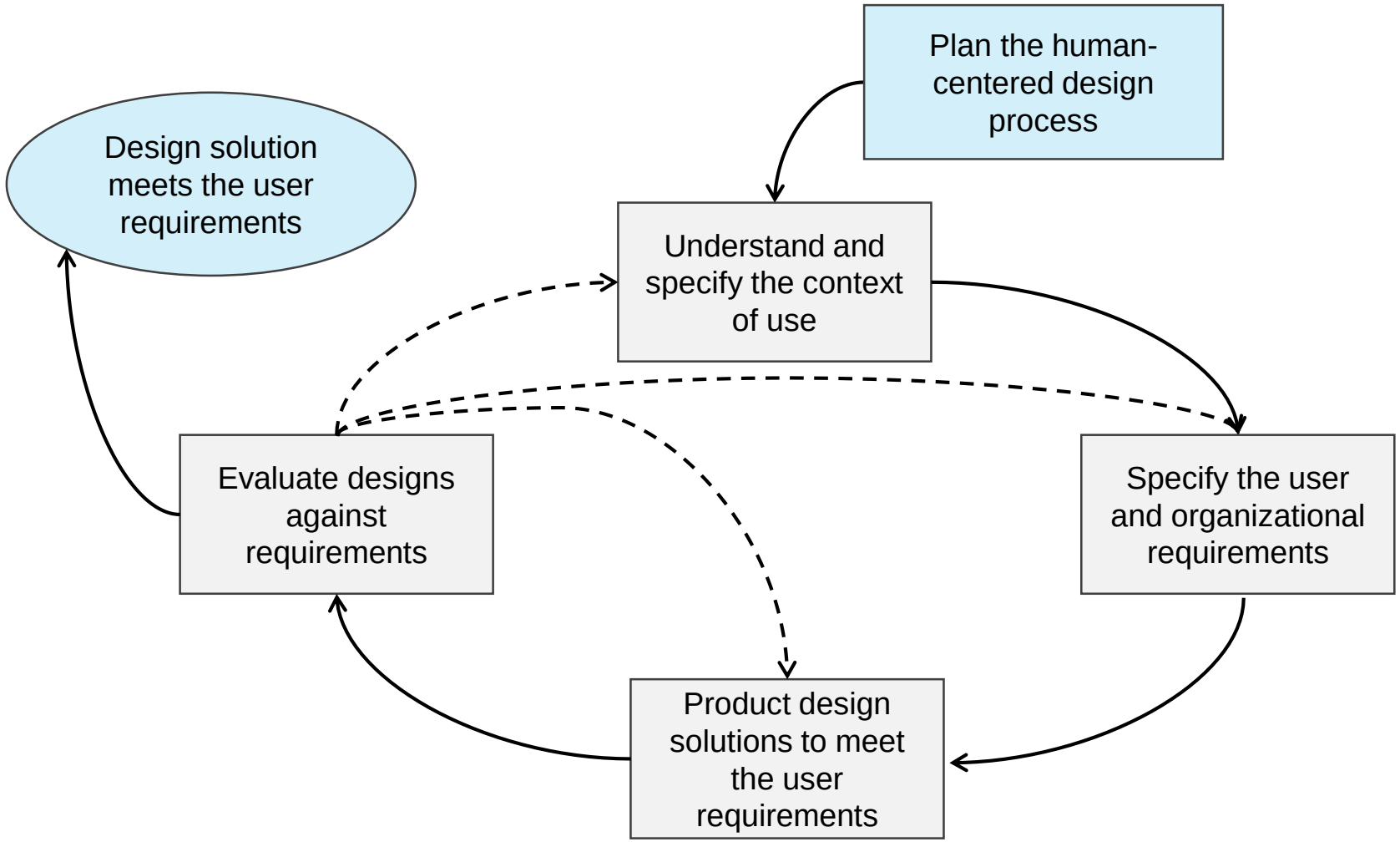
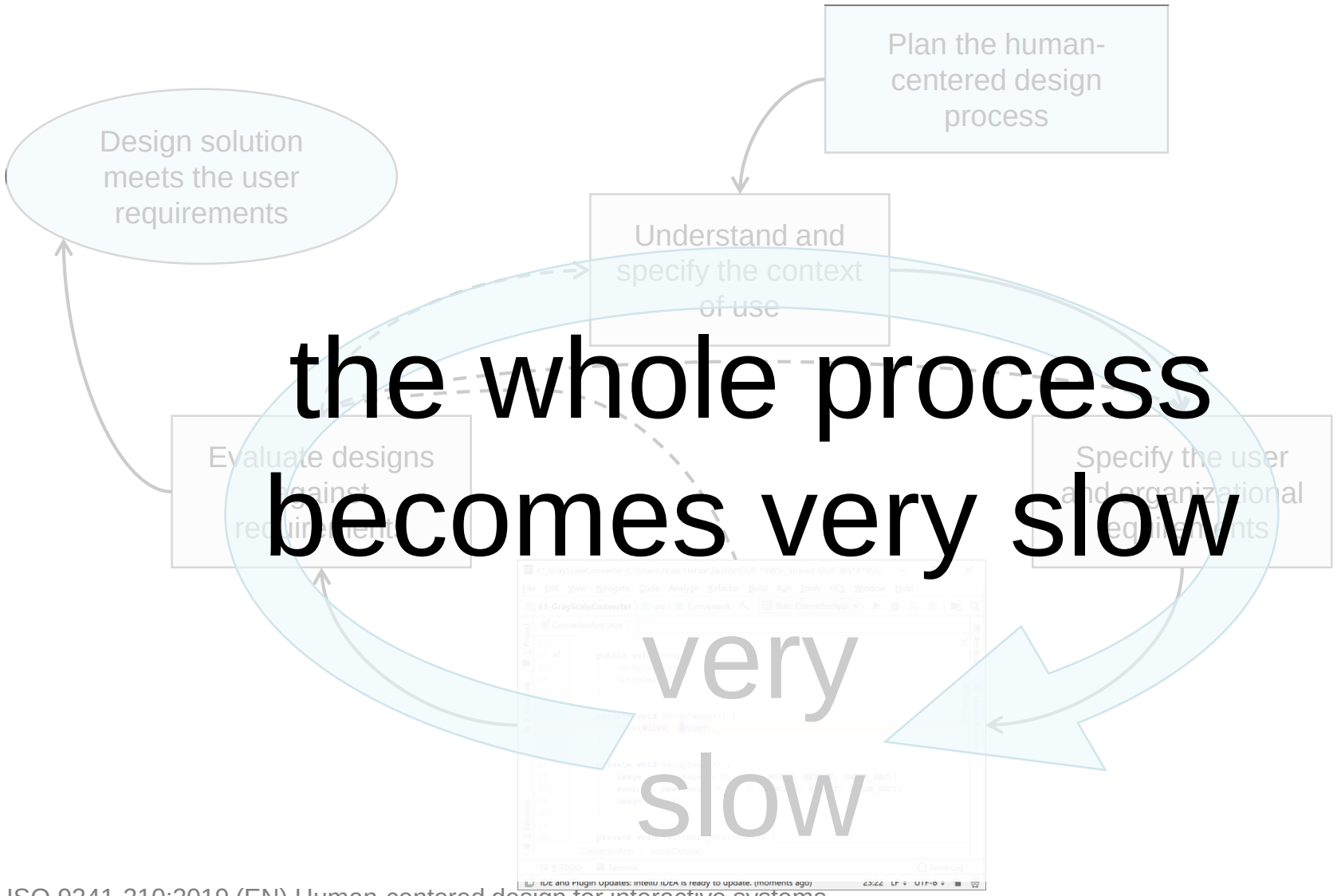
Systemizing Prototypes

Learning Goals

- Understand why prototypes are useful
- Know different ways to systemize prototypes



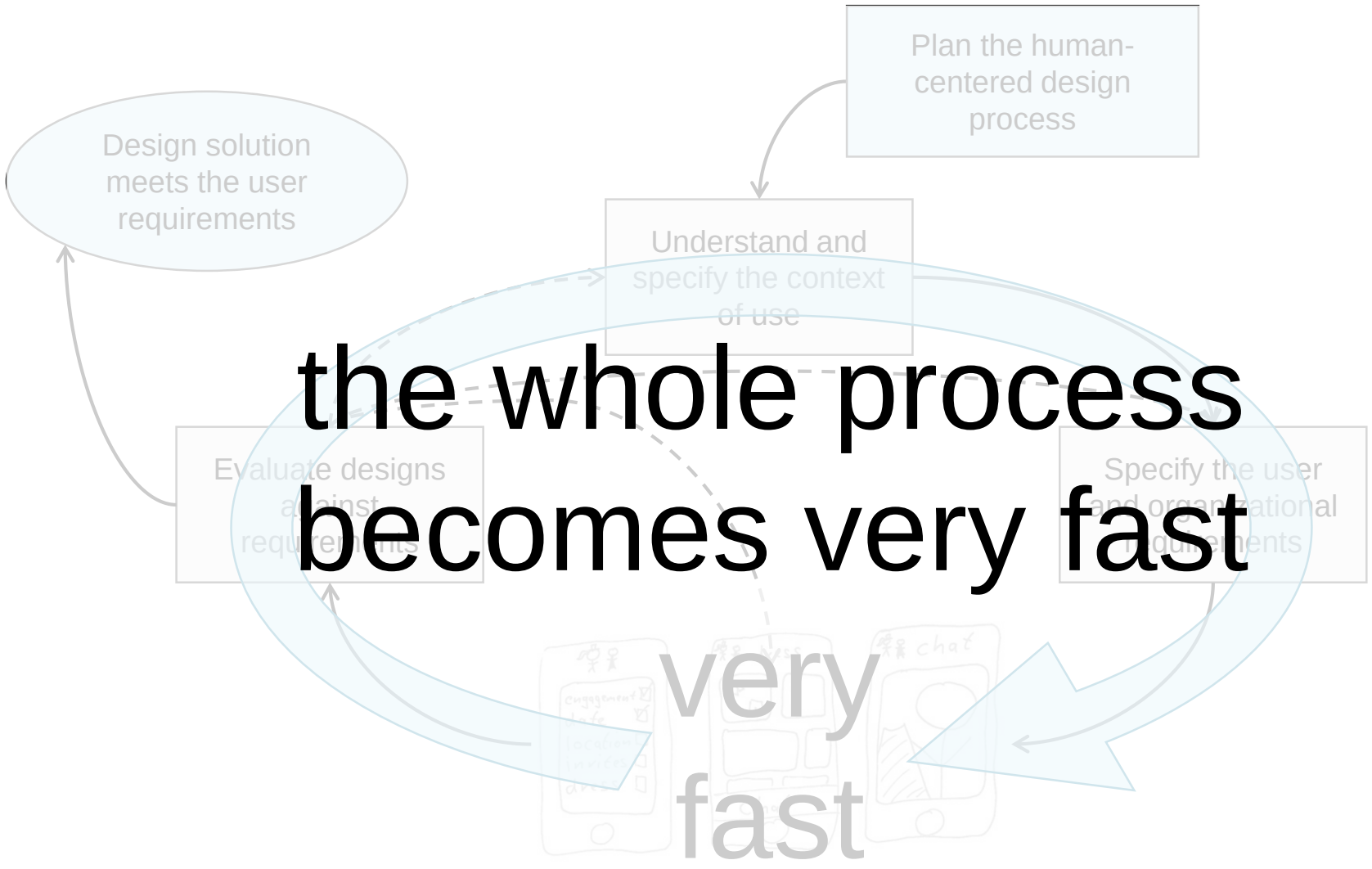
ISO 9241-210:2019 (EN) Human-centered design for interactive systems



the whole process becomes very slow

very slow

ISO 9241-210:2019 (EN) Human-centered design for interactive systems



the whole process becomes very fast

very

fast

ISO 9241-210:2019 (EN) Human-centered design for interactive systems

- Minimize the time for early design Iterations
- Make errors quickly!
- Enables to explore more design options

- “A concrete representation of part or all of an interactive system”

  Beaudouin-Lafon, M., & Mackay, W. E. (2009). Prototyping tools and techniques. In Human-Computer Interaction (pp. 137-160). CRC Press.

- “Prototyping models your final product and allows you to test attributes of the final product even if it's not ready yet.”

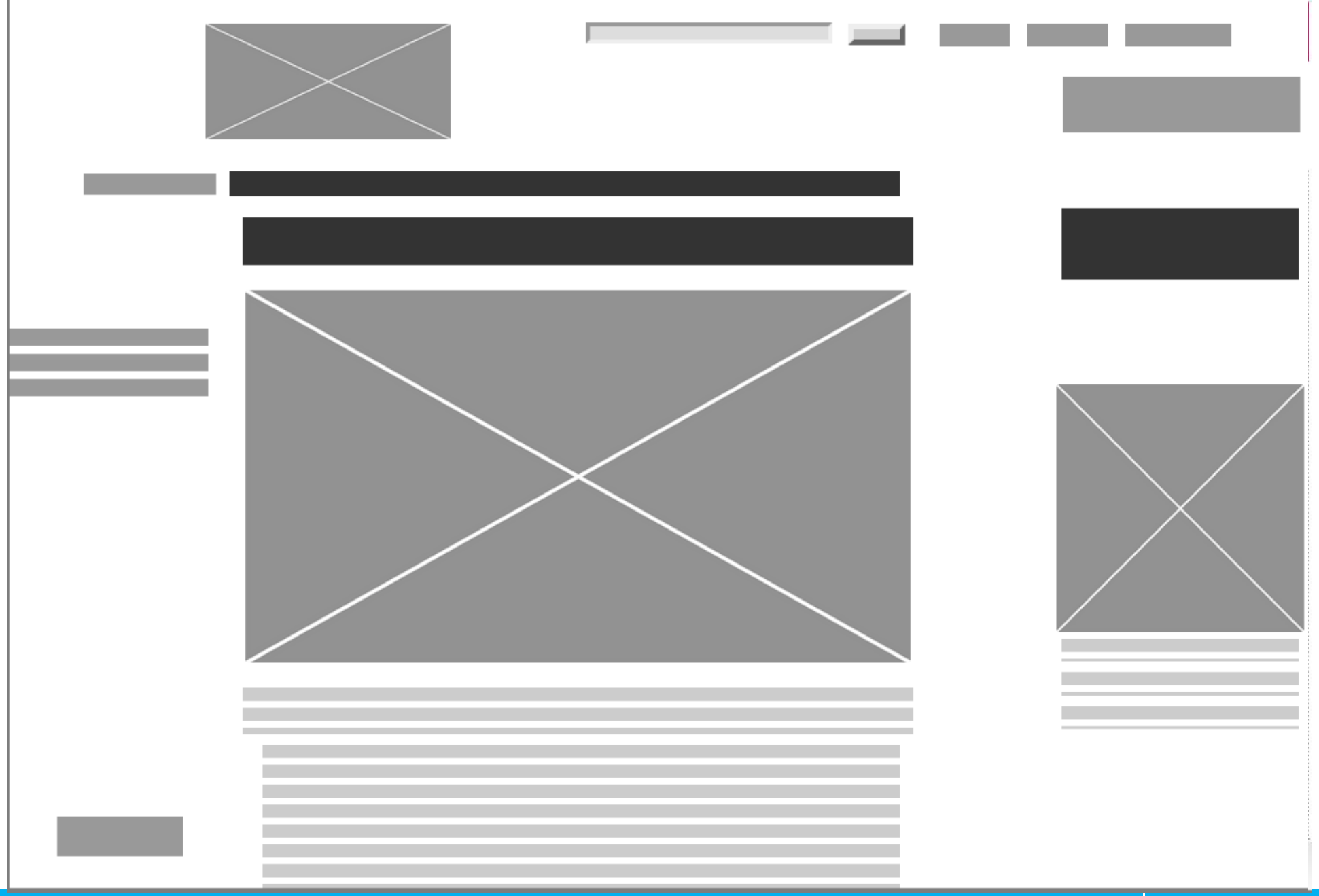
  Horn, J. (1998). The usability methods toolbox handbook. San Jose State University: Industrial and Systems Engineering Department, San Jose, CA.

- Dynamic visual model providing a communication tool for customer and developer that is far more effective than narrative prose or static visual models for portraying functionality. It has been described as:
  - functional after a minimal amount of effort
  - a means for providing users of a proposed application with a physical representation of key parts of the system before system implementation
  - flexible, modifications require minimal effort
  - not necessarily representative of a complete system.

  Connell, J. L., & Shafer, L. (1989). Structured rapid prototyping: an evolutionary approach to software development. Yourdon Press.

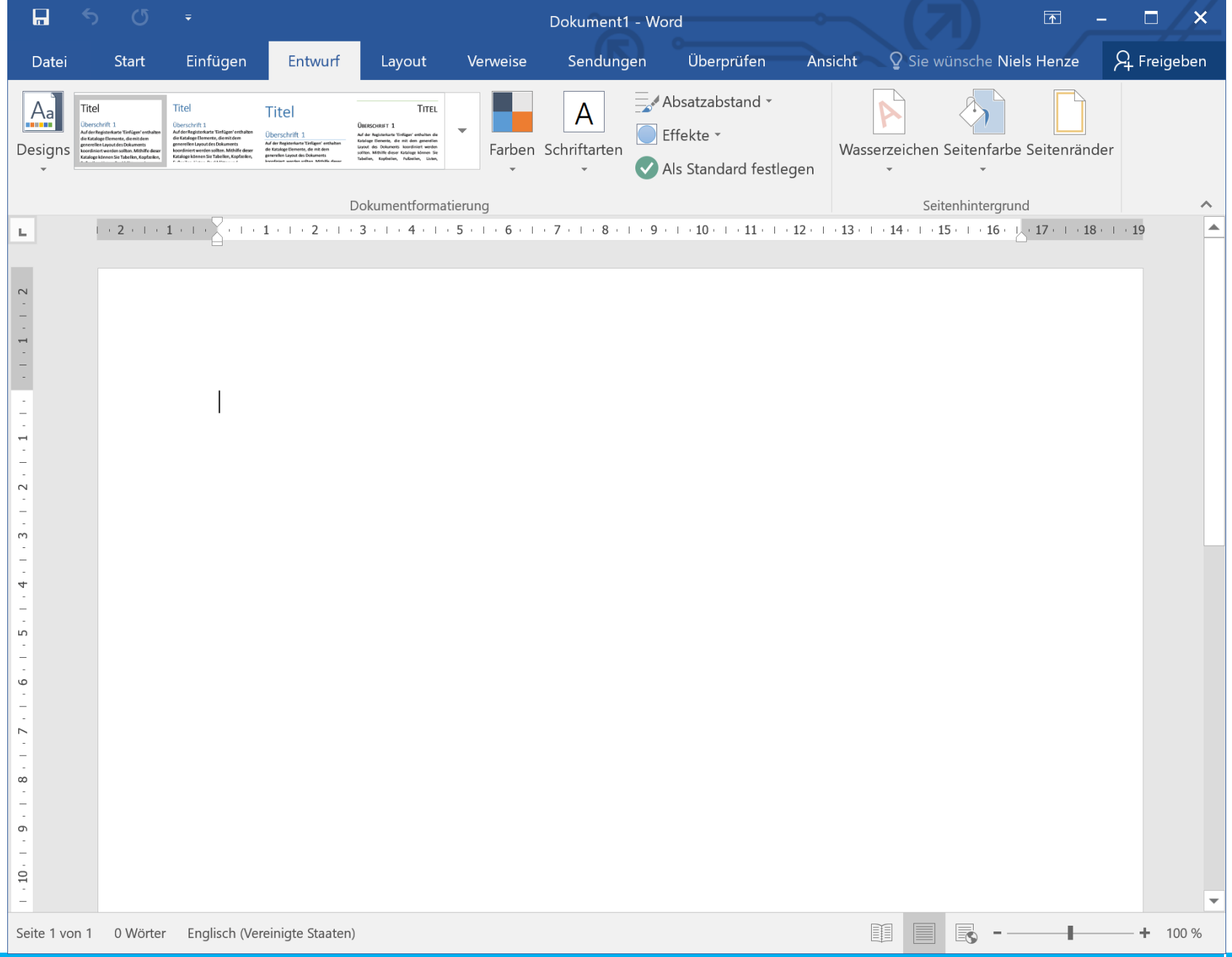
- Work flow, task design
- Screen layouts and information displays
- Difficult, controversial, critical areas

- Everything else considered important...



Taxonomy of Prototypes

- Horizontal vs. Vertical Prototypes
- Low-Fidelity vs. High-Fidelity Prototypes
- Non-Functional vs. Functional Prototypes
- Evolutionary prototypes vs. throw away prototypes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Farben
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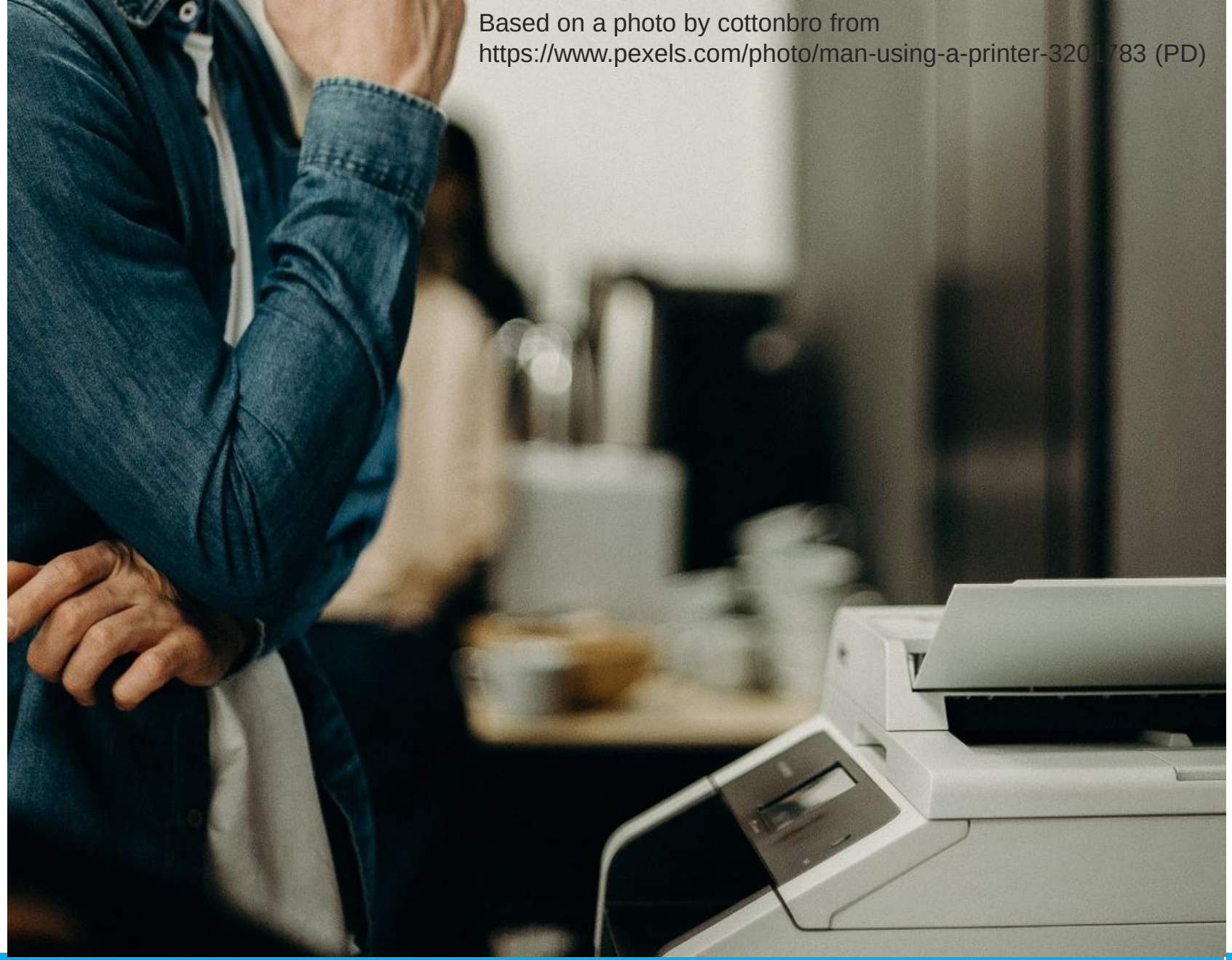
Horizontal Prototyping

- Demonstrates the feature spectrum without implementing them

- Helps to evaluate/test
  - Navigation (e.g. finding a specific function or feature)
  - Overall user interface concept
  - Feature placement
  - Accessibility
  - User preferences

- Applicable in low-fidelity prototyping and high-fidelity prototyping
- Used in early design stages
  - To determine the set of features to include
  - To decide on the user interface concept



Based on a photo by cottonbro from
https://www.pexels.com/photo/man-using-a-printer-3201783 (PD)

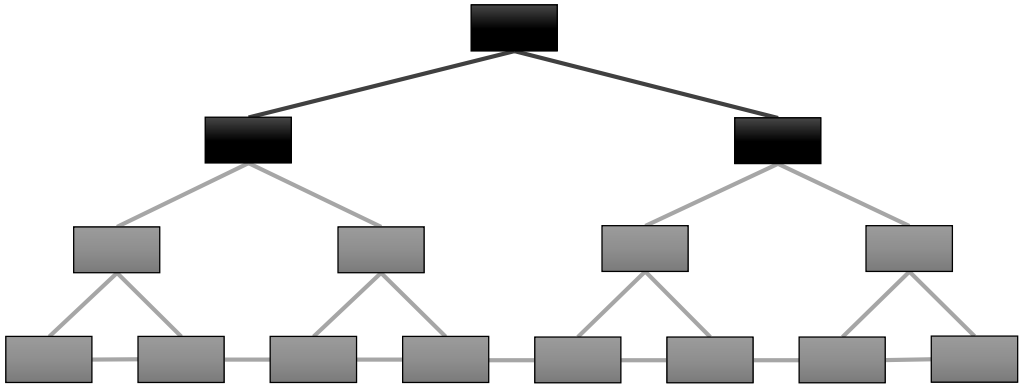
Vertical Prototyping

- Demonstrate a specific feature
- The details of the function/feature are shown/implemented

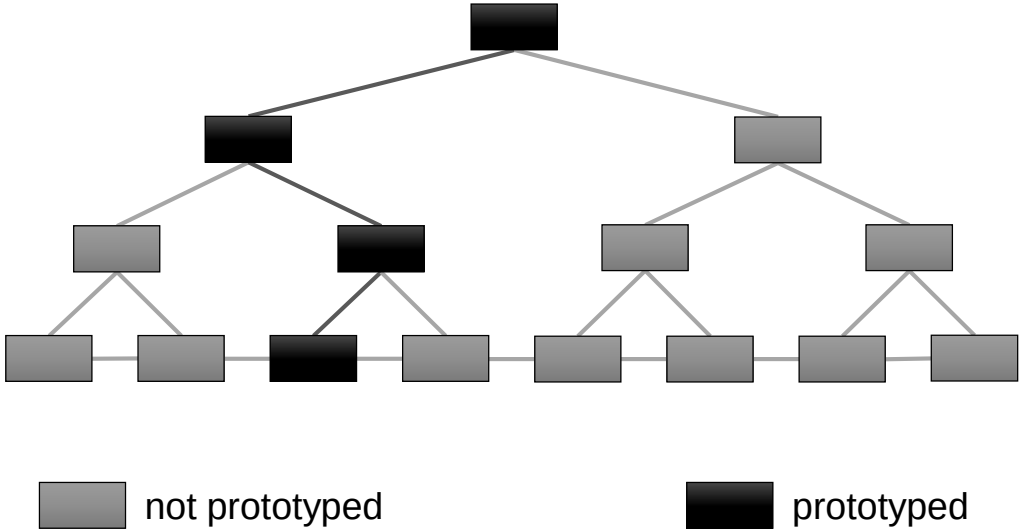
- Helps to evaluate/test
  - The optimal design for a particular function
  - Optimize the usability of this function
  - User performance for this particular function

- Often used in high-fi prototyping but is also applicable to low-fi prototyping

Horizontal Prototype



Vertical Prototype



Low-Fidelity PDA Prototype

Photo by Mark Richards from https://www.computerhistory.org/revolution/mobile-computing/18/321/1648

High-Fidelity Prototype

Image by Grace R. Samson from https://commons.wikimedia.org/wiki/File:Samsung_Galaxy_Z_Flip_fold.jpg (CC-BY-SA 4.0)

Low-Fi prototypes

- Check ideas and interaction flow
- Fast, cheap and easy to change
- Advantages
  - Cheap, easy and quick to implement
  - Users are keen to criticise
- Disadvantages
  - No real functionality, difficult to identify errors
  - Reuse and extending difficult to impossible
  - Not all ideas can be realized

Photo by Mark Richards from https://www.computerhistory.org/revolution/mobile-computing/18/321/1648

High-fidelity Prototype

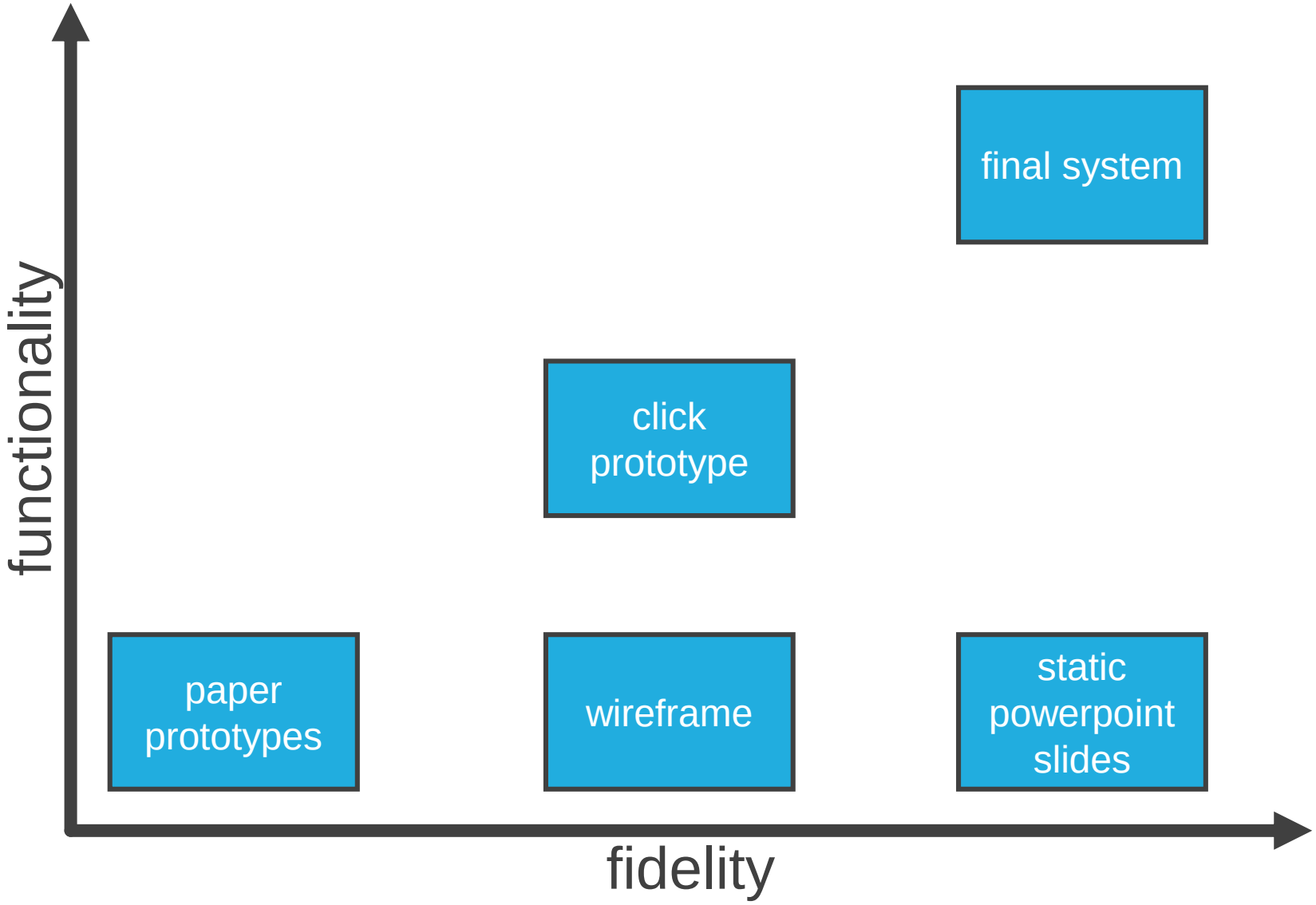
- Looks & feels like the final product
  - Colors, screen layout, fonts, … text used
  - Response time and interactive behavior
- Restricted functionality
  - Only certain functions work
  - Functionality is targeted towards the tasks
  - Invisible issues (e.g. security)
- Standard technologies for prototyping
  - HTML, JavaScript
  - Axure, Director, Presentation programs
  - GUI Builder (e.g. Visual Basic, Delphi, NetBeans)

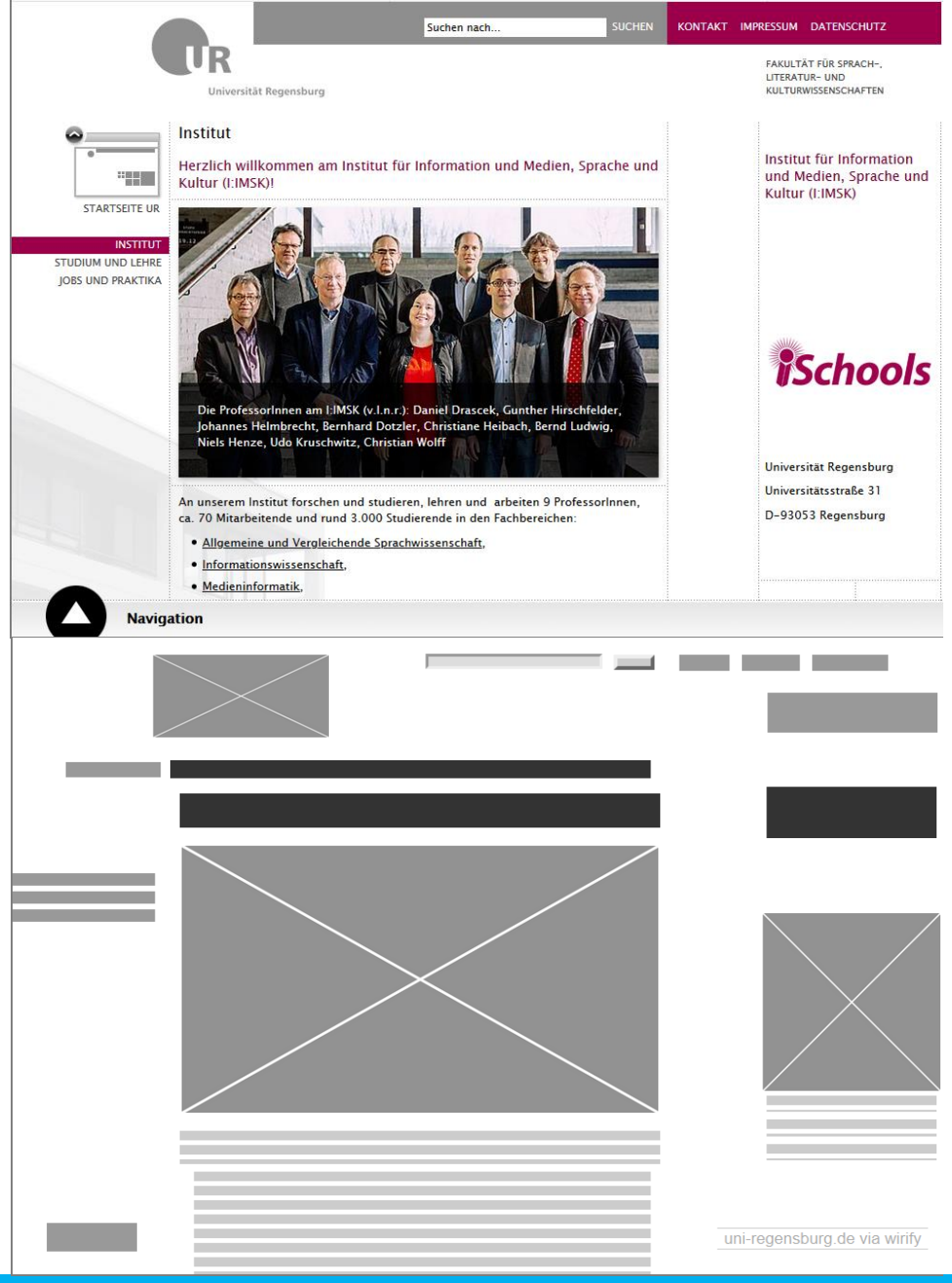
Image by Grace R. Samson from https://commons.wikimedia.org/wiki/File:Samsung_Galaxy_Z_Flip_fold.jpg (CC-BY-SA 4.0)

High-fidelity Prototype

- Advantages
  - Show how the finished product will look and feel
  - Behaves like the final product for selected tasks
  - Allows predicting efficiency

- Disadvantages
  - Can be very time-consuming to implement
  - Users can only “use” the implemented functions
  - Feedback centered around look & feel
  - Managers may expect that “the product” is nearly ready


functionality
fidelity
final system
click prototype
paper prototypes
wireframe
static powerpoint slides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