HEXMD
HUMAN EXPERIENCE & MEDIA DESIGN

AN INTRODUCTION TO :

HUMAN-CENTERED DESIGN

BY ROELOF DE VRIES

WHO AM I?

Roelof de Vries

Background:

BSc at UvA in Artificial Intelligence
MSc at UvA in Information Studies
PhD at UT-HMI -> theory-based behavior change technology
Postdoctoral researcher UT-BSS -> design of behavior change technology

Since 2023:
HU: Senior researcher Human Experience and Media Design
HU: Lecturer -> Master Data-Driven Design for IvM &
-> Human-Centered Design Module in Master of Informatics for HE&MD

WHO ARE WE?

Lectoraat Human Experience & Media Design

HUMAN EXPERIENCE
MEDIA DESIGN

WHO ARE WE?

Lectoraat Human Experience & Media Design

Koen van Turnhout

me

HUMAN EXPERIENCE
MEDIA DESIGN

TODAY

1. HOW FAMILIAR ARE YOU WITH DESIGN APPROACHES?

2. A SHORT HISTORY OF HUMAN-CENTERED DESIGN

3. HUMAN-CENTERED DESIGN & ISO-NORM & BEYOND

HUMAN EXPERIENCE
MEDIA DESIGN

HOW FAMILIAR ARE YOU WITH DESIGN APPROACHES?

Inclusive Design
Value Sensitive Design
Universal Design
Participatory Design
Co-Design
More-Than-Human Design
Futuring
Speculative Design

Critical Design
User-Centered Design
Human-Centered Design
Contextual Design
Responsible Design
Design for All
Design Thinking
Double Diamond

Raise your hand if you know 5+

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## Raise your hand if you know 1 or 2

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Who, or what, is important?

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Who, or what, is important?
(and that's a lot of responsibility)

A SHORT HISTORY OF HUMAN-CENTERED DESIGN
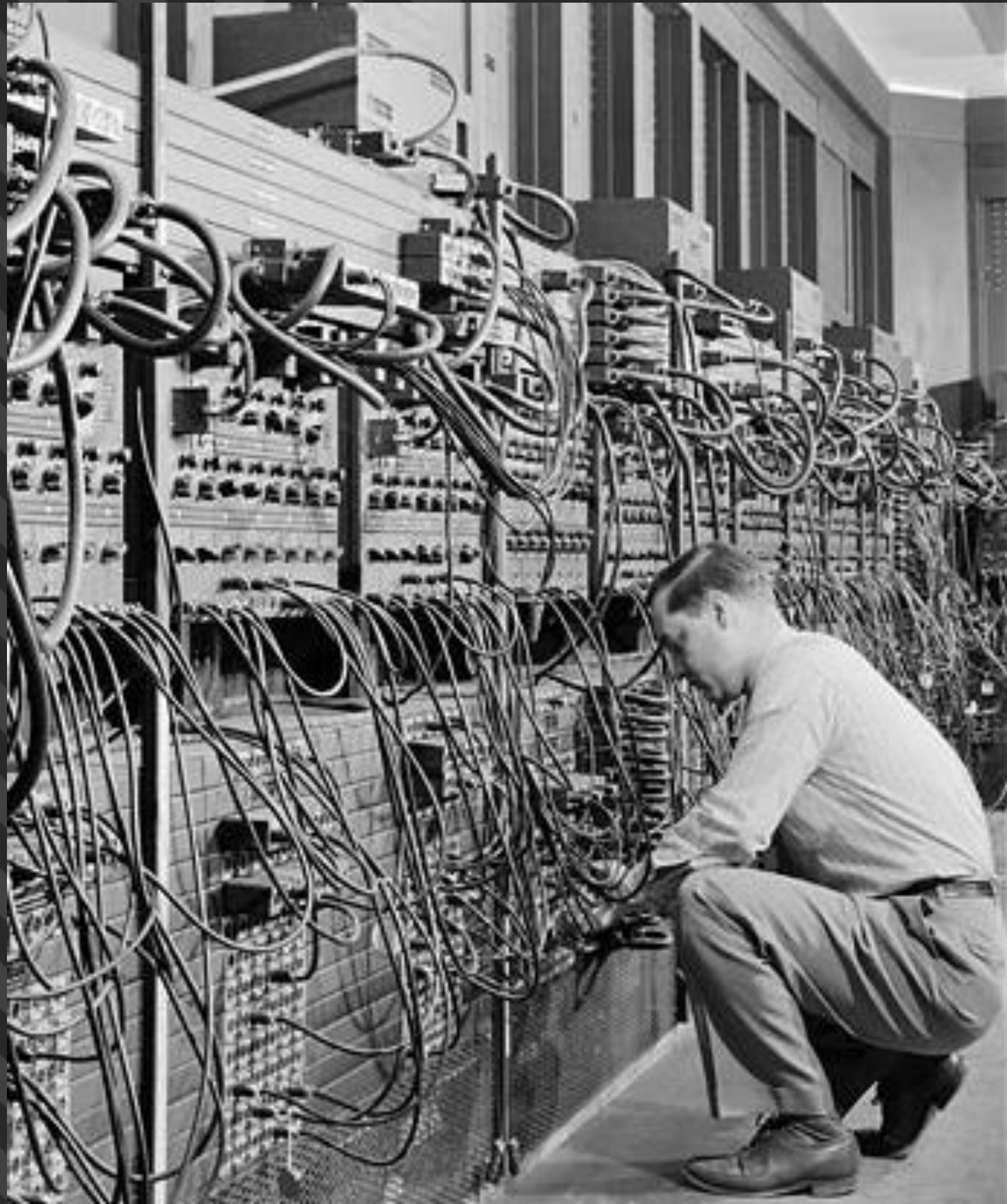
Eniac (1946)

"Ergonomics / Human Factors Engineering" approach

application of psychological and physiological principles to the engineering and design of products, processes, and systems.

→ goal: reducing human error, productivity

50's and 60's

Mainframe computers

Dedicated design (hardware and software)

E.g. Airplane cockpits

"Humans" are described in table books *for* design

Who, or what, is important?
-> The task, and effectiveness

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A SHORT HISTORY OF HUMAN-CENTERED DESIGN

Participatory Design Approach (Scandinavia)

70's and beyond

Computers enter the workplace, but not yet 'personal'

Generic controls, dedicated software

E.g. Factories

"Humans" are considered design partners

Still task-centered approach

But, equality is most important value

IBM Mainframe (1964)

**Who, or what, is important?
-> The task, and equality**

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A SHORT HISTORY OF HUMAN-CENTERED DESIGN

Personal Computers (1980ies)

User-centered Design (US)

80's and 90's.

Computers invade the workspace (and our homes) and become more personal!

Generic controls, generic software

E.g. Office Cubicles

"Humans" are considered object of design research

Needs-centered approach

Usability is most important value

Who, or what, is important?
-> The user, and usability

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A SHORT HISTORY OF HUMAN-CENTERED DESIGN

Networked Computer (1990ies)

Human-centered Design

90's and 00's.

Networked computers, social software, generic controls, generic software

E.g. online computers

"Humans" are considered object of design research plus co-design (participatory design)

Needs-centered approach

Flexible (private) values

ISO 9241-210:2019 Ergonomics of human-system interaction — Part 210: Human-centred design for interactive systems
https://www.**iso**.org/ru/standard/77520.html

Who, or what, is important?
-> The human, and private values

HUMAN-CENTERED DESIGN & ISO-NORM & BEYOND

ISO 9241-210:2019
Ergonomics of human-system interaction — Part 210: Human-centred design for interactive systems
https://www.**iso**.org/ru/standard/77520.html

Nederlandse norm

NEN-EN-ISO 9241-210
(en)

Ergonomie van de mens-systeeminteractie - Deel
210: Op de mens gericht ontwerp voor
interactieve systemen (ISO 9241-210:2019,IDT)

Ergonomics of human-system interaction - Part
210: Human-centred design for interactive
systems (ISO 9241-210:2019,IDT)

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HUMAN-CENTERED DESIGN & ISO-NORM & BEYOND

Systems designed using human-centred methods improve overall quality, for example, by:

a) increasing the **productivity** of users and the operational **efficiency** of organizations;

b) being easier to understand and use, thus reducing training and support costs;

c) increasing **usability** (effectiveness, efficiency and satisfaction)

d) increasing **accessibility** (for people from a population with the widest range of user needs, characteristics and capabilities);

e) improving **user experience**;

f) reducing discomfort and stress;

g) providing a competitive advantage, for example by improving brand image;

h) contributing towards sustainability objectives.

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Table 1 — Examples of outputs from human-centred design activities

Activities	Outputs from human-centred design	Examples of information contained in outputs
Understand and specify the context of use	Context of use description	— User group profiles — As-is scenarios — Personas
Specify the user requirements	User needs description User requirements specification	— Identified user needs — Derived user requirements — Required design guidance
Produce design solutions to meet these requirements	User-system interaction specification User interface specification Implemented user interface	— Scenarios of use — Low-fidelity prototypes — High-fidelity prototypes
Evaluate the designs against requirements	Evaluation results Conformance test results Long-term monitoring results	— Usability-test report — Field report — User survey report

NOTE   More detailed information on each output can be found in ISO/IEC TR 25060.

HUMAN-CENTERED DESIGN & ISO-NORM & BEYOND

human-centered principles:

a) the design is based upon an explicit understanding of users, tasks and environments;

b) users are involved throughout design and development;

c) the design is driven and refined by user-centered evaluation;

d) the process is iterative;

e) the design addresses the whole user experience;

f) the design team includes multidisciplinary skills and perspectives.

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HUMAN-CENTERED DESIGN & ISO-NORM & BEYOND

human-centered principles:

a) **the design is based upon an explicit understanding of users, tasks and environments;**

1. All stakeholders should be identified
2. Constructing systems based on inappropriate or incomplete understanding of user needs is major source of failure
3. Usability and accessibility of product depends on the context, i.e. the specified users, having specified goals, performing specified tasks, in a specified environment (together called context of use).

For example: the kind of interface that provides good user experience for a young person downloading music on a phone may be completely inappropriate for accessing corporate data on a PDA (personal digital assistant).

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human-centered principles:

b) users are involved throughout design and development;

1. Involving users in the design and development provides a valuable source of knowledge about the context of use (users, tasks, environment).
2. User involvement should be active, whether by participating in design, acting as a source of relevant data or evaluating solutions.
3. The people who are involved should have capabilities, characteristics and experience that reflect the range of users for whom the system is being designed.
4. The nature and frequency of this involvement can vary throughout design and development, depending on the type of project.
5. The effectiveness of user involvement increases as the interaction between the developers and the users increases.

human-centered principles:

c) the design is driven and refined by user-centered evaluation;

1. Feedback from users is a critical source of information in human-centred design.
2. Evaluating designs with users and improving them based on their feedback provides an effective means of minimizing the risk of a system not meeting user or organizational needs.
3. Such evaluation allows preliminary design solutions to be tested against "real world" scenarios, with the results being fed back into progressively refined solutions.
4. User-centred evaluation should also take place as part of the final acceptance of the product to confirm that requirements have been met.
5. Feedback from users during operational use identifies long-term issues and provides input to future design.

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human-centered principles:

d) the process is iterative;

1. The most appropriate design for an interactive system cannot typically be achieved without iteration.
2. The complexity of human–computer interaction means that it is impossible to specify completely and accurately every detail of every aspect of the interaction at the beginning of development.
3. Many of the needs and expectations of users and other stakeholders that will impact on the design of the interaction only emerge in the course of development, as the designers refine their understanding of the users and their tasks, and as users are better able to express their needs in response to potential solutions.
4. Iteration of proposed solutions incorporating feedback from a user perspective provides a means of mitigating risk.

HUMAN-CENTERED DESIGN & ISO-NORM & BEYOND

human-centered principles:

e) the design addresses the whole user experience;

1. User experience is a consequence of the presentation, functionality, system performance, interactive behaviour, and assistive capabilities of an interactive system, both hardware and software.
2. It is also a consequence of the user's prior experiences, attitudes, skills, habits and personality.
3. Users' strengths, limitations, preferences and expectations should be taken into account when specifying which activities are carried out by the users and which functions are carried out by the technology.

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human-centered principles:

f) the design team includes multidisciplinary skills and perspectives.

1. Human-centered design teams do not have to be large, but the team should be sufficiently diverse to collaborate over design and implementation trade-off decisions at appropriate times.

a) human factors and ergonomics, usability, accessibility, human-computer interaction, user research;

b) users and other stakeholder groups (or those that can represent their perspectives);

c) application domain expertise, subject matter expertise;

d) marketing, branding, sales, technical support and maintenance, health and safety;

e) user interface, visual and product design;

f) technical writing, training, user support;

g) user management, service management and corporate governance;

h) business analysis, systems analysis;

i) systems engineering, hardware and software engineering, programming, production/ manufacturing and maintenance;

j) human resources, sustainability and other stakeholders.

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RESEARCH
Discover goals & needs

IDEATE
Generate ideas

PROTOTYPE
Produce something tangible

EVALUATE
Determine ease of use

LAUNCH
Release to users and measure

ITERATE

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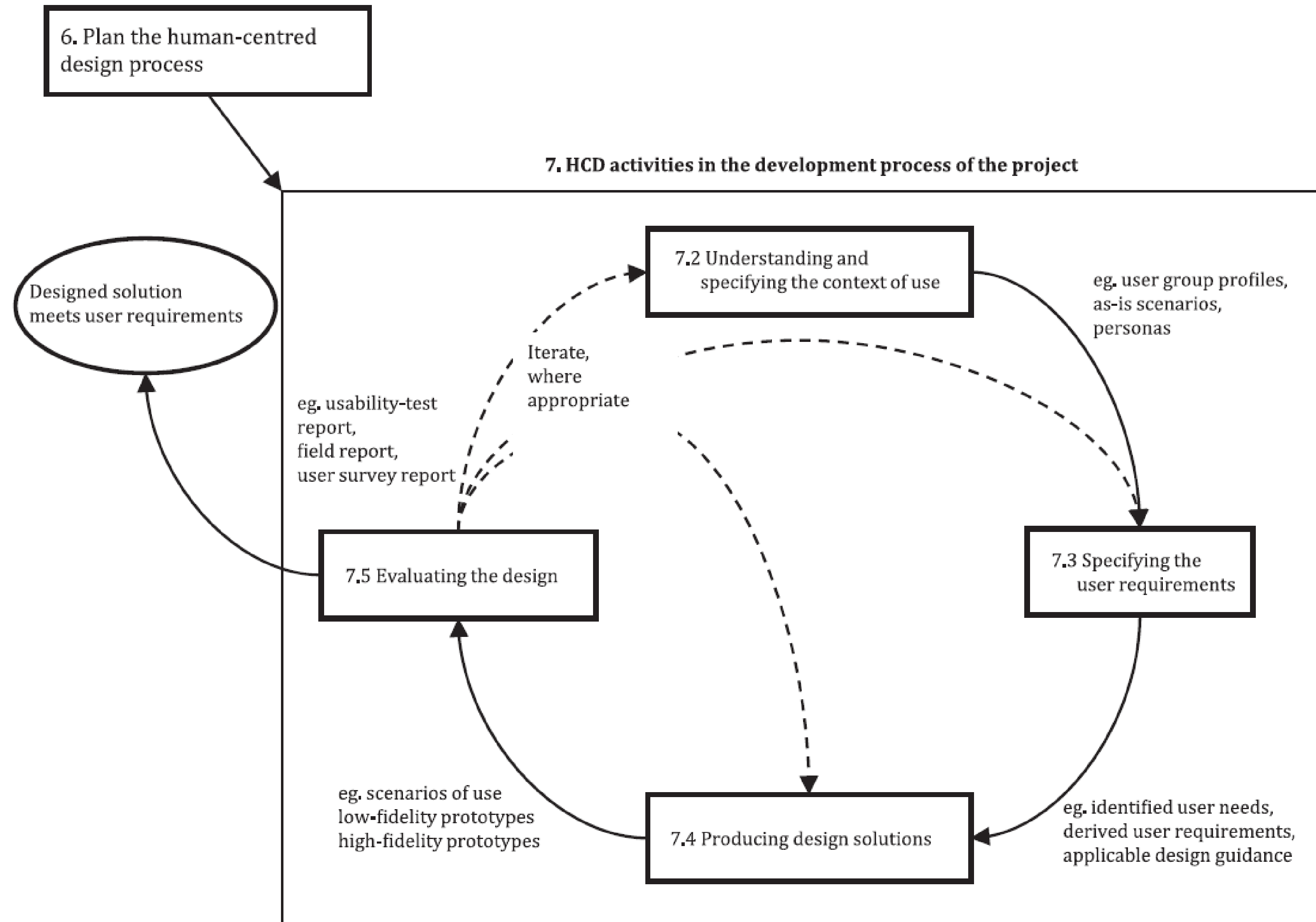
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Universal Design process

Start here!

Define	Research	Brainstorm	Develop	Review	Finalize	Support	
1.	2.	3.	4.	5.	6.	7.	

Pivot

Revise

Outcome: human-centered, universal design.

THE UNIVERSAL DESIGN PROJECT
UNIVERSALDESIGN.ORG/PROCESS

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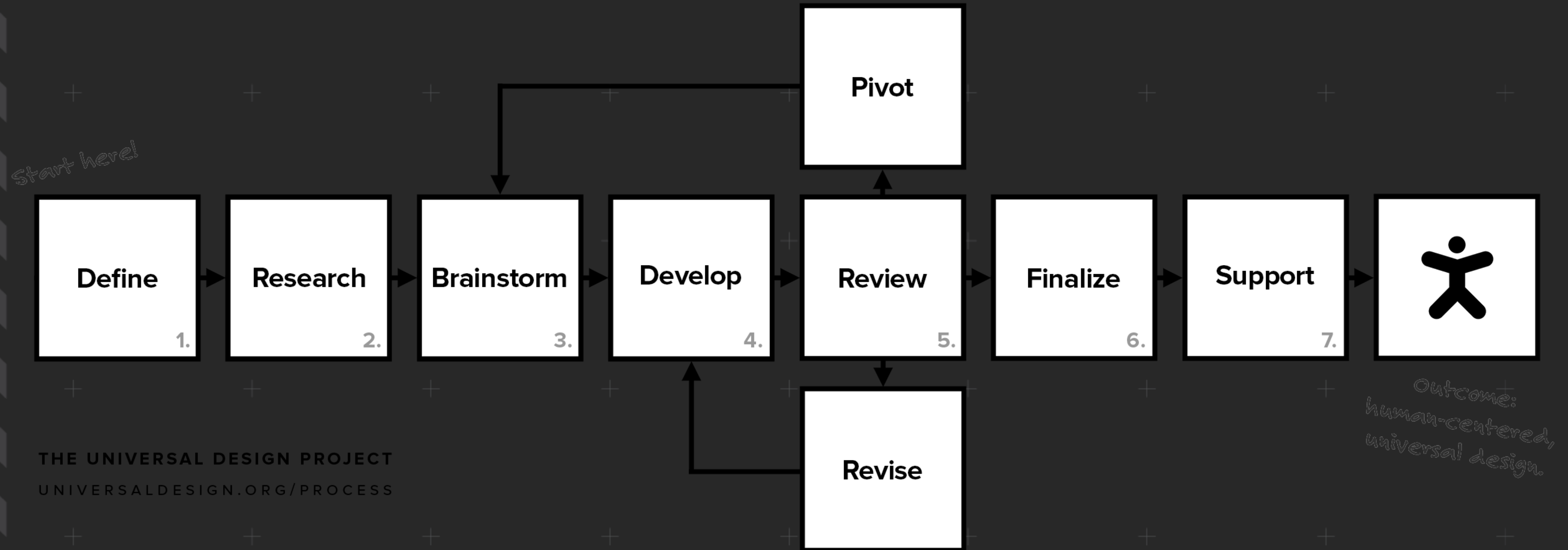
Design Thinking:
a Non-Linear Process

Learn about users through testing

Empathy helps define problems

Tests create new ideas for projects

Empathize

Define

Ideate

Prototype

Test

Prototype sparks a new idea

Tests reveal insights that redefine the problem
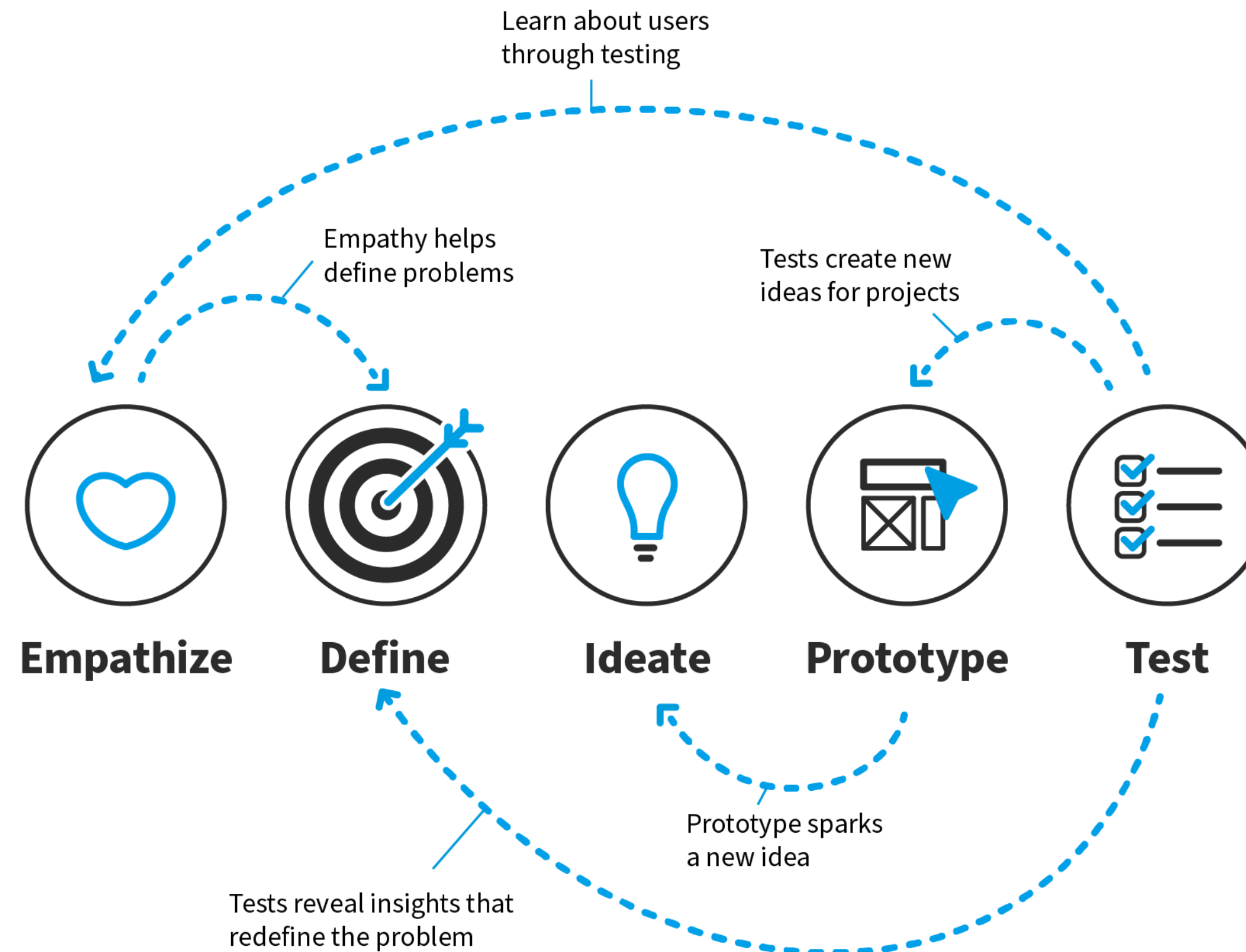
Interaction Design Foundation
interaction-design.org

The double diamond design process

A four-step process for designing solutions to complex problems.

What's the problem?

What's the solution?

DIVERGE

CONVERGE

DIVERGE

CONVERGE

Discover

Define

Develop

Deliver

Understand *all* relevant problems, causes, and knock-on effects.

Combine what you've discovered to identify the key issues.

Brainstorm, experiment, and test a wide variety of possible solutions.

Narrow your focus onto the best solutions, hone and launch them.
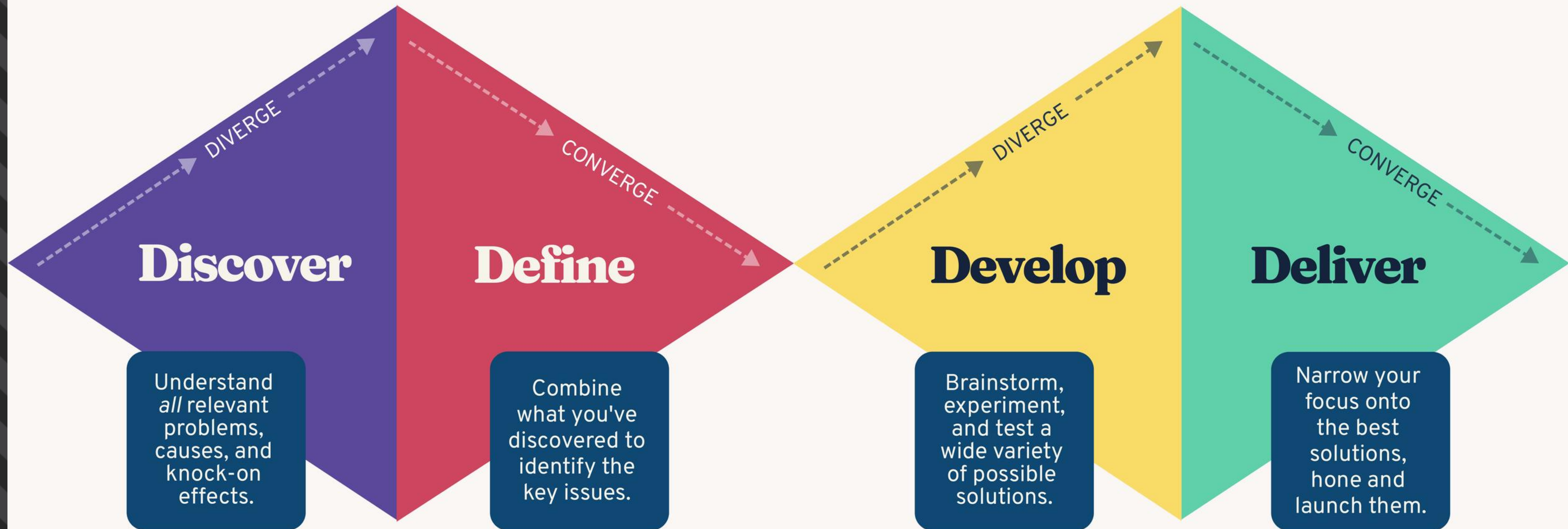
BiteSize Learning

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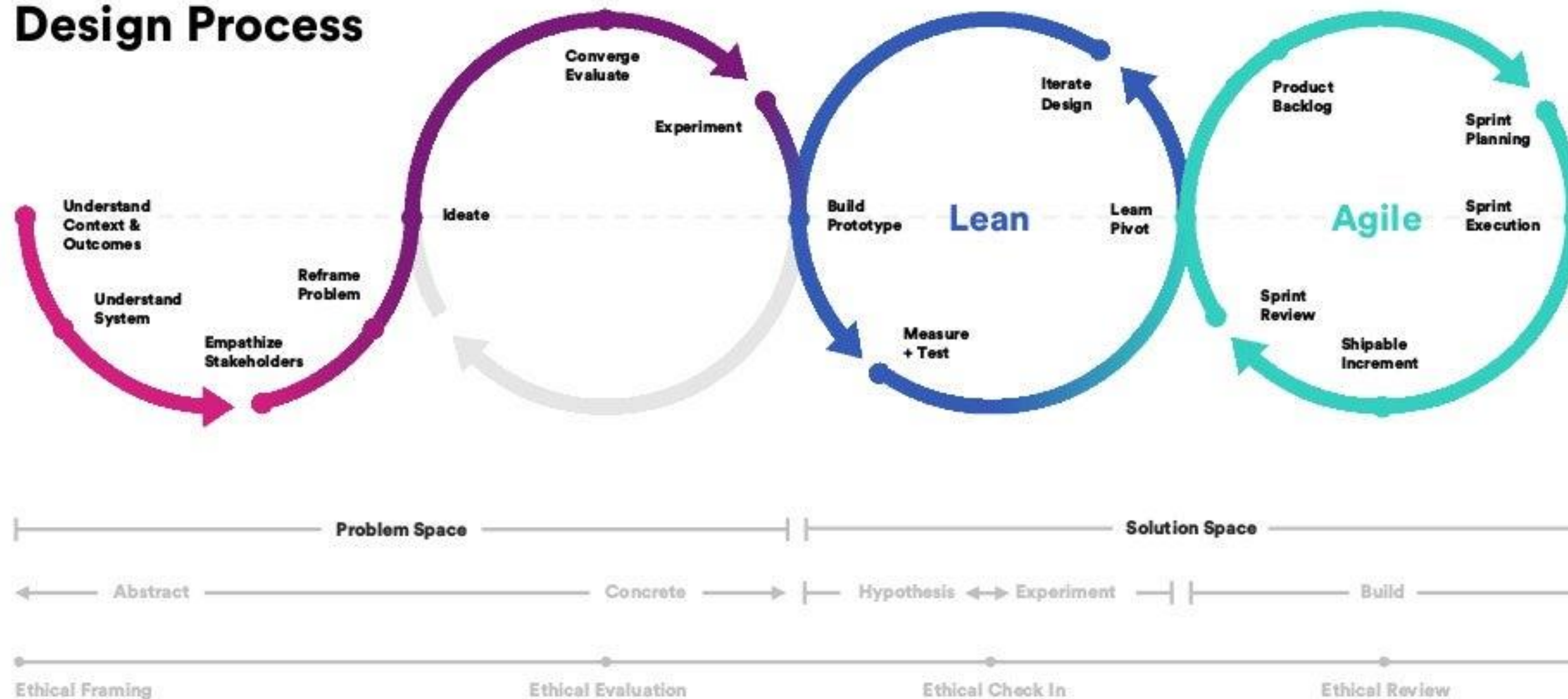MEDIA DESIGN

Responsible Design Process

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Who, or what, is important?
(and that's a lot of responsibility)

HUMAN-CENTERED DESIGN MODULE
Master of Informatics

Weeks in the module: **human-centered principles:**

1 Introduction HCD

2 Algoritmic Affordances ➡   a) the design is based upon an explicit understanding of users, tasks and environments;

3 Relatable Interfaces ➡   b) users are involved throughout design and development;

4 Behavior Change Technology ➡   c) the design is driven and refined by user-centered evaluation;

5 Wearable Interaction ➡   d) the process is iterative;

6 Immersive Interaction ➡   e) the design addresses the whole user experience;

7 Enterprise UX ➡   f) the design team includes multidisciplinary skills and perspectives.

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