

**Lund University  
Cognitive Science**

Peter Gärdenfors

**Paper as a tool for thinking**



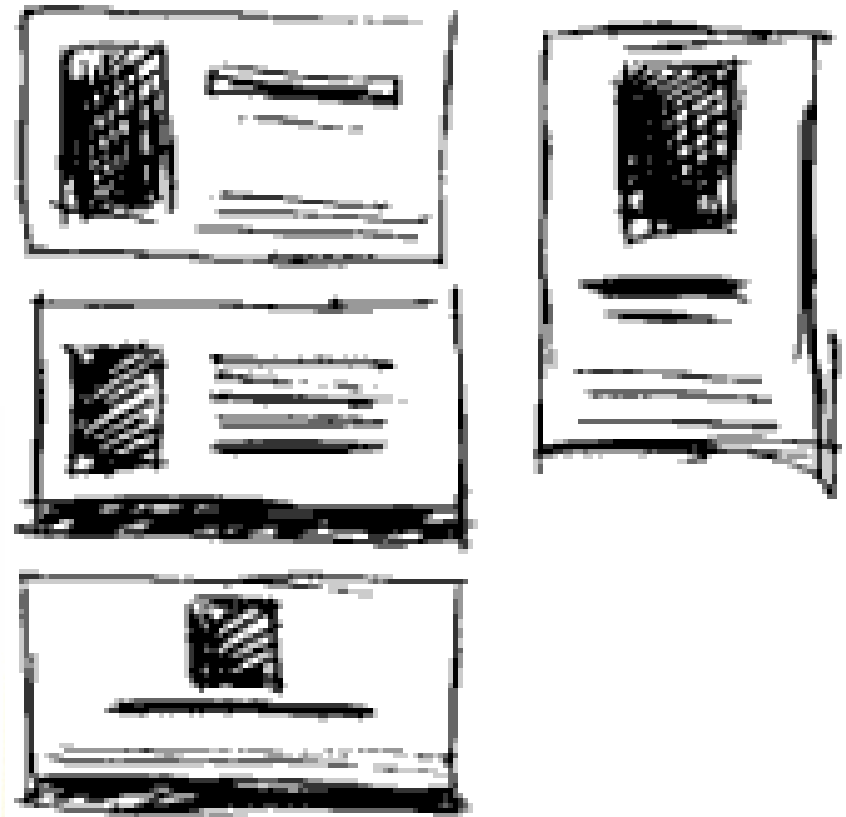
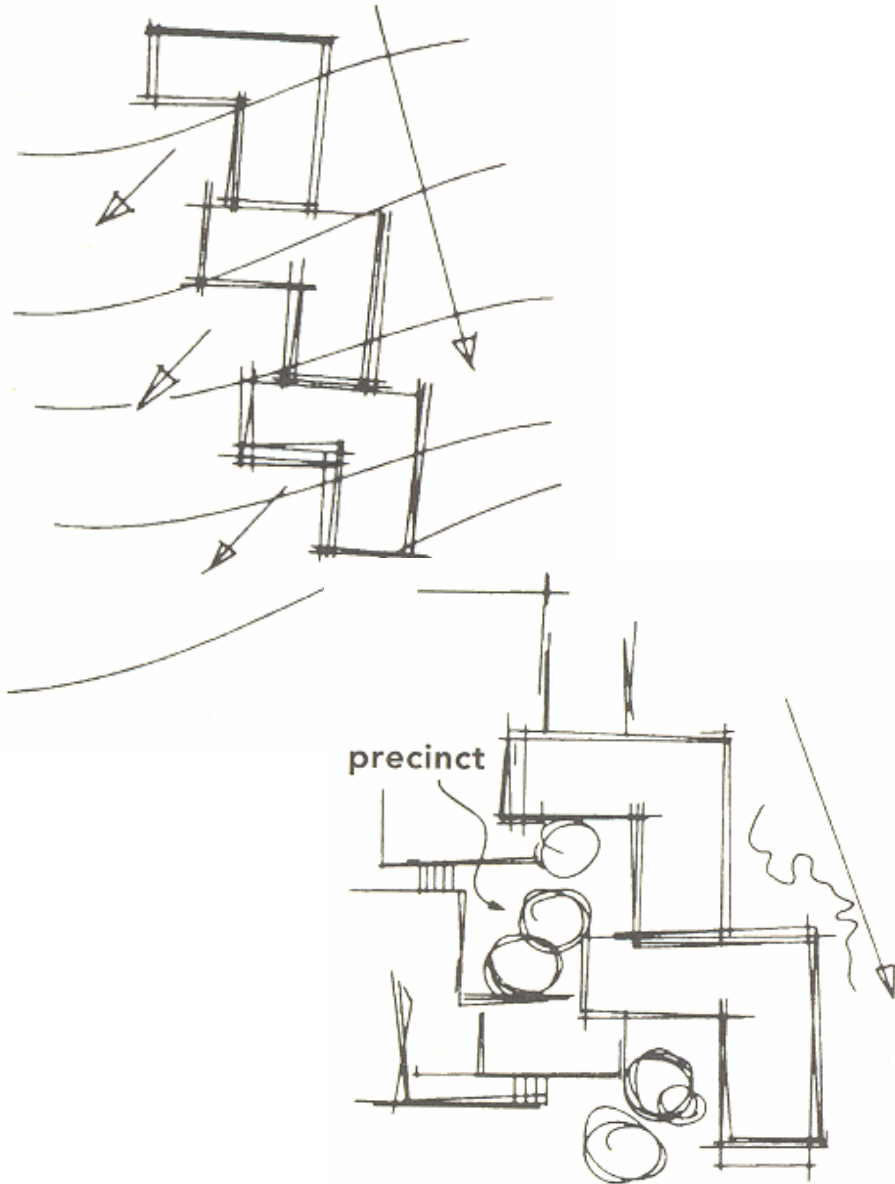
# The past

- David Olson: *The World on Paper*
- Printing made us change attitudes to language: The text *contains its own meaning* independently of the speaker.
- Scientists began to "read" nature in the same way as they read a text.
- The paper world is not just for storing common scientific knowledge, but it provides a tool for *coordinating* various forms of knowledge.
- The voyages of the explorers are not just putting the world on paper, but they involve exploring the world from the map's point of view.

# The present

- Computers vs. paper: Have we achieved the paperless office?
- The traditional theory of design and architecture claims that the designer first forms a mental model and then transfers it to paper. (Thinking is separated from the world).
- But, the designer *thinks* with her hands together with her eyes and her brain. (Thinking is *situated*).

# Sketches and thumbnails



# The present

- Computers vs. paper: Have we achieved the paperless office?
- The traditional theory of design and architecture claims that the designer first forms a mental model and then transfers it to paper. (Thinking is separated from the world).
- But, the designer *thinks* with her hands together with her eyes and her brain. (Thinking is *situated*).
- The techniques of sketching are still dependent on paper and pencil.

# The near future

## Augmented paper

- Several new techniques for adding functionality to paper
- Three examples from Swedish companies:
- *Cypak*: intelligent RFID technology, timestamped data capturing
- Medicine packaging that reminds and monitors the patient
- A parcel that tells you when it has been opened
- A card with a keypad to protect your integrity
- *Design Force*: Semi-conducting colours
- Touch sensitive cardboard

# The cardboard piano

QuickTime och en  
YUV420 codec-dekomprimerare  
krävs för att kunna se bilden.

# The near future

## Augmented paper

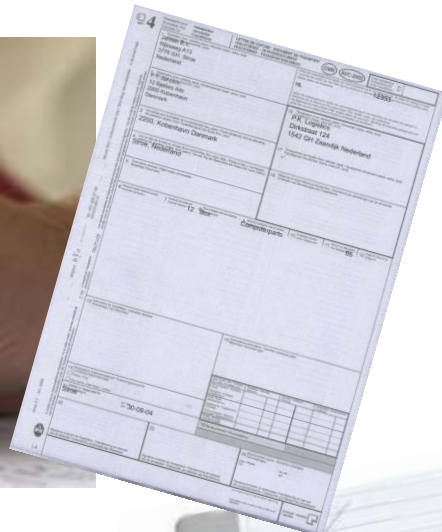
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- *Design Force*: Semi-conducting colours
- Touch sensitive cardboard
- *Anoto*: A paper with a unique dot grid so that a pen with a camera "knows" exactly where it is on the paper.

# The Anoto pen

QuickTime och en  
YUV420 codec-dekomprimerare  
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# The Anoto pen

- Automatic transfer of forms to databases



- Transfer of notes and sketches to your computer or mobile



# The Fly pen

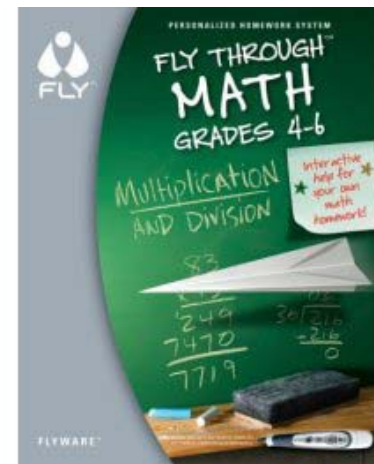
The pen gives sound feedback



Draw your own calculator

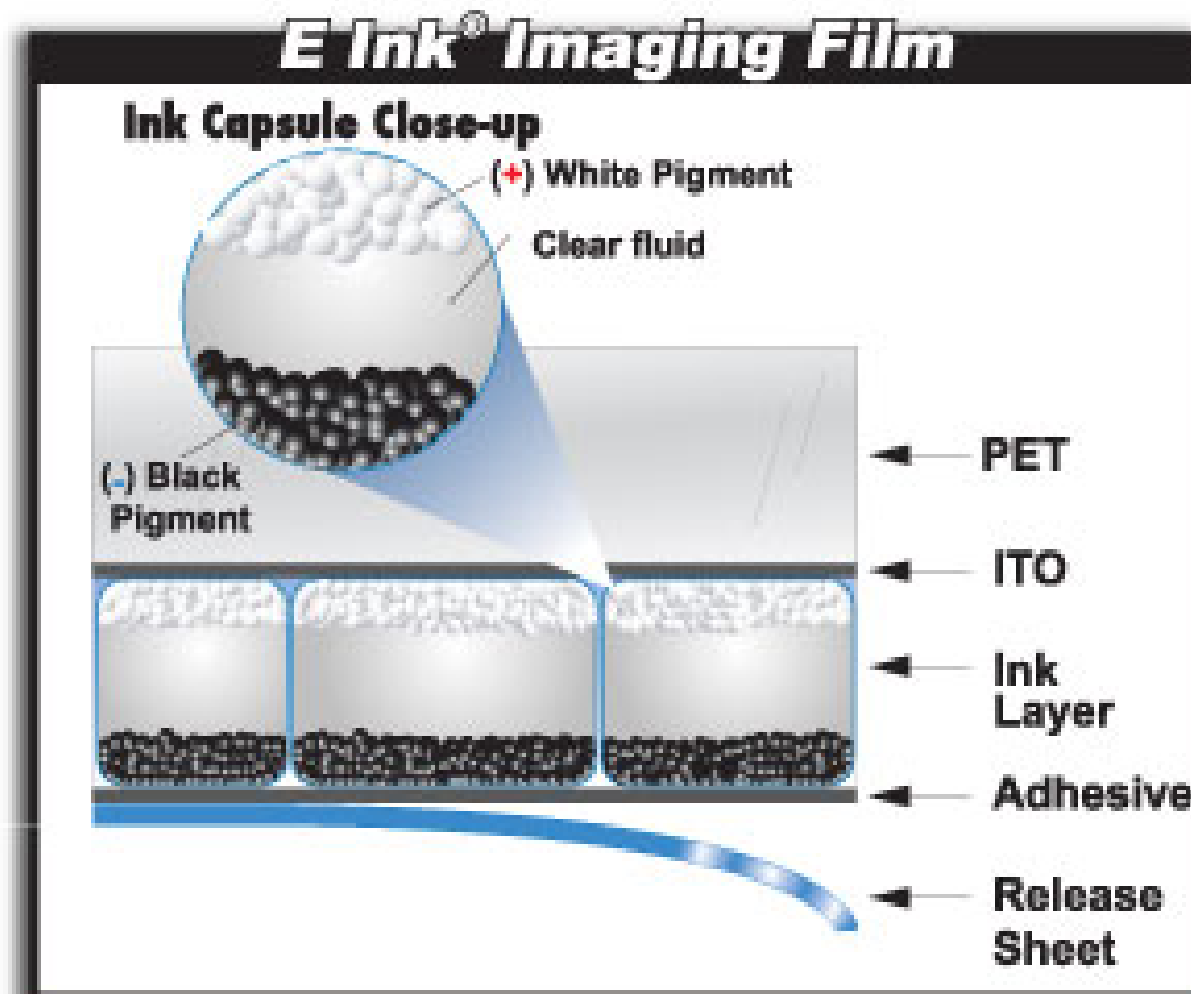
Draw your own keyboard

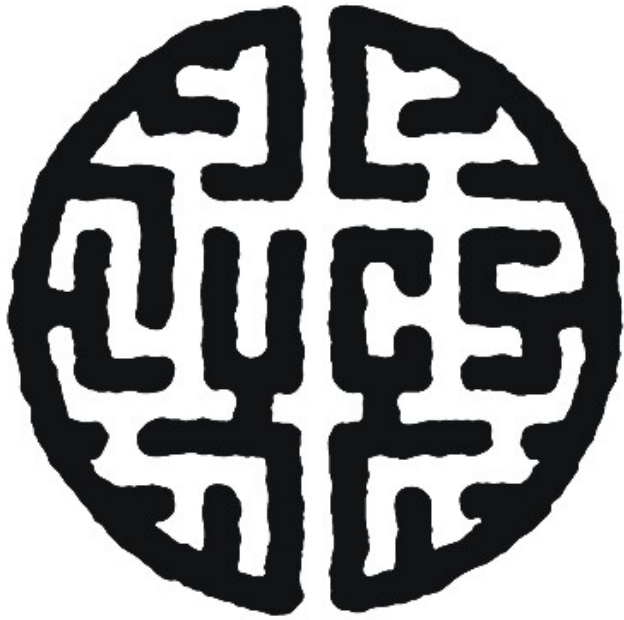
New kinds of text-books  
become possible



# The future

## Computer = Paper





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