carefully.

Some general information for the course:

- **Announcements:** We want to maintain Friday afternoon as the day of the

Calendar

Monday, 12 February, 2024

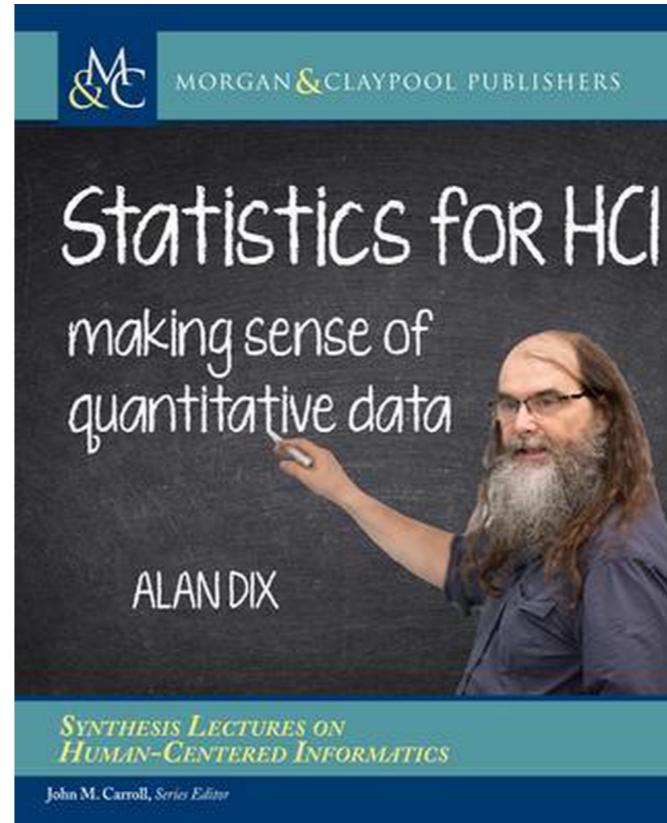
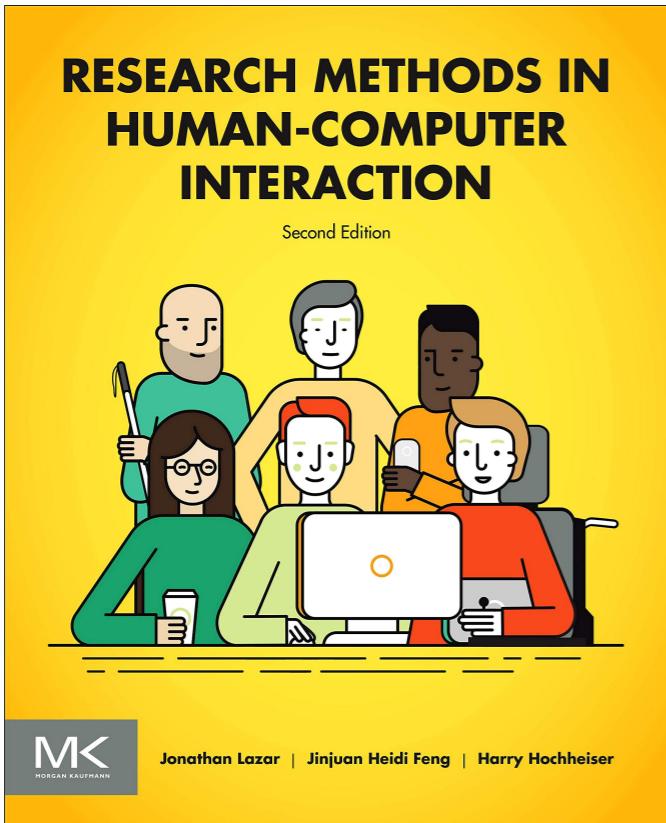
Upcoming events

FEB 13 12:00 Task 1: Please introduce yourself - Due

FEB 13 12:00 Task 2: Please complete the following survey - Due

FEB 13 12:00 Task 3: Please review the preparatory material for this week

Course Materials



Selected chapters from these books, shared on [Course Website](#) and [Brightspace > Content > Materials](#).

Additional content (videos, readings) also shared weekly.

Recordings/Slides of course lectures shared weekly on [Course Website](#) and [Brightspace](#).

It's not necessary to buy the books.

Summative Assessments

Summative Assessment I

Group work (**60%** of Final Grade)

Group report (**20 pages max.**)

**We provide template in Week 2*

Assessment rubrics will be provided

**Coming in Week 4*

Group reports deadline on **12th April, 17:00**

Summative Assessment II

Individual exam (**40%** of Final Grade)

MCQs and open-ended questions

Exam duration: **2h max.**

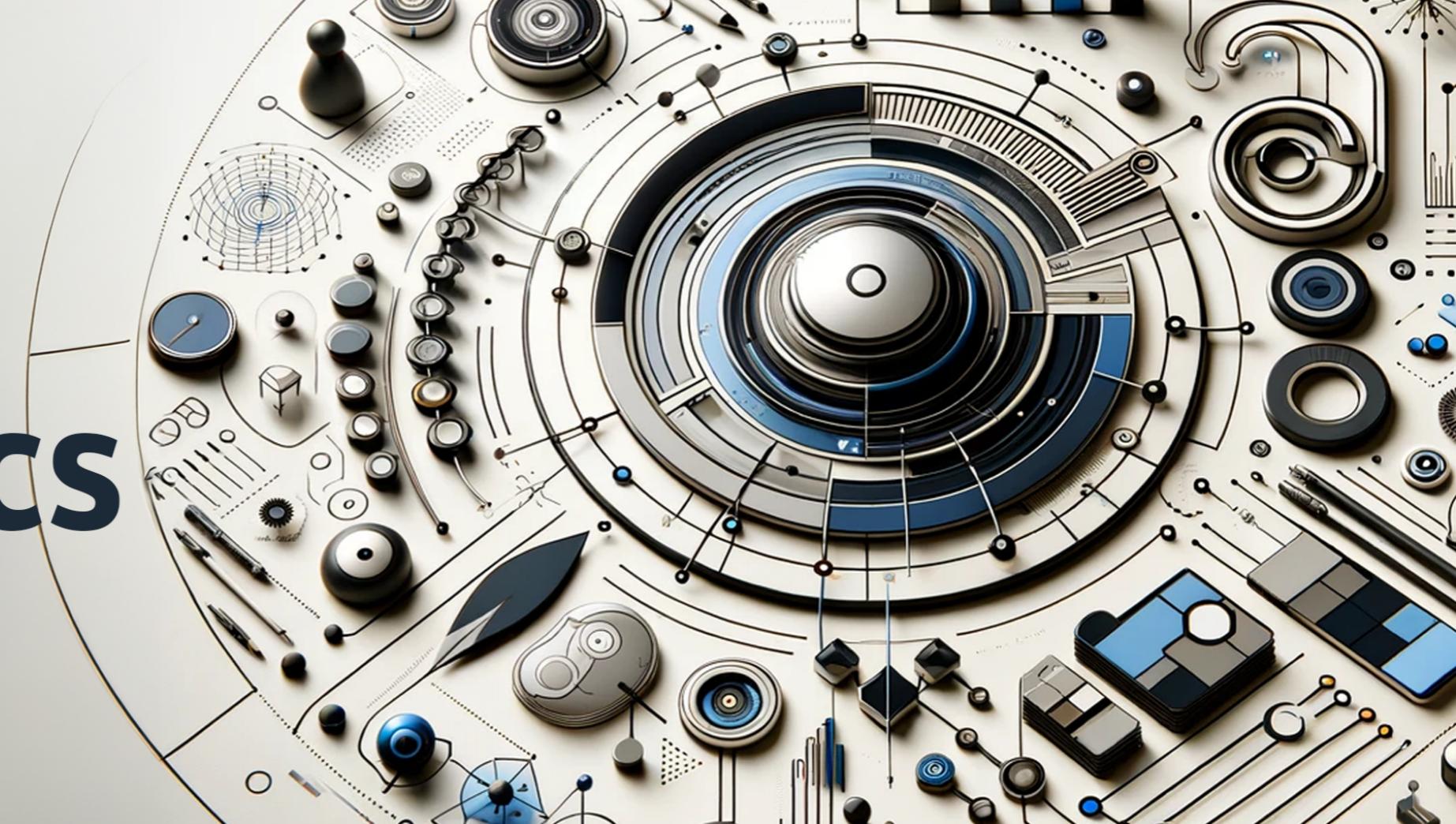
Example questions every week

On campus, **16th April**

*Anyone following the Honors
program?*

Design Analytics

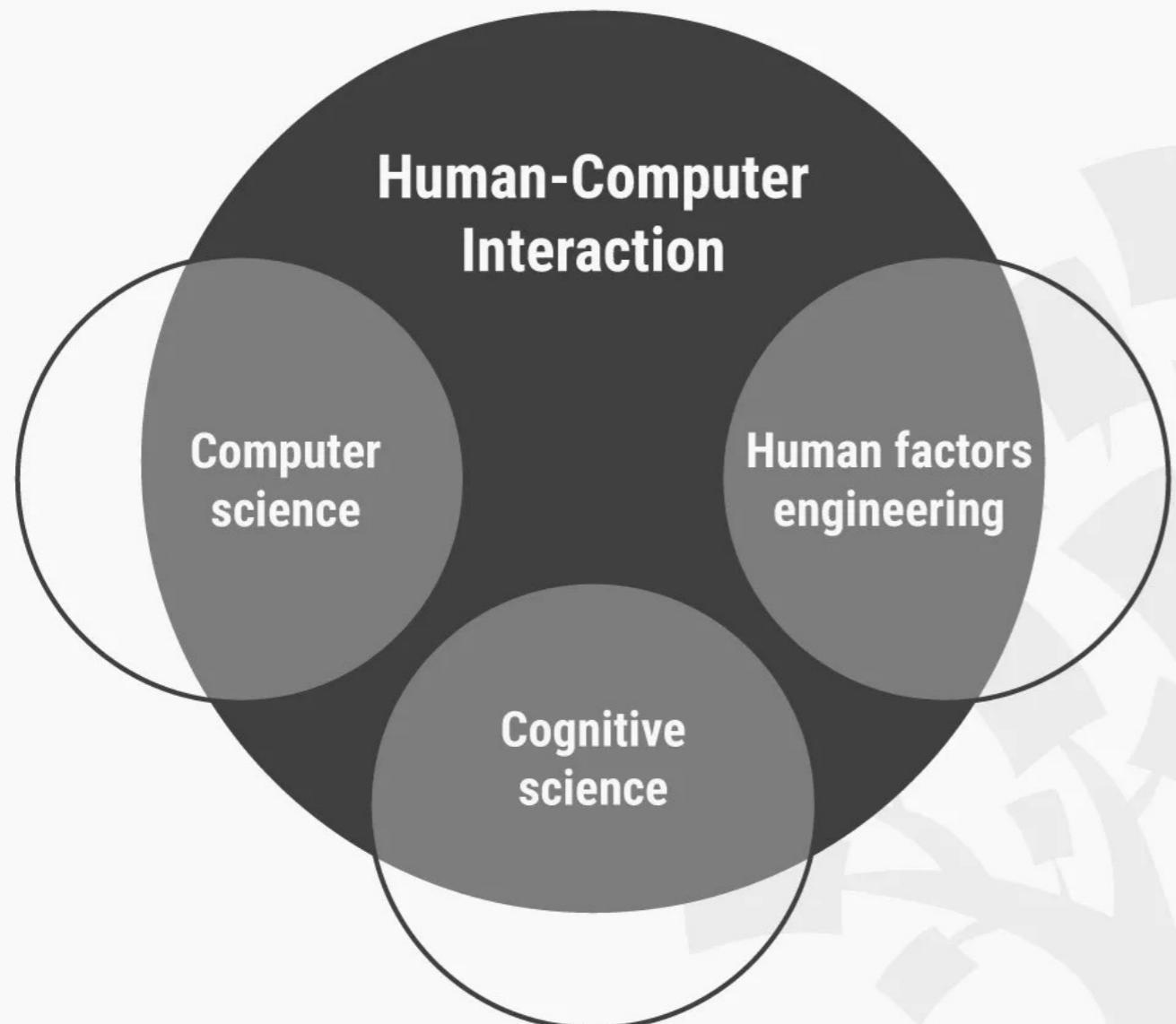
IOB6-E8 | 2023-24



Introduction

Design Analytics: Inspirations

The Multidisciplinary Field of HCI



INTERACTION DESIGN
FOUNDATION

INTERACTION-DESIGN.ORG

Design Analytics is inspired from the domain of **Human-Computer Interaction (HCI)**

HCI studies diverse contexts, artifacts, humans, and relationships between them.

HCI contributions are diverse, and include:

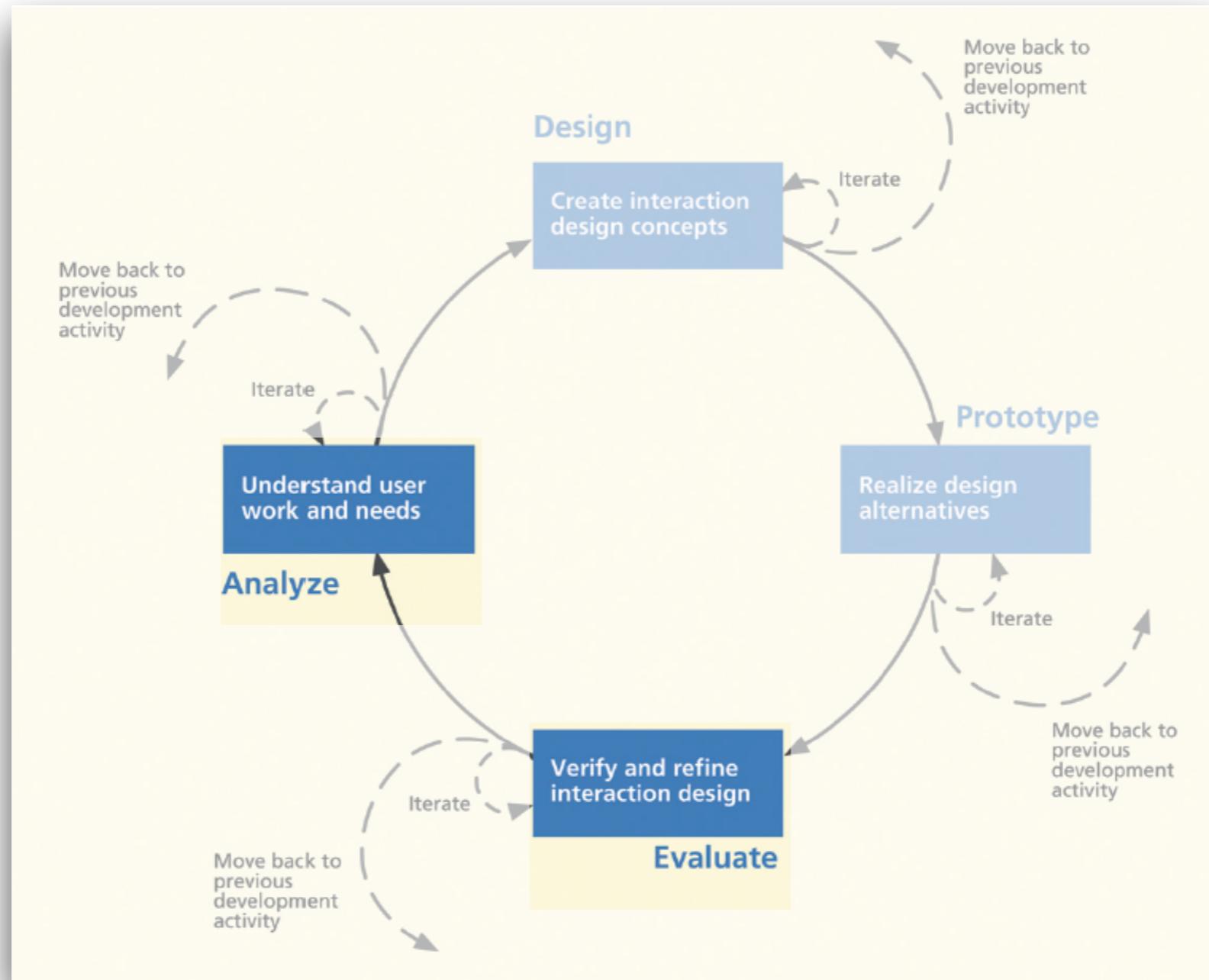
- **Empirical:** Understandings of context, human behavior, or technology use
- **Artifact:** Products, services, systems; ranging from personal to urban level technologies
- **Methodological:** New ways of studying phenomena, systems, humans

HCI has strong ties to industry and academia

“The Wheel” and Design Analytics

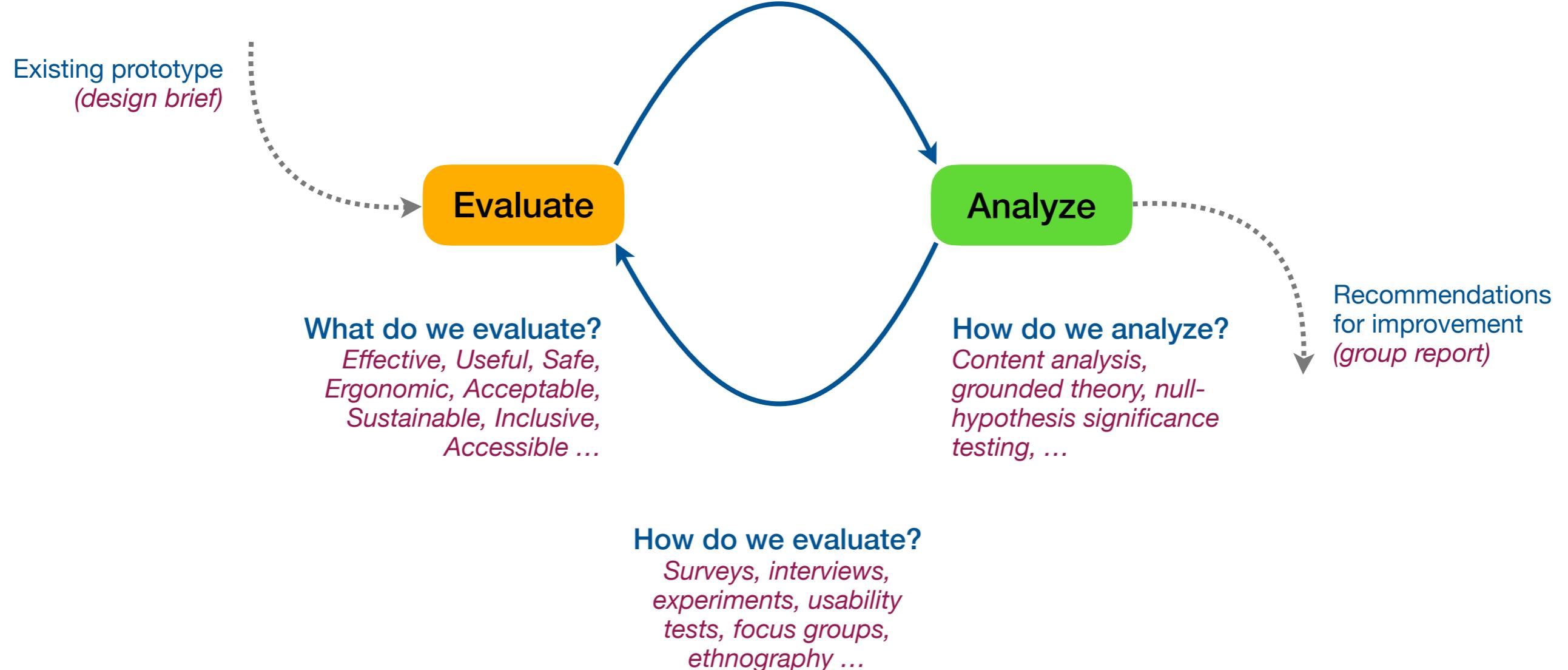
Here, we focus on
Evaluate and Analyze

*Not only for UX or interaction design



Source: Hartson, R., & Pyla, P. S. (2012). The UX Book: Process and guidelines for ensuring a quality user experience. Elsevier.

Evaluate & Analyze Loop



(Scientific) Reasoning

*“Scientific reasoning (or inquiry) has been studied from a variety of theoretical perspectives, and has been defined as a **problem-solving process** that involves **critical thinking** in relation to **content** (observations, designs, or evidence), **processes** (workflows, habits, or routines), and **knowledge** (existing theories)”*



Source: Simon, H. A., & Newell, A. (1971). Human problem solving: The state of the theory in 1970. *American psychologist*, 26(2), 145.

Types of Reasoning/I

Deductive

*Formation of a **conclusion** based on **generally accepted or truthful statements or facts**. The **truthfulness of conclusion** is **assured** by the **truthfulness of initial statements**.*

Inductive

*Formation of a **generalized conclusion** from a **set of instances or observations** (typically a sample). As opposed to universally accepted facts, inductive reasoning produces **probabilistic conclusions** (i.e., may be false).*

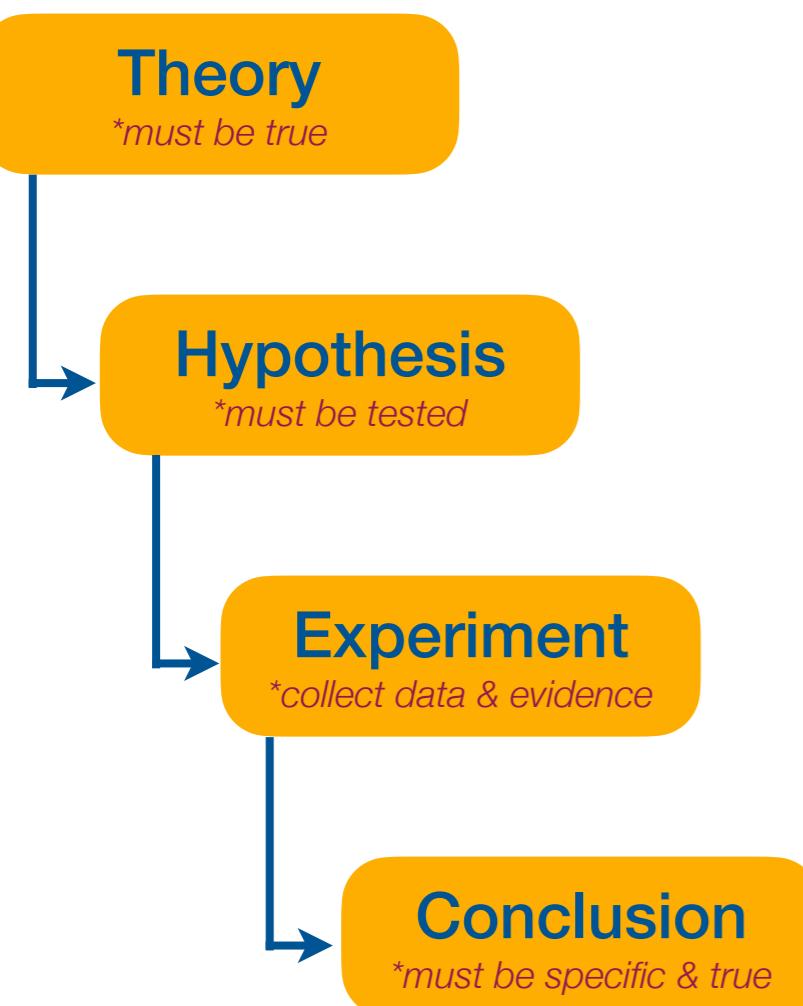
Abductive

*Formation of a **conclusion** based on **what is known or observed**. It typically begins with an **incomplete set of observations** and proceeds to the **likeliest possible explanation**, which may be wrong.*

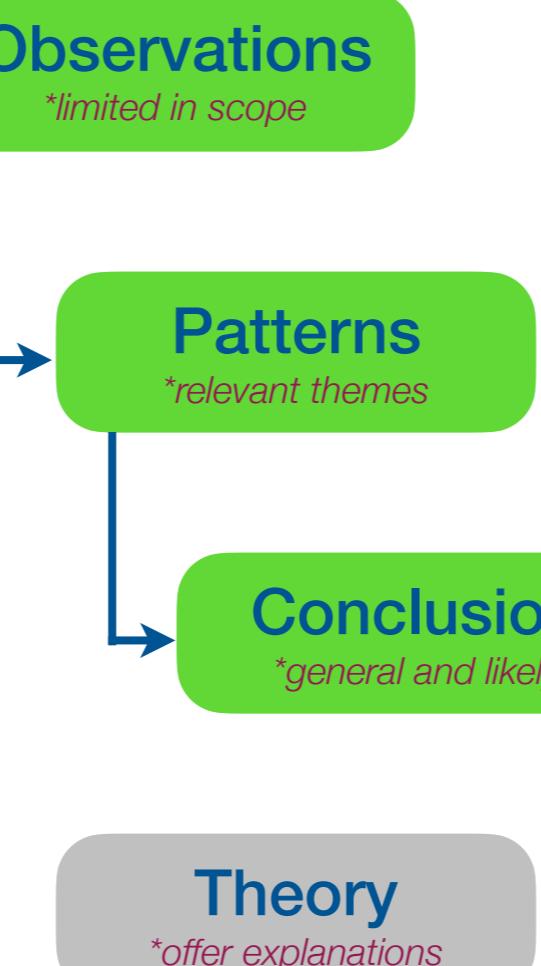
Source: <https://www.butte.edu/departments/cas/tipsheets/thinking/reasoning.html>

Types of Reasoning/II

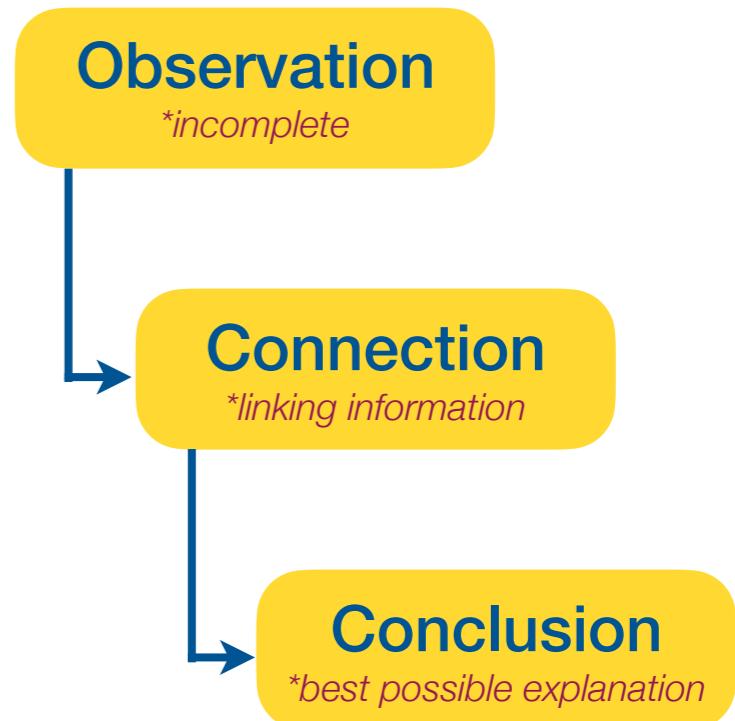
Deductive Reasoning



Inductive Reasoning



Abductive Reasoning



Miro for online whiteboarding

Ways to improve performance

- Yellow column:
 - We need to optimize delivery pipeline
 - Some teams need to be more transparent
 - Support team needs more people
- Orange column:
 - Break up projects into manageable chunks
 - Last quarter was the best in terms of results
 - We should revamp our marketing strategy
- Yellow column:
 - Hiring process is too slow. We're in hypergrowth
 - Design team timelines are vague
- Purple column:
 - Other teams are not transparent at all
 - Prague office is disconnected from the rest
 - I don't understand what's expected from me
- Blue column:
 - Hires to operations team for component pipeline!
 - We need better KPIs
 - More clarity on what we need to achieve
- Pink column:
 - Better stakeholder management
 - Have more informal team activities
 - Change our planning and grooming session
 - Focus on impact

Bea
Hisham
Anna
Mae

Who knows Miro!?



What about this one?



MeetHub

Research Context

How do groupware influence collocated collaboration?

performance, balanced participation, mutual understanding, information sharing, conversation quality ...

Study Design

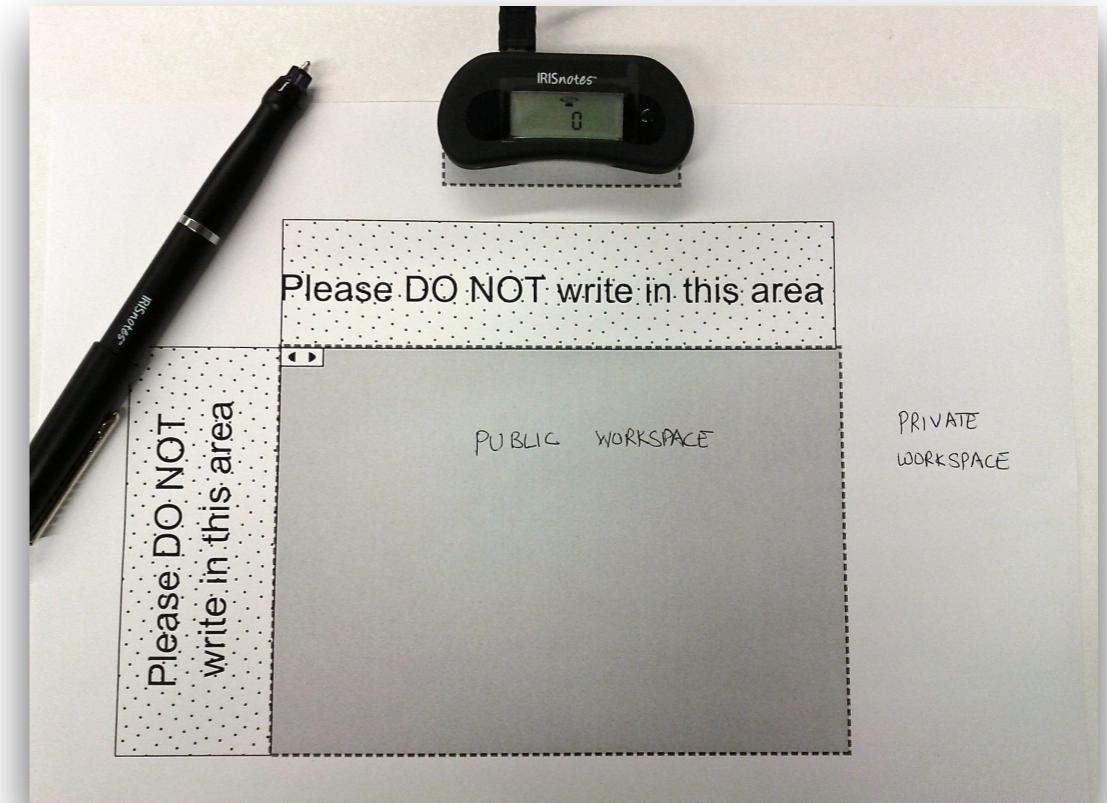
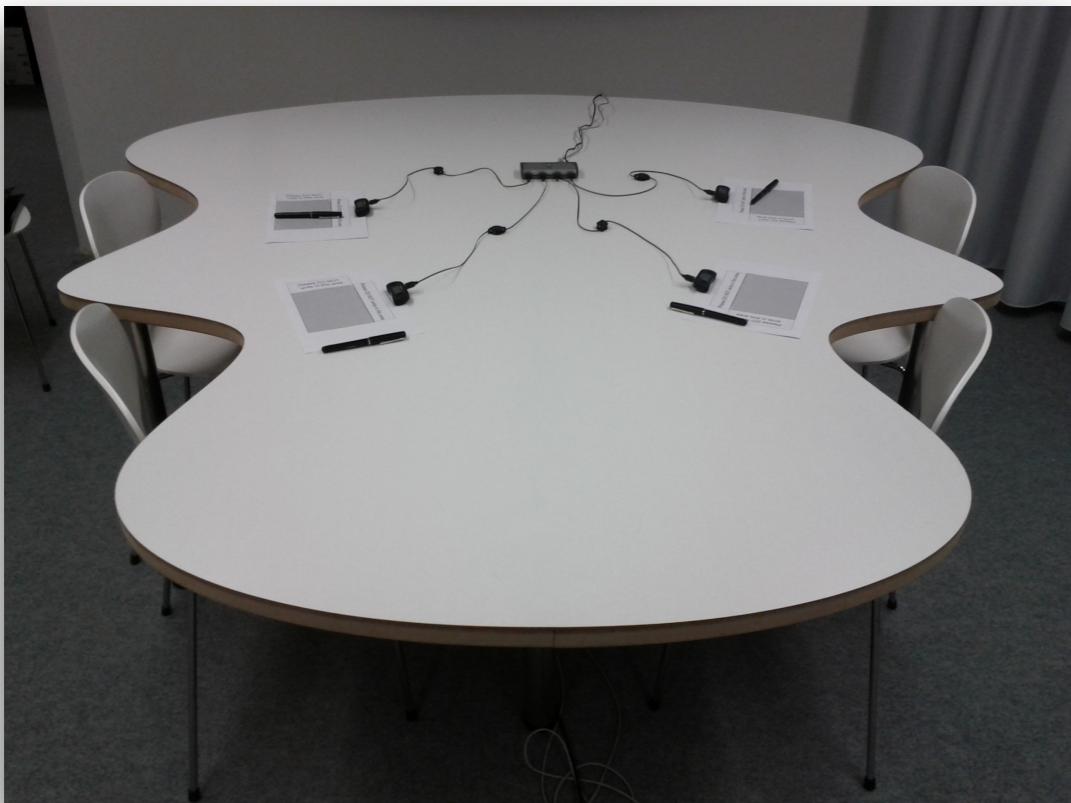
The study/experiment design should enable designer/researcher to answer the research question in reliable way.

Good Practice

Experiments should incorporate both qualitative and quantitative (mixed-methods) approaches.

In this course we will particularly focus on quantitative methodology.

Input Modality: Pen & Paper



Considering MeetHub as a **prototype** groupware, what can be the **reasonable** and **relevant** research questions (RQs):

- RQ1: Is Pen & Paper setup an **effective way of interacting** with a shared whiteboard?
- RQ2: How does Pen & Paper prototype **influence the type of content** that the group creates?
- RQ3: What **kind of collaborative tasks** are suitable for Pen & Paper prototype?

(Mouse & Keyboard) vs. (Pen & Paper)



To compare, we need a **Baseline** or the “**Status Quo**”

- *Baseline is the default prototype/scenario/way of doing things*
- *Baselines are also referred to as control conditions in quantitative research*
- *Baselines should provide the same functions/features to facilitate comparisons*

Source: Verma, H., Roman, F., Magrelli, S., Jermann, P., & Dillenbourg, P. (2013, February). Complementarity of input devices to achieve knowledge sharing in meetings. In *Proceedings of the 2013 conference on computer supported cooperative work* (pp. 701-714).

Methods & Measures

- In your study design, you can include both the **objective** and **subjective** measures.
- **Objective** measures are clearly defined and there is no room for alternative interpretations.
**e.g., task completion time, #words, #drawings*
- **Subjective (or perceived)** measures reflect participants' perceptions/feelings about the concerned prototype.
**e.g., fatigue, workload*
- We often try to “reinvent the wheel”, so, here we will also learn about **standardized** and **validated** measures.



Standardized Measures

NASA TLX (physical and cognitive workload)

NASA Task Load Index

Hart and Staveland's NASA Task Load Index (TLX) method assesses work load on five 7-point scales. Increments of high, medium and low estimates for each point result in 21 gradations on the scales.

Name	Task	Date
------	------	------

Mental Demand How mentally demanding was the task?

Physical Demand How physically demanding was the task?

Temporal Demand How hurried or rushed was the pace of the task?

Performance How successful were you in accomplishing what you were asked to do?

Effort How hard did you have to work to accomplish your level of performance?

Frustration How insecure, discouraged, irritated, stressed, and annoyed were you?

System Usability Scale
(perceived usability)

	Strongly disagree						Strongly agree
1. I think that I would like to use this ballot frequently.	<input type="checkbox"/>						
2. I found the ballot unnecessarily complex.	<input type="checkbox"/>						
3. I thought the ballot was easy to use.	<input type="checkbox"/>						
4. I think that I would need the support of a poll official to be able to use this system.	<input type="checkbox"/>						
5. I found the various parts of this ballot were well integrated.	<input type="checkbox"/>						
6. I thought there was too much inconsistency in this ballot.	<input type="checkbox"/>						
7. I would imagine that most people would learn to use this ballot very quickly.	<input type="checkbox"/>						
8. I found the ballot very awkward to use.	<input type="checkbox"/>						
9. I felt very confident using the ballot.	<input type="checkbox"/>						
10. I needed to learn a lot of things before I could get going with this ballot.	<input type="checkbox"/>						

UX Questionnaire
(perceived experience)

	1	2	3	4	5	6	7	
annoying	<input type="radio"/>	enjoyable						
not understandable	<input type="radio"/>	understandable						
creative	<input type="radio"/>	dull						
easy to learn	<input type="radio"/>	difficult to learn						
valuable	<input type="radio"/>	inferior						
boring	<input type="radio"/>	exciting						
not interesting	<input type="radio"/>	interesting						
unpredictable	<input type="radio"/>	predictable						
fast	<input type="radio"/>	slow						
inventive	<input type="radio"/>	conventional						
obstructive	<input type="radio"/>	supportive						
good	<input type="radio"/>	bad						
complicated	<input type="radio"/>	easy						
unlikable	<input type="radio"/>	pleasing						
usual	<input type="radio"/>	leading edge						
unpleasant	<input type="radio"/>	pleasant						
secure	<input type="radio"/>	not secure						
motivating	<input type="radio"/>	demotivating						
meets expectations	<input type="radio"/>	does not meet expectations						
inefficient	<input type="radio"/>	efficient						
clear	<input type="radio"/>	confusing						
impractical	<input type="radio"/>	practical						
organized	<input type="radio"/>	cluttered						
attractive	<input type="radio"/>	unattractive						
friendly	<input type="radio"/>	unfriendly						
conservative	<input type="radio"/>	innovative						

Participants

- Who should we recruit in our study and why?
- Are all of our participants able to use the prototype?
- How many participants are enough?
- Should we compensate our participants for their time and effort?
- Do we have their consent to use their data?
- Do we have an ethical approval to run our study?



Tasks

- What tasks do we ask our participants to perform in our study?
- The task should be **neutral** and should not favor one condition over another (**crooked study**).
- In what sequence do the participants have to perform the task? Should the sequence be fixed or should we **counterbalance**?
- Can participants perform a **practice task** before doing the actual task?
- Please make sure to **document** every aspect of your study (especially in your report).



Experimental Validity

Internal Validity

*The extent to which the study establishes trustworthy **cause-and-effect relationship** between a treatment/intervention and an outcome.*

External Validity

*The extent to which the study findings can be **generalized to the general population** from which the sample was drawn.*

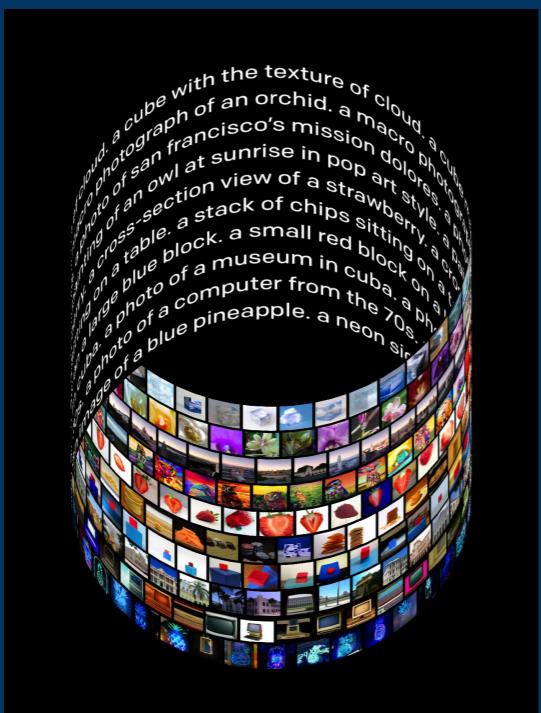
Ecological Validity

*The extent to which the study findings can be **generalized to real-world settings**.*

Acknowledgements



Dr. Evangelos Niforatos for his valuable contributions with the design of this course and for significant proportion of lecture content.



Dall-E for some of the illustrations which have been used in this course.