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technology

“MULTIMODAL INTERACTION, COLLABORATION, and SYNTHESIS in DESIGN and ENGINEERING PROCESSING”

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the Design Society
a worldwide community

- LFDS › Loosely Fitted Design Synthesizer

  Hybrid Design Tool for Individual and Collaborative Interaction:

  - Design & Engineering Processing
  - Applied Innovation
  - Mixed Reality

- Connecting & merging analogue and digital realm.
- Stimulate iterative interaction, singular or collaborative.
- Support non-linear, non-explicit, non-standard thinking.
- Allow ambiguity and causality.
- Enhance metacognitive action and multi perception.

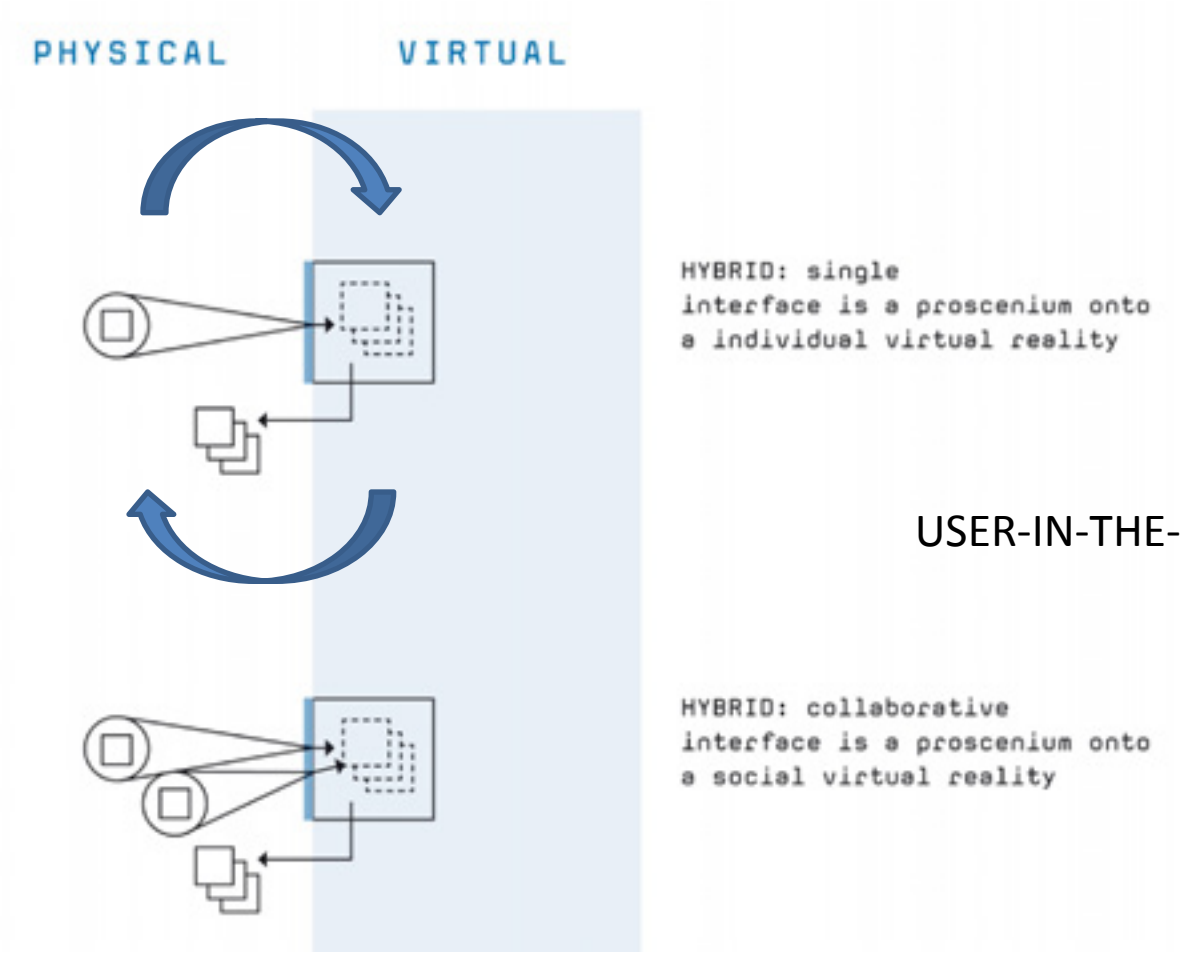
Manipulation
Transformation
Translation
in
Design & Engineering Processing

MIXING REALITIES

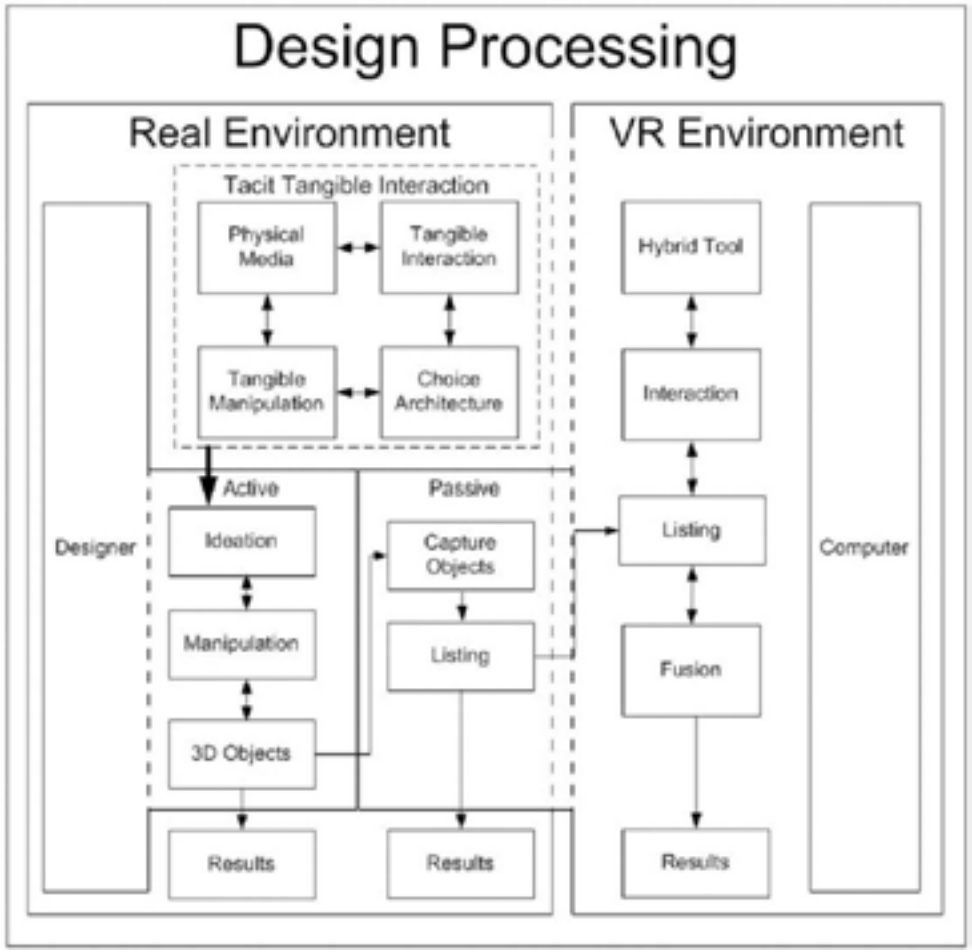
combining

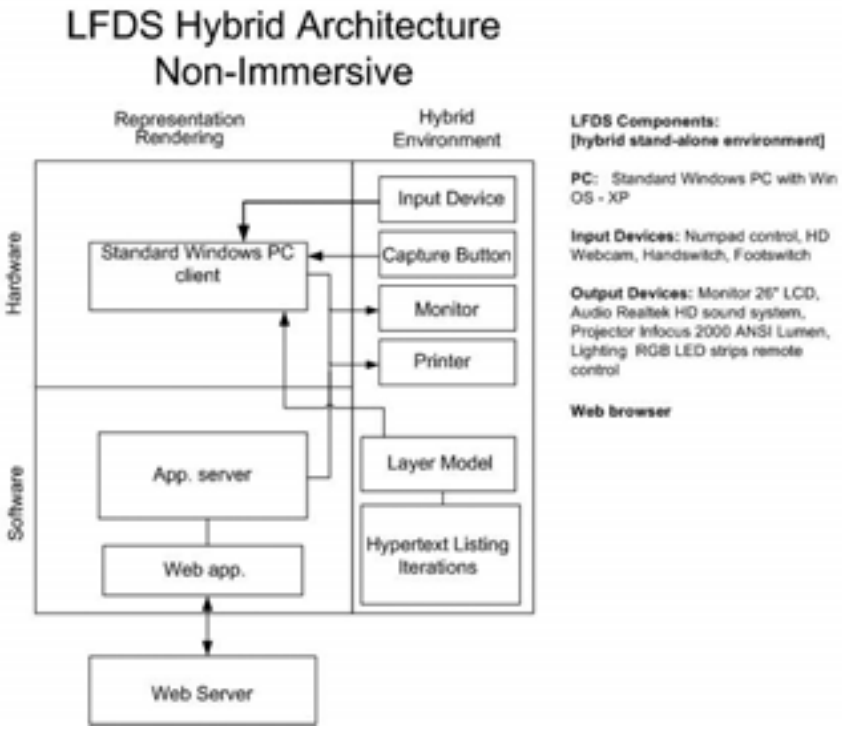
REALITY & VIRTUAL REALITY

- LFDS >Embedded in Design & Engineering
  - Hybrid approach mixing real and virtual:



Hybrid Design Tool for Individual and Collaborative Interaction:





• LFDS ›Embedded in Design & Engineering

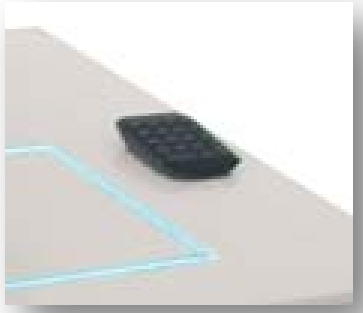
- Stimulate interaction between various ACTORS
- Untethered tangible processing combined with VR
- Real world materials [photos, drawings, illustrations, etc.]
- Loose & structured mapping of information

- ❑ Captures of iterations › digital instances
- ❑ Data sets allow fast reviewing & reflection, incubation
- ❑ Intuitive tacit experience during sessions
- ❑ Synthesis of design & engineering processing

- ❖ Store | retrieve | distribute
- ❖ Accessibility
- ❖ Sharing & communication
- ❖ Peer-to-peer collaboration & sharing success
- ❖ Strategy & governance

- LFDS › Multimodal Interaction
  - USE CASE: Education IDE › Ba & Ma
  - Project: Individual & Collaborative Artefact Design

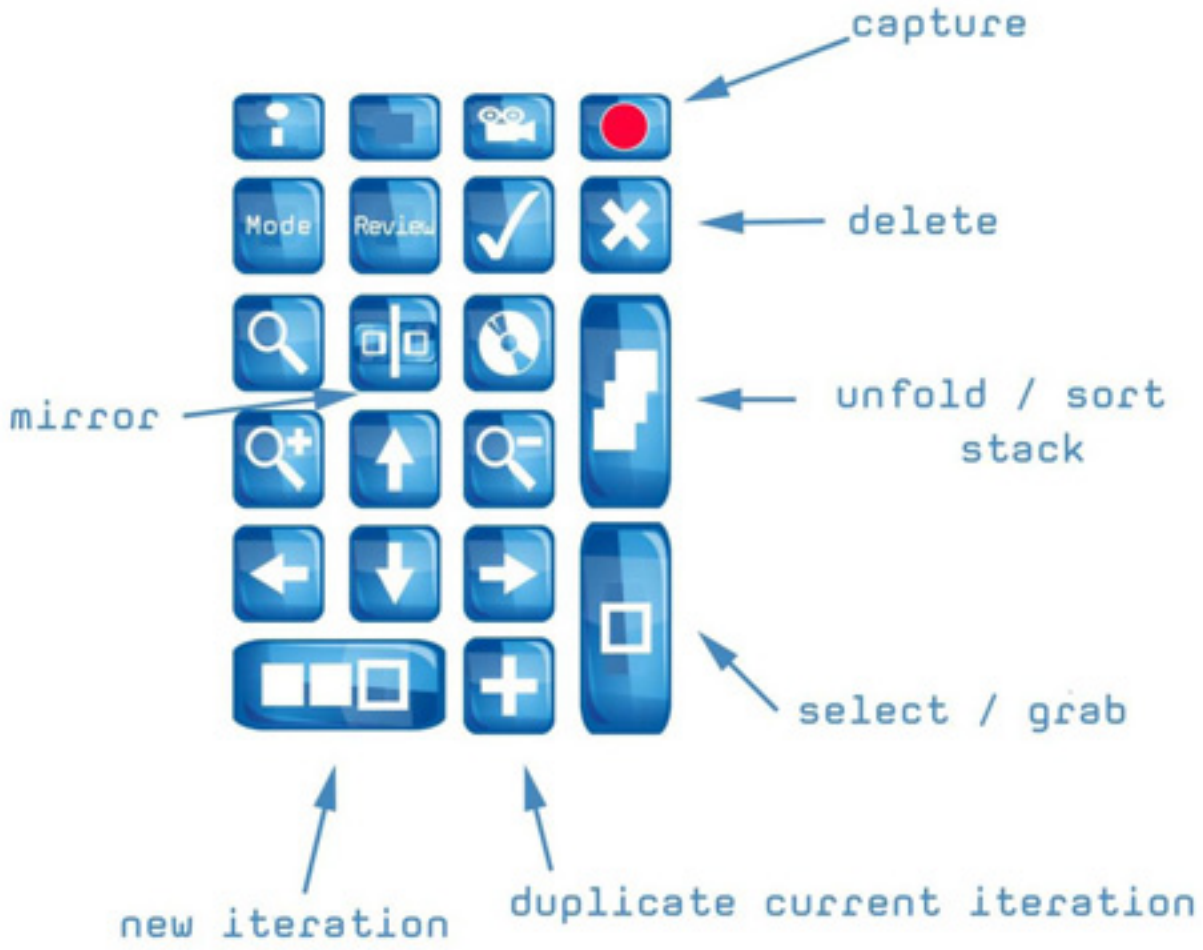
Capture Button



UI Numpad

Capture Pedal

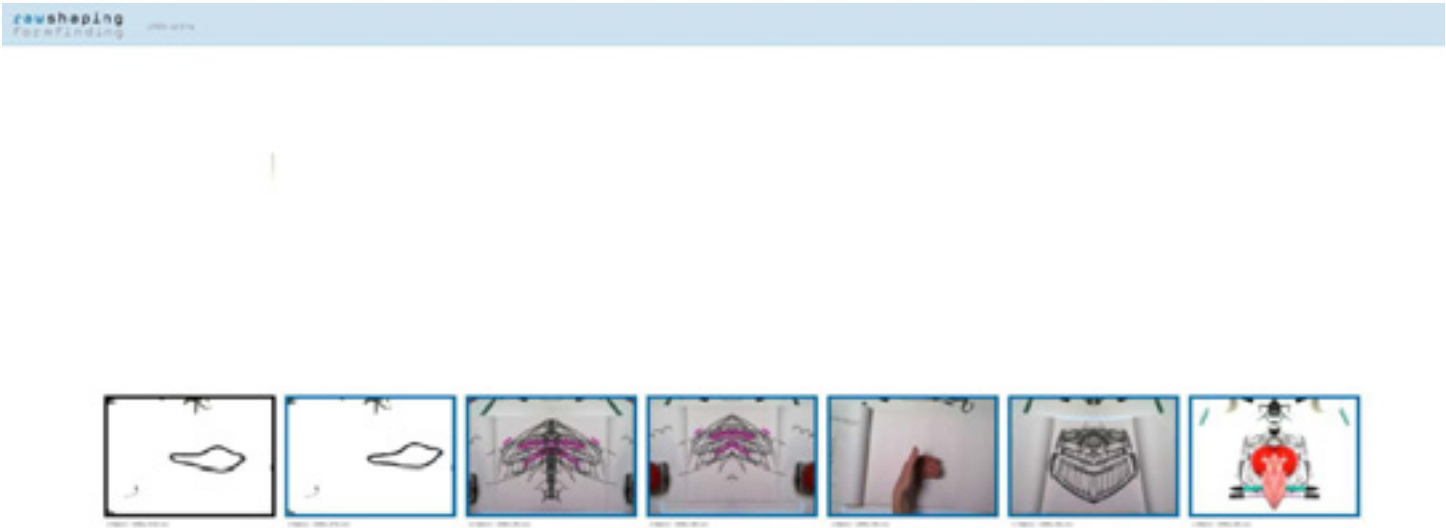
- LFDS >User Interface
  - USE CASE: Education IDE
  - User Interface Numpad Explained



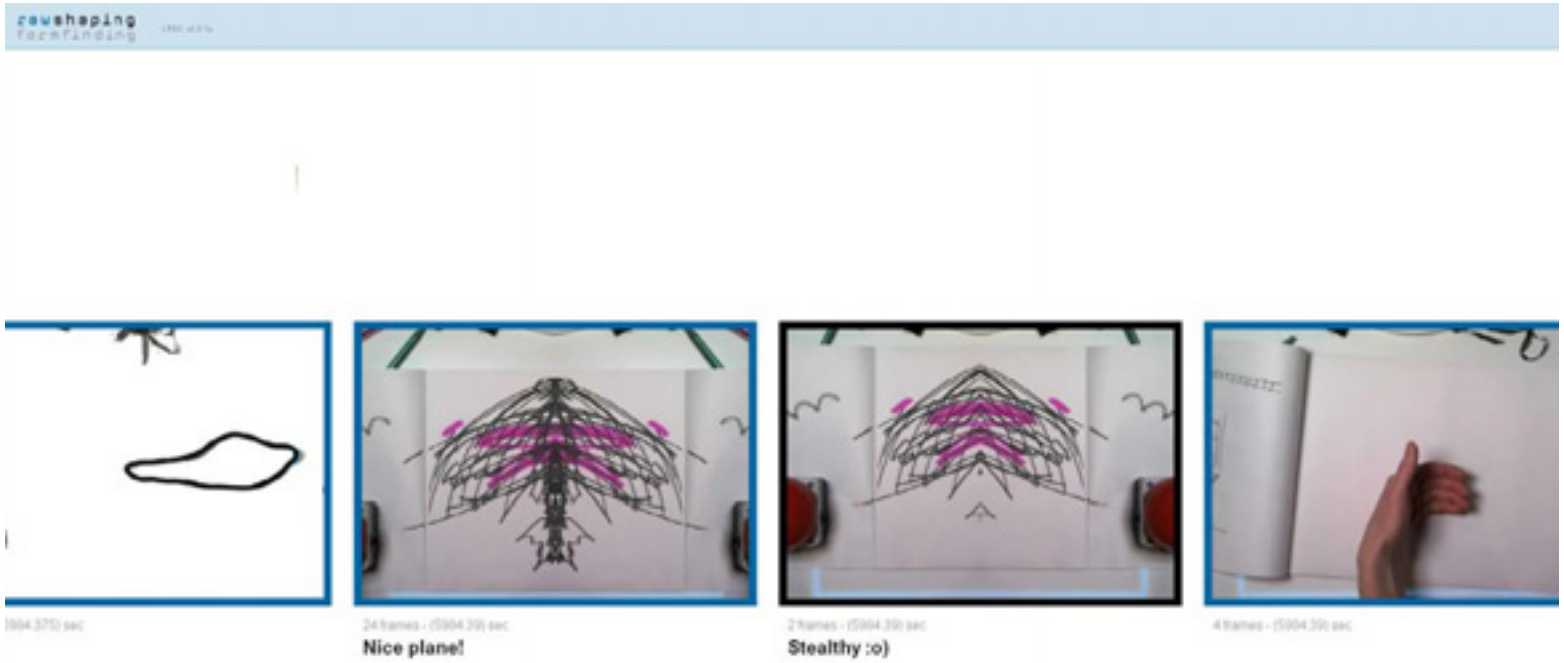
- LFDS › Virtual Representation
  - USE CASE: Education IDE › Ba & Ma
  - Instances on screen › Iterative Processing Mode

- LFDS ›Virtual Representation
  - USE CASE: Education IDE › Ba & Ma
  - Review Mode: Loosely Fitted

- LFDS ›Virtual Representation
  - USE CASE: Education IDE › Ba & Ma
  - Review Mode: Matrix



- LFDS ›Virtual Representation
  - USE CASE: Education IDE › Ba & Ma
  - Tag Mode: Selected Instances › Choice Architecture › Annotations › Reflection-On-Action



- LFDS ›Design Ideation
  - USE CASE: Education IDE › Ba & Ma
    - **Identification of five (5) key features of collaborative AR or MR environments:**

Virtuality: Objects that don't exist in the real world can be viewed and examined.

Augmentation: Real objects can be augmented by virtual annotations.

Cooperation: Multiple users can see each other and cooperate in a natural way.

Independence: Each user controls his own independent viewpoint.

Individuality: Displayed data can be different for each viewer.

Schmalsteig et al. 1996

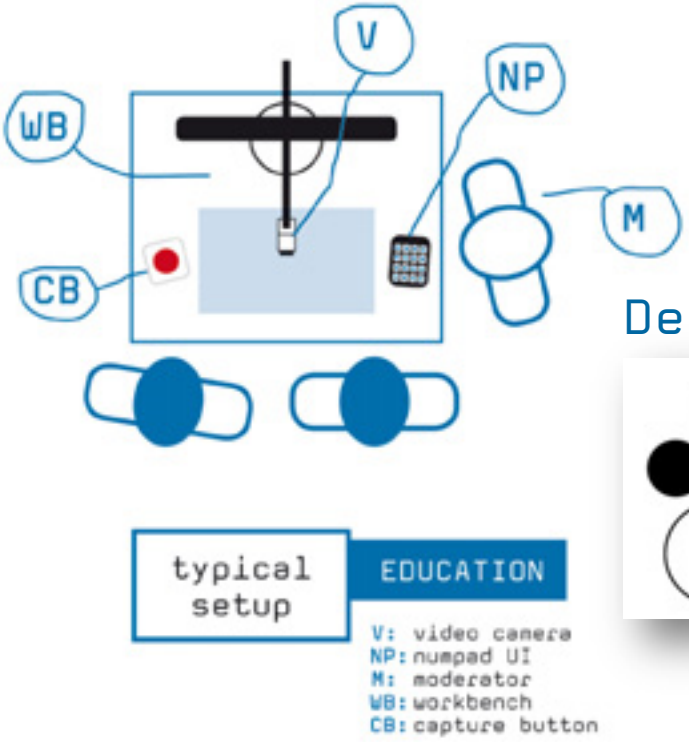
Loosely Fitted Design Synthesizer:

Movie not included in this pdf

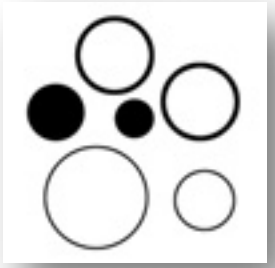
Experimental: CASE › Automotive Artefact Design

Paired Setup:

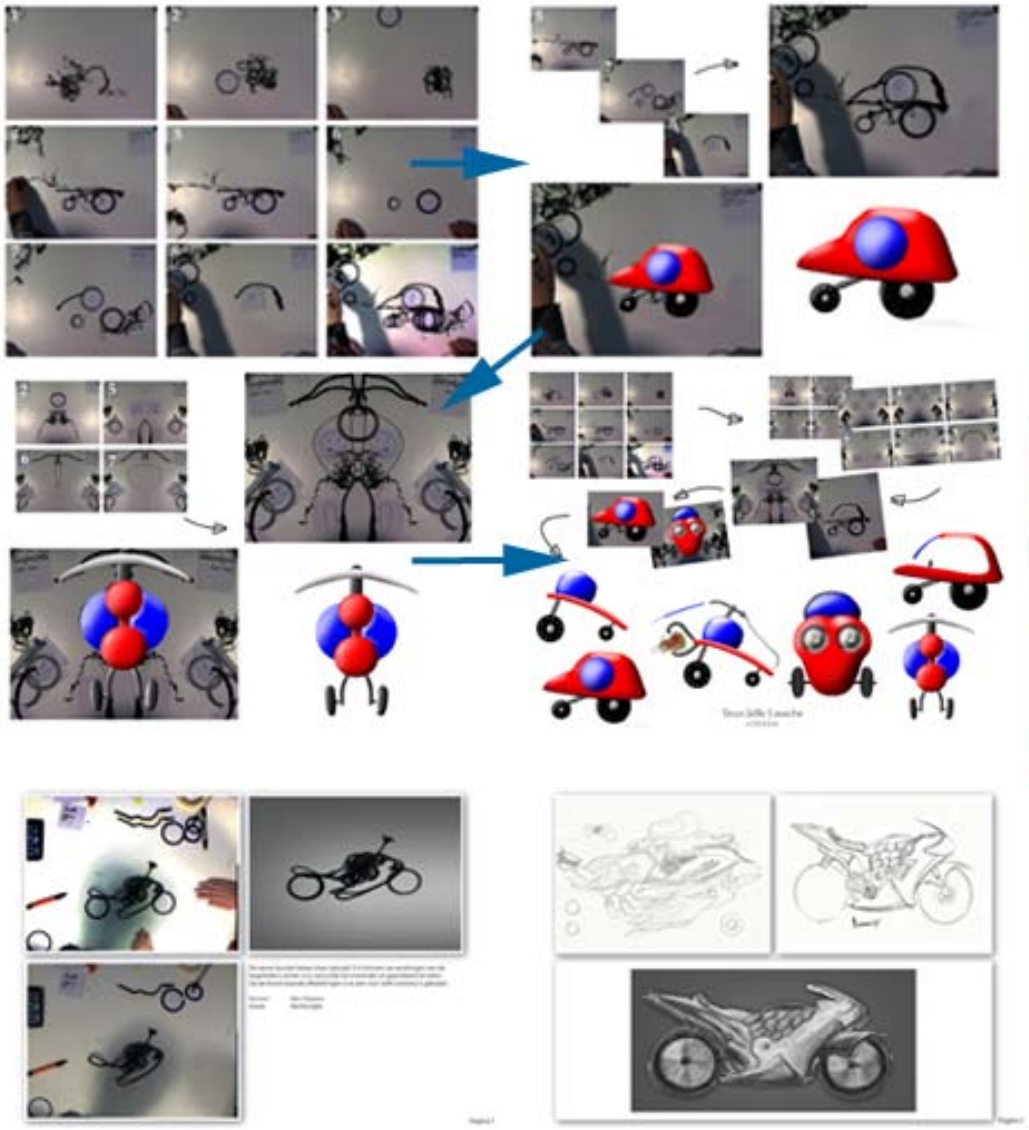
- 1x 2 Ba Students
- 1x 2 Ba Students
- 1 Facilitator RST
- Video
- 2 Full Hybrid Systems



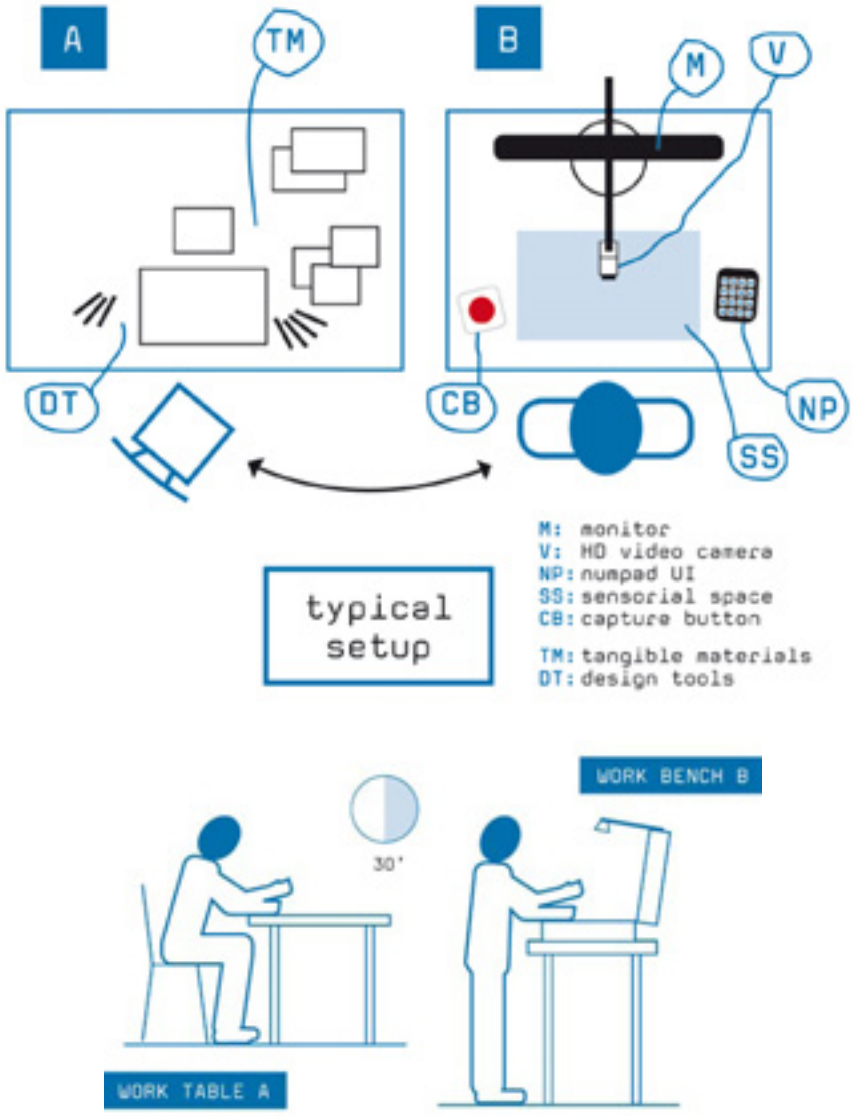
Design Metaphor:



Results:



Experimental: CASE › Electric Kitchen Device

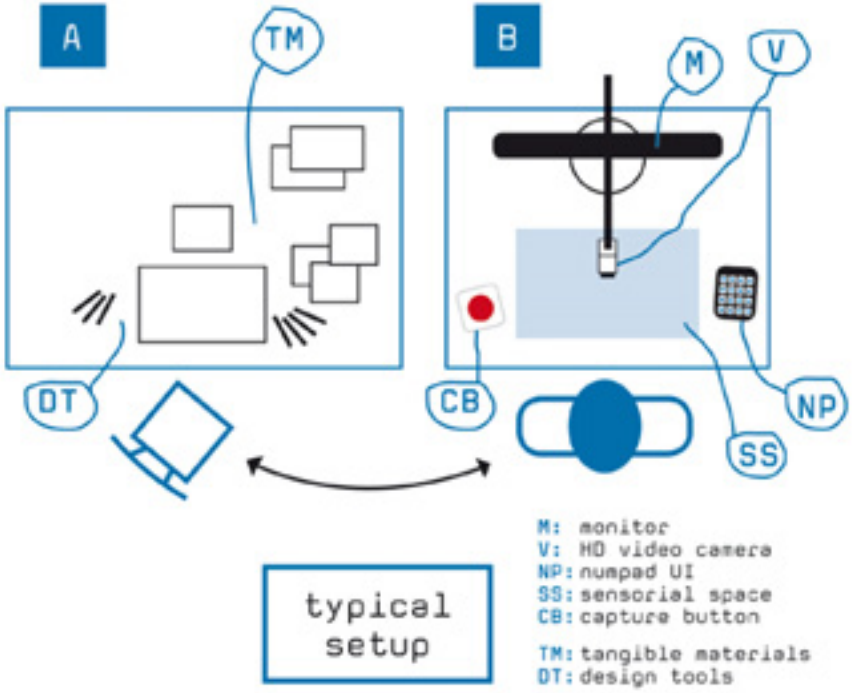


Singular Setup:

- 1 Student
- No Facilitator
- 2 Observers | Video
- 1 Full Hybrid System

Experimental: CASE › Electric Kitchen Device

Design Metaphor:



Singular Setup:

- 1 Student
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- 2 Observers | Video
- 1 Full Hybrid System

Tangible Constraints:

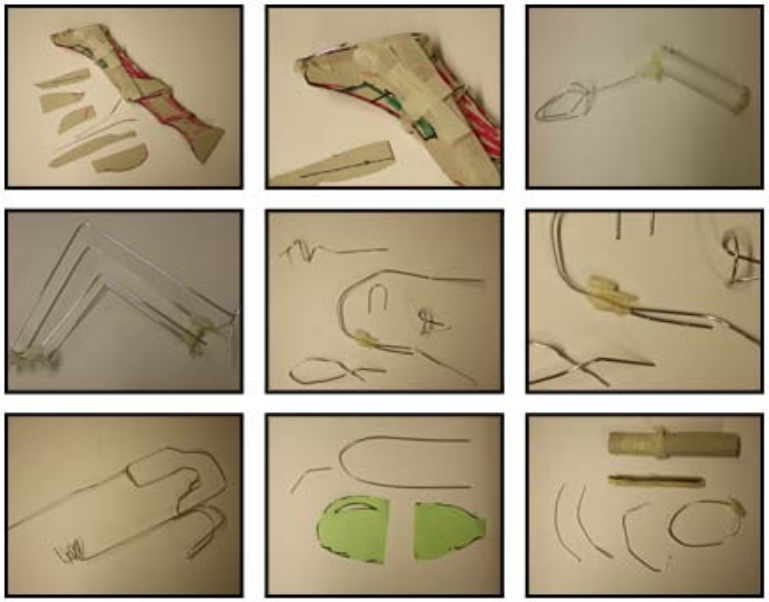
Results:

User interaction in set-up

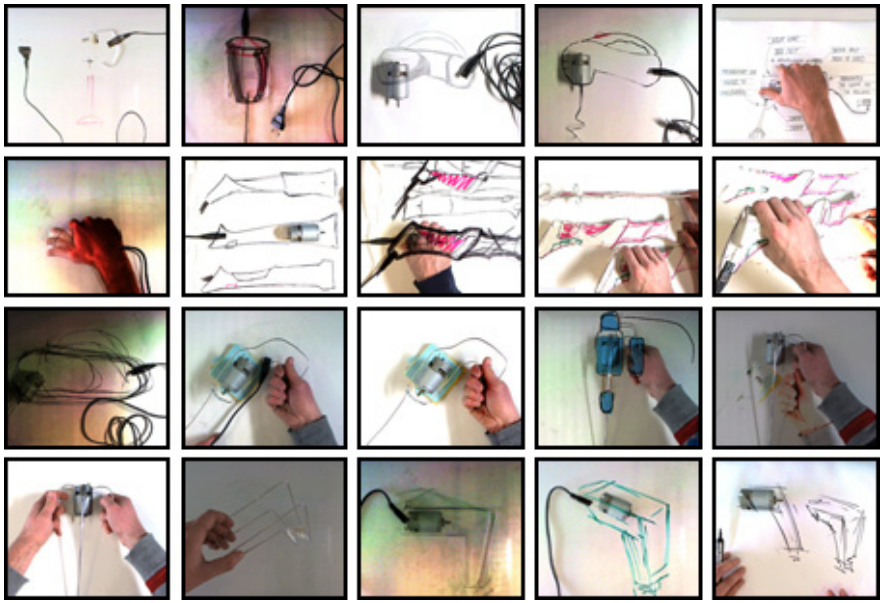
Movie not included in this pdf

Results:

Raw Tangible Models

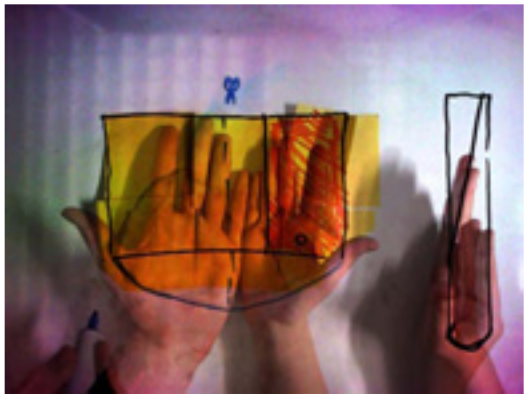


Raw Virtual Models



Hybrid Collaborative Interaction:

Design of a next generation Pad/Tablet



Movies not included in this pdf

Conclusion

preliminary

- ✓ Supports Decision & Choice Architecture
- ✓ Real-Time Visualization & Exploration
- ✓ Allows for Intuitive Tangible Interaction
- ✓ Easy Accessible Data Base
- ✓ Track-Back & Synthesizing Data|Content
- ✓ Project Management & File Sharing
- ✓ Instant Feedback › Real-time Support
- ✓ Aquisition & Sharing Knowledge and Insight
- ✓ Enhancement Pleasure & Enjoyment
- ✓ …

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