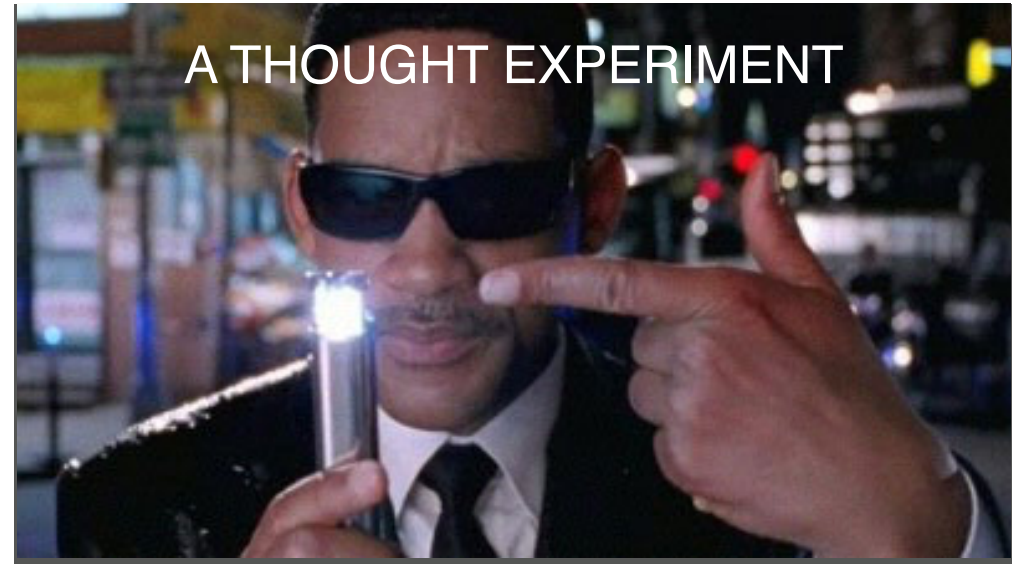


TOWARDS UNIFIED PRINCIPLES OF INTERACTION


MICHEL BEAUDOUIN-LAFON
 UNIVERSITÉ PARIS-SUD



MEET NANCY

XEROX 6085 Workstation

User-Interface Design

To make it easy to compose text and graphics, to do electronic filing, printing, and reading all at the same workstation, requires a revolutionary user interface design.

Bit-map display - Each of the pixels on the 19" screen is mapped to a bit in memory, thus, arbitrarily complex images can be displayed. The 6085 displays all fonts and graphics as they will be printed. In addition, familiar office objects such as documents, folders, file drawers and in-baskets are portrayed as recognizable images.

The mouse - A unique pointing device that allows the user to quickly select any text, graphic or office object on the display.

See and Point

All functions are visible to the user on the keyboard or on the screen. The user does filing and retrieval by selecting them with the mouse and reaching the MOVE, COPY, DELETE PROPERTIES commands keys. Text and graphics are edited with the same keys.

Shorter Production Times

Experience at Xerox with prototype work stations has shown shorter production times and thus lower costs, as a function of the percentage of use of the workstation. The following

THE GUI IN 1981

Table 3: Percentages of use of methods.

Method	Percentage
2560	45
2564	30
2568	10
2566	5

Figure 1: Data from Table 3 drive

NAME	EXTENSION	SIZE	DATE
COMMAND	COM	22677	15-11
ANSI	SYS	2556	18-11
ASSIGN	COM	364	20-11
ATTRIB	EXE	15091	14-11
BACKUP	COM	17024	20-11
CHKDSK	COM	7435	24-11
CHMOD	COM	6528	27-11
COMP	COM	3018	10-11
DEBUG	EXE	15364	15-11

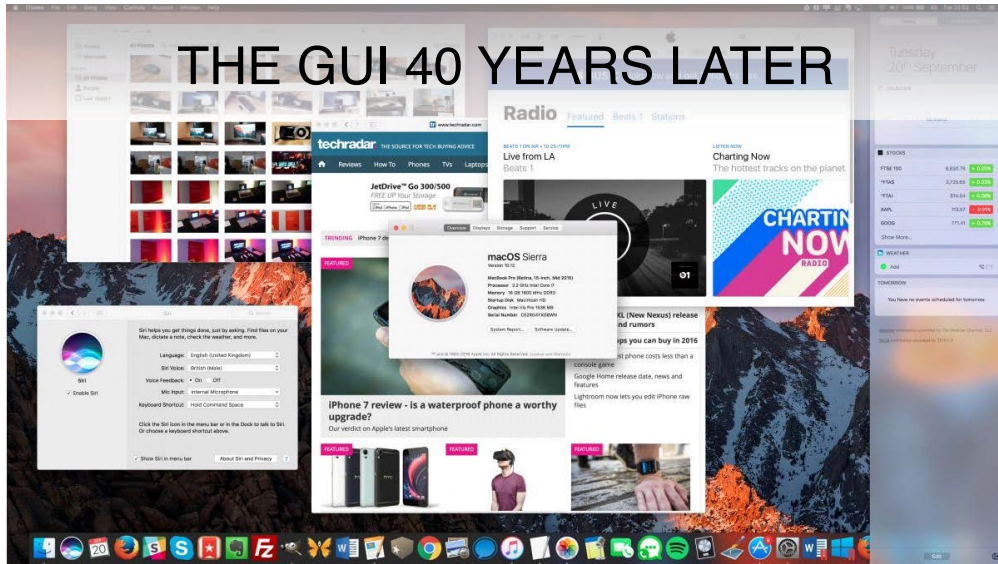
Text and Graphics

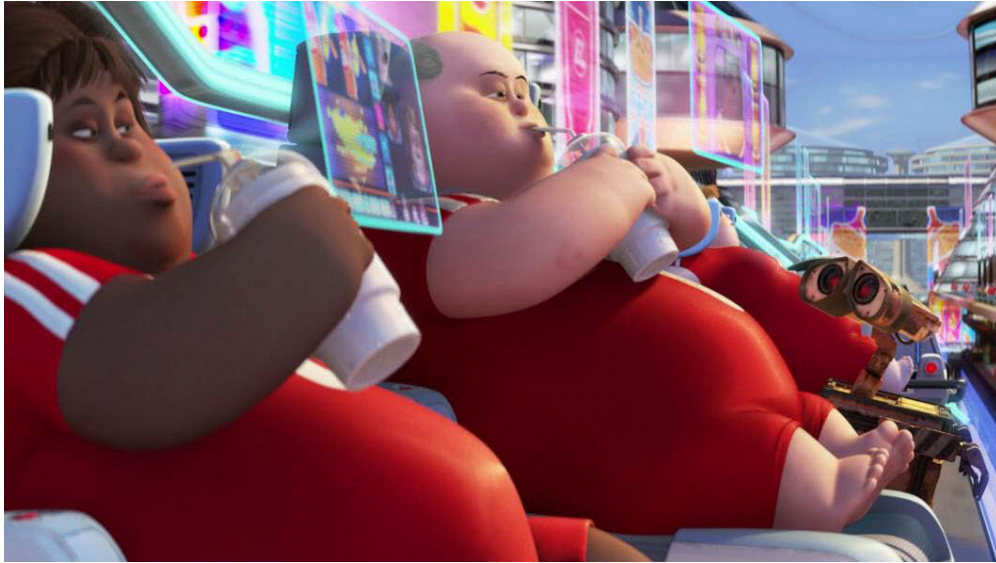
To replace typesetting, the 6085 offers a choice of type fonts and sizes from 6 point to 36 point.

Here is a sentence of 18 point text.

18 point text.

24-point text.





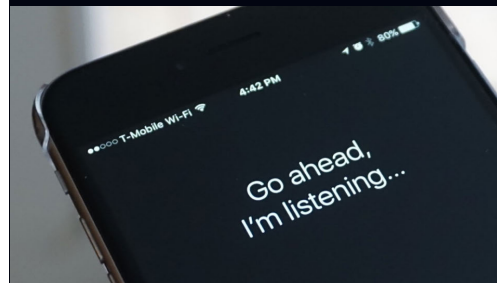
TODAY'S
INTERACTION
STYLES

GRAPHICAL (MOSTLY)



TODAY'S
INTERACTION
STYLES

VOCAL (A BIT)



TODAY'S
INTERACTION
STYLES

VIRTUAL (EMERGING?)



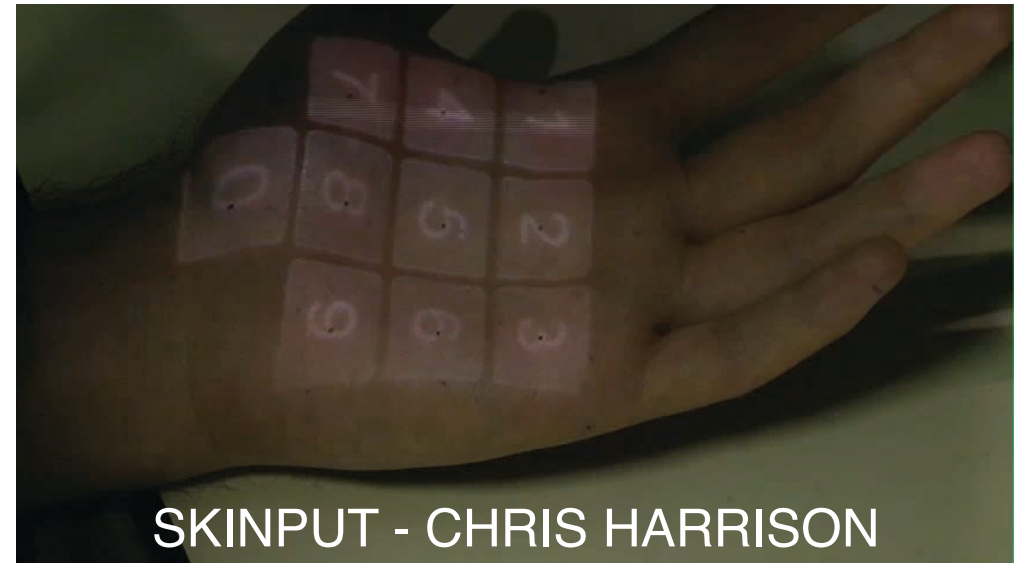
TOMORROW'S
INTERACTION
STYLES

AUGMENTED

TANGIBLE

EMBODIED

...



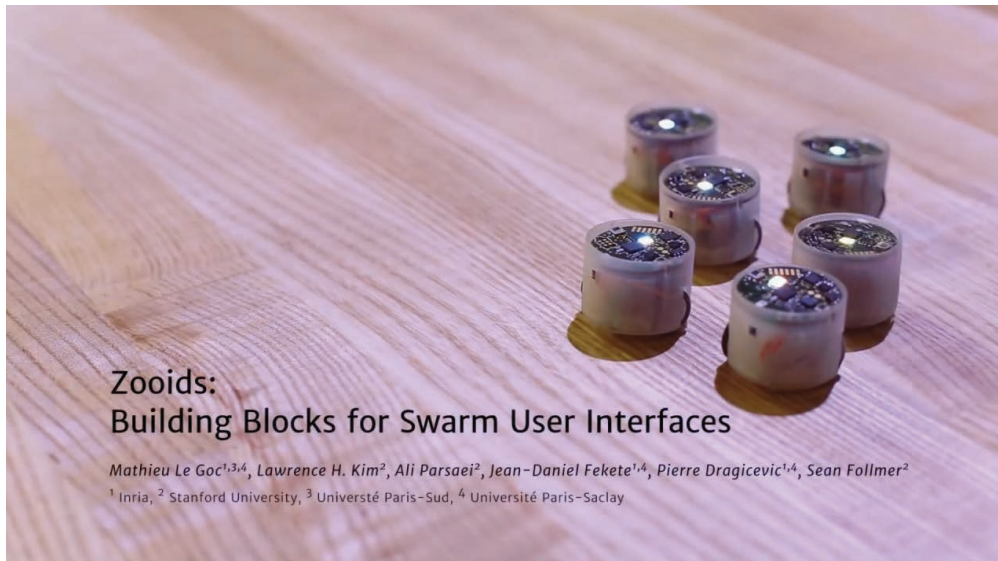
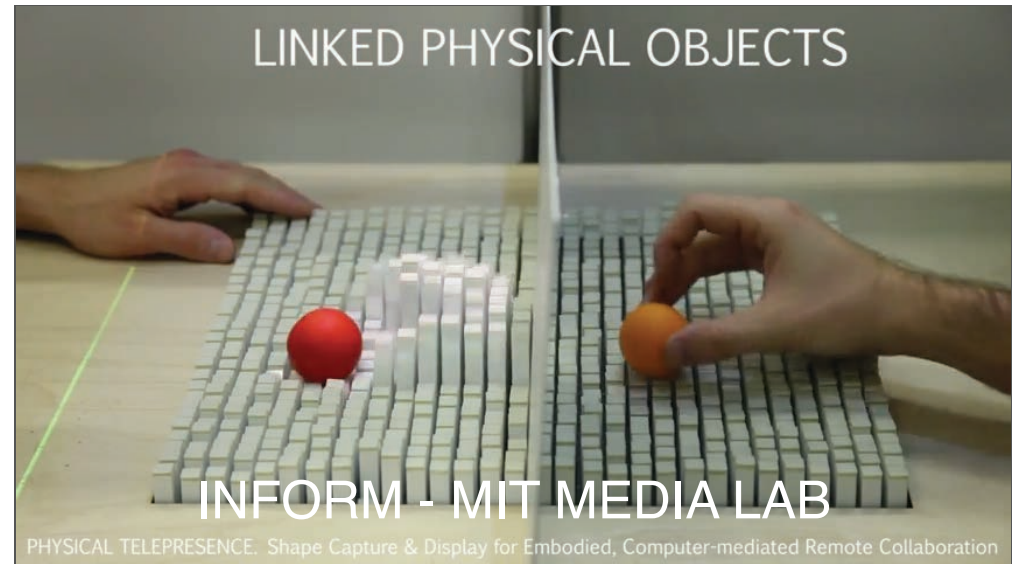
SKINPUT - CHRIS HARRISON

PaperTonnetz
Supporting Music Composition
with Interactive Paper

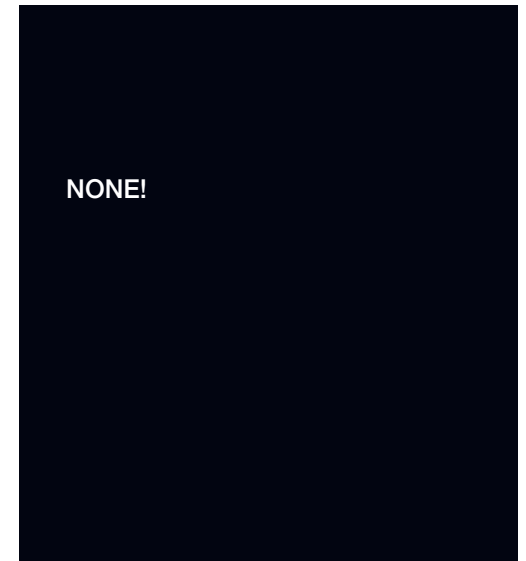
Jérémie Garcia, Louis Bigo, Antoine Spicher and Wendy E. Mackay
INRIA, IRCAM, LACL



HOLODESK - OTMAR HILLIGES



—
WHICH
STYLE WILL
REPLACE
GUIS?



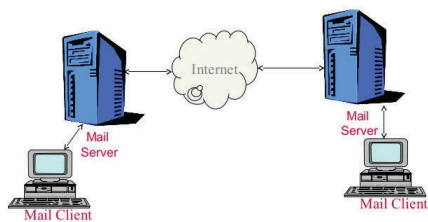
THE REAL QUESTION IS:

HOW CAN THESE INTERACTION STYLES COEXIST AND ENRICH EACH OTHER?

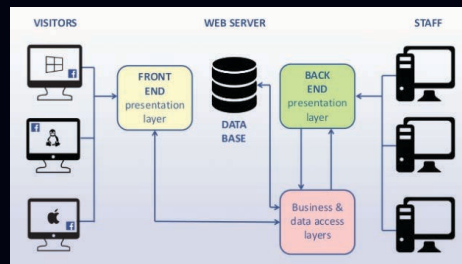
ISSUES WITH CURRENT APPROACHES

WALLED GARDENS
INFORMATION SILOS

EMAIL



FACEBOOK



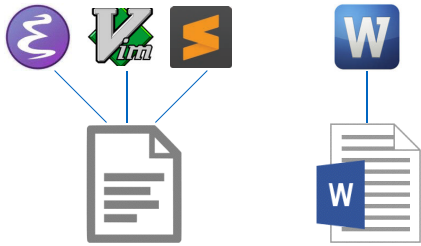
EMAIL



FACEBOOK



MY FILES



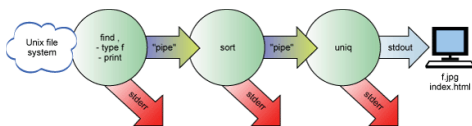
“THE CLOUD”



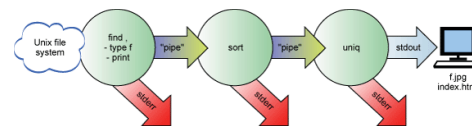
ISSUES WITH CURRENT APPROACHES

- LACK OF FLEXIBILITY
- USERS CANNOT APPROPRIATE THEIR TOOLS
- SOFTWARE IS NOT SOFT!

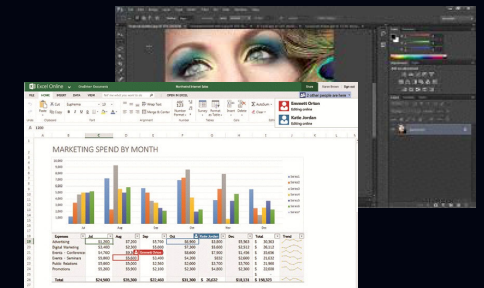
UNIX



UNIX



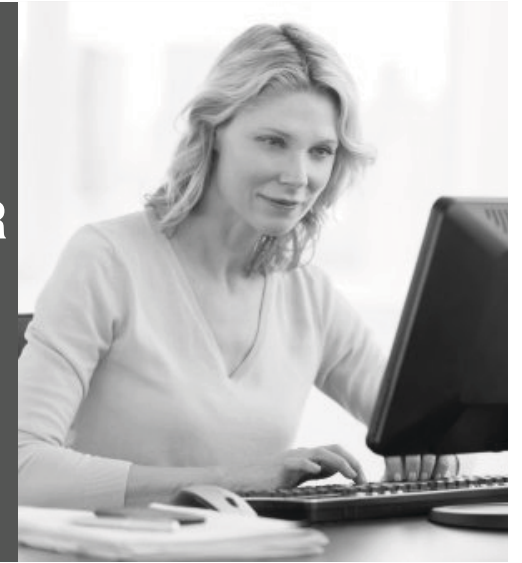
APPS



—
HOW TO SUPPORT
INTEROPERABILITY
AND END-USER
APPROPRIATION?

TO SUPPORT *DIVERSITY*,
WE NEED *UNIFICATION*

ONE USER
ONE COMPUTER
ONE TASK



ONE APP IS NOT ENOUGH



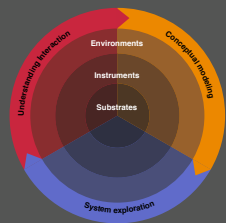
ONE DEVICE IS NOT ENOUGH





ONE: ONE IS NOT ENOUGH

ONE: ONE IS NOT ENOUGH
UNIFIED PRINCIPLES OF INTERACTION



HOW TO IDENTIFY
UNIFYING PRINCIPLES?

— HOW DO WE INTERACT IN THE PHYSICAL WORLD?

LANGUAGE



— HOW DO WE INTERACT IN THE PHYSICAL WORLD?

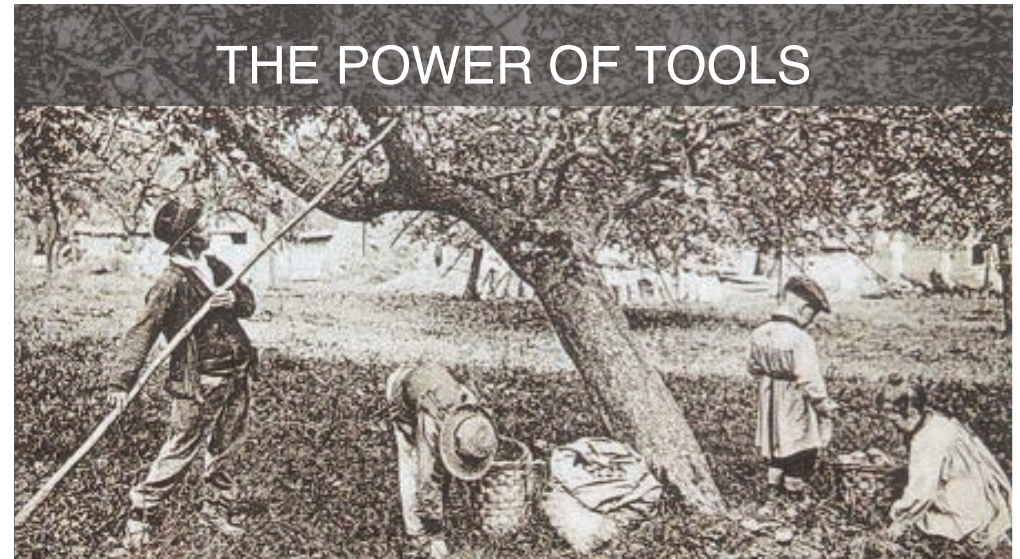
PHYSICAL ACTION

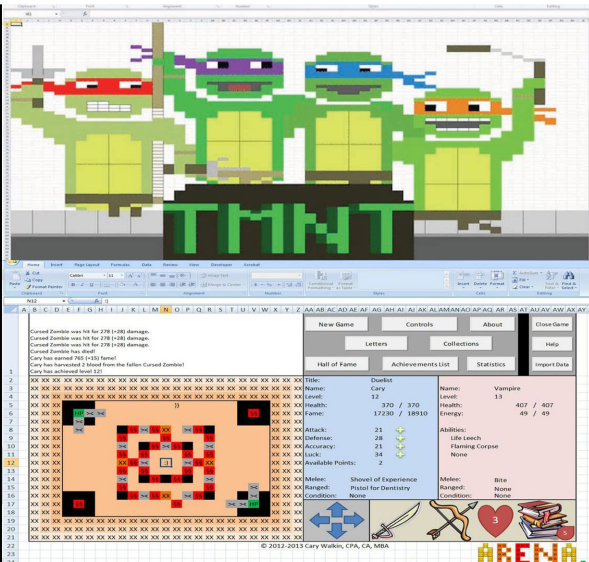
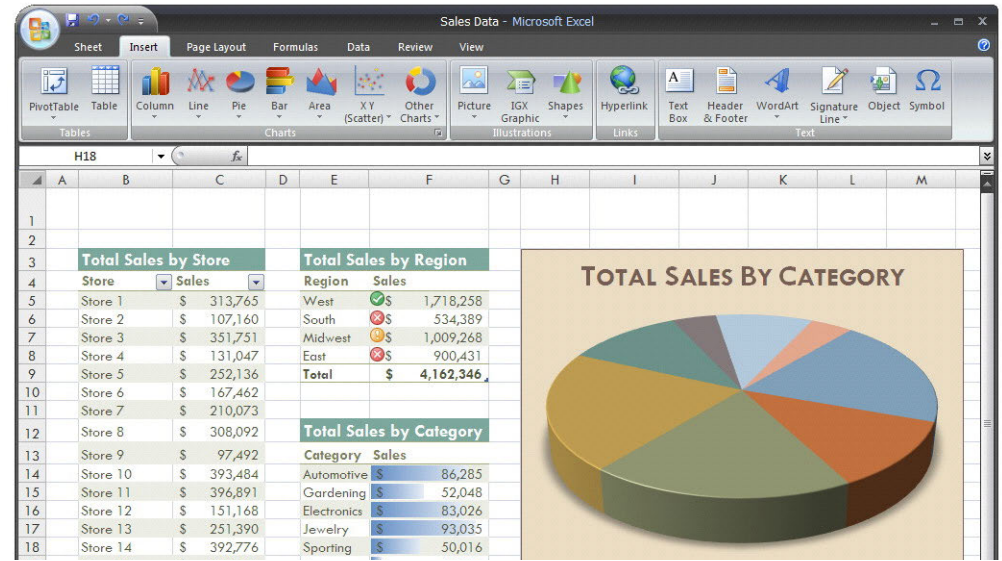
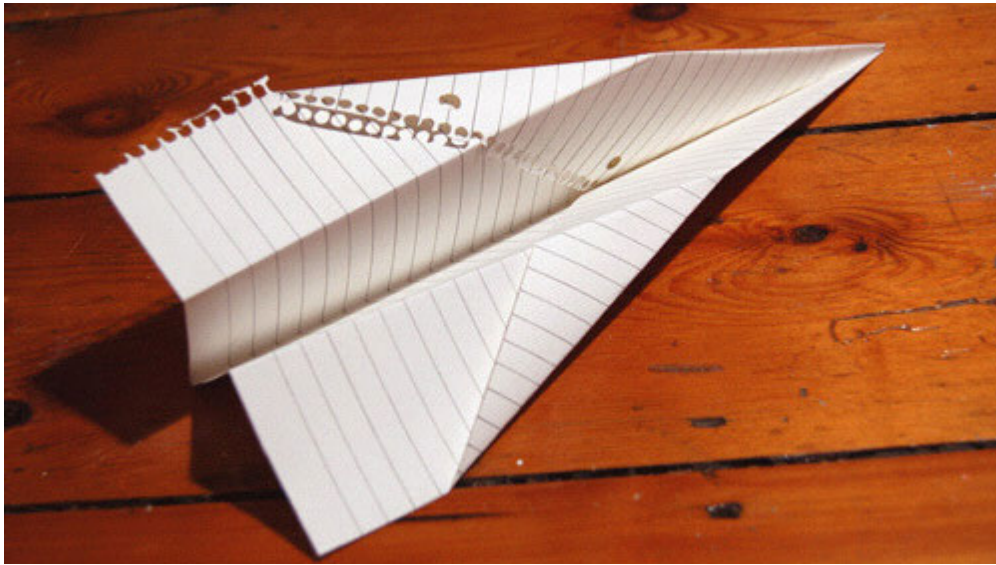


— PHYSICAL ACTION IS OFTEN MEDIATED BY TOOLS



THE POWER OF TOOLS





BIG GAP
BETWEEN
PHYSICAL
AND DIGITAL
TOOLS

TO SUPPORT DIVERSITY,
WE NEED UNIFICATION

THINK OF
THE LAWS OF PHYSICS

THIS IS NOT (JUST) A PENCIL

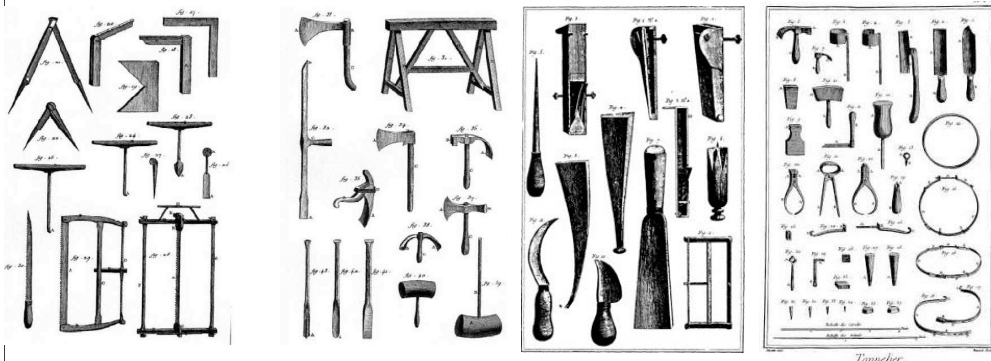


ATOMS
MOLECULES
MATERIAL
OBJECT
TOOL
USE
CULTURE

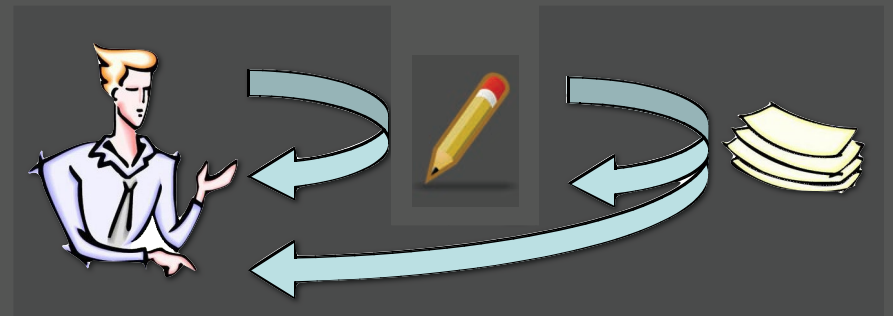
THIS IS NOT (JUST) A PENCIL



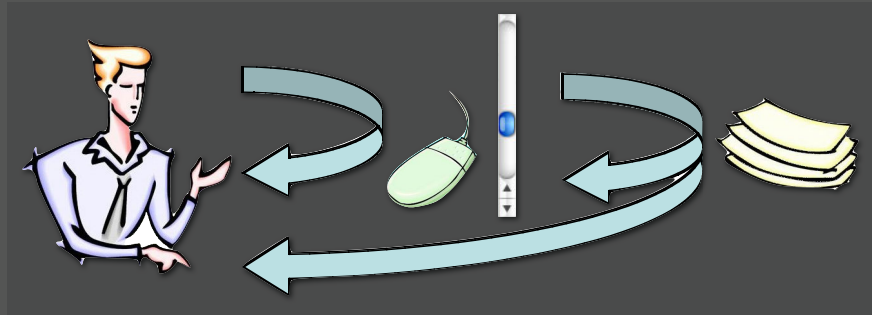
INSTRUMENTAL INTERACTION



TOOLS MEDIATE INTERACTION



INSTRUMENTAL INTERACTION



INSTRUMENTAL INTERFACES

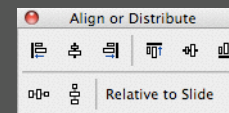


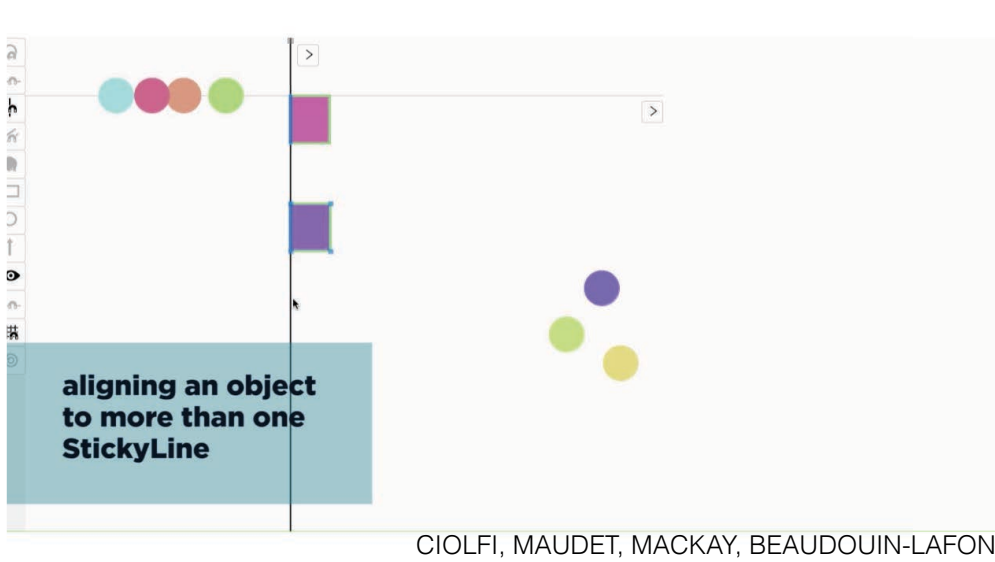
DESIGN
PRINCIPLE:

REIFICATION

TURN
ABSTRACT COMMANDS
INTO
CONCRETE OBJECTS
(INSTRUMENTS)

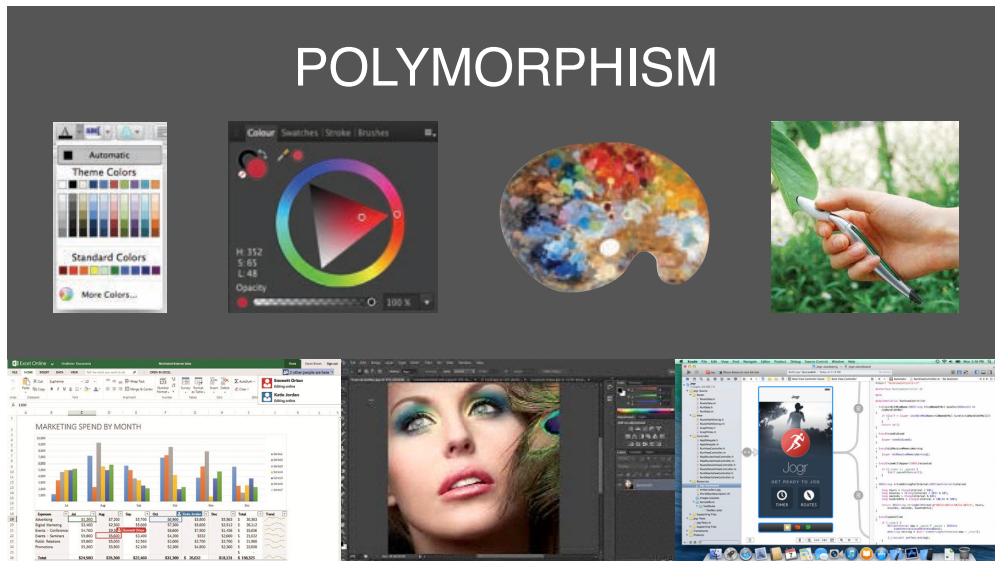
MAGNETIC GUIDELINES





DESIGN PRINCIPLE:
POLYMORPHISM

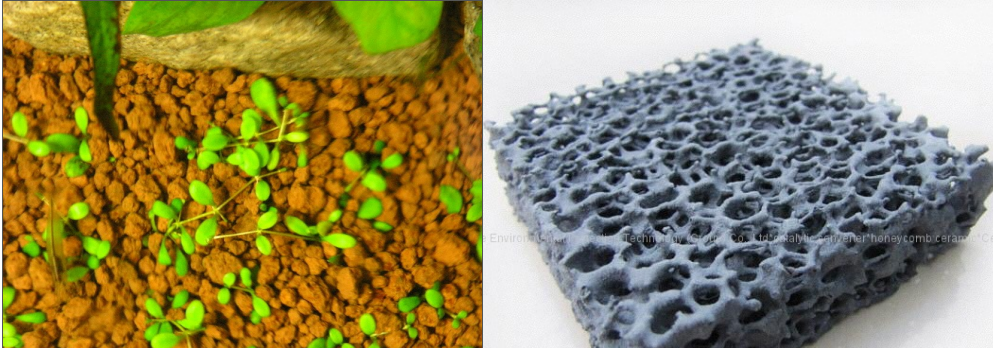
MAKE INSTRUMENTS WORK WITH DIVERSE CONTENT (SUBSTRATES)



DESIGN PRINCIPLE:
REUSE

CAPTURE AND REUSE INTERACTION PATTERNS

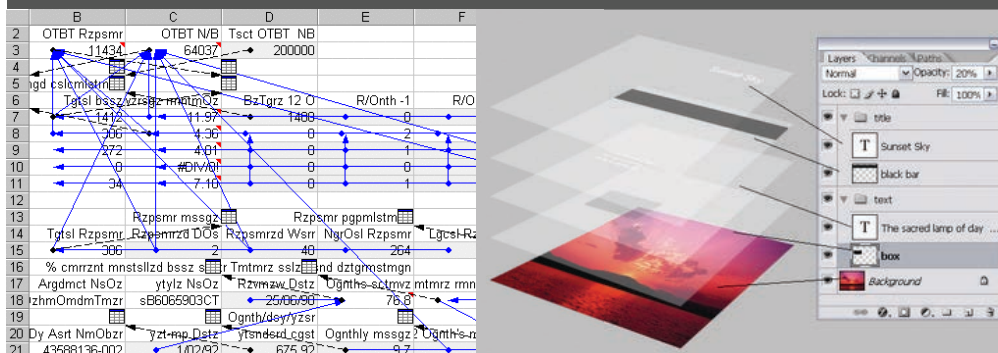
INFORMATION SUBSTRATES



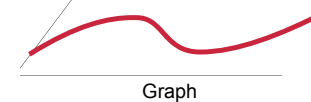
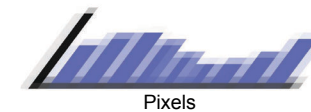
INFORMATION SUBSTRATES



INFORMATION SUBSTRATES



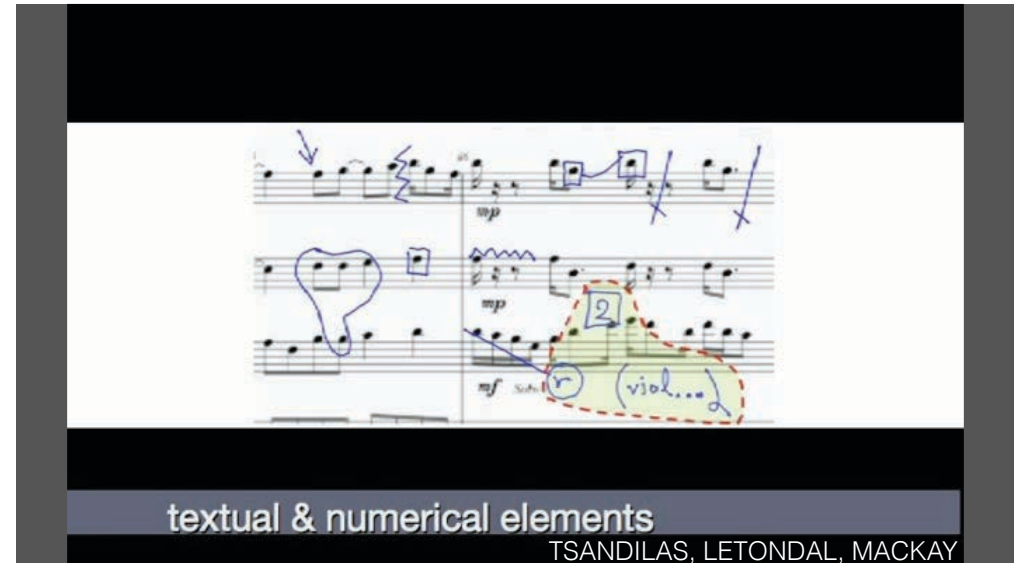
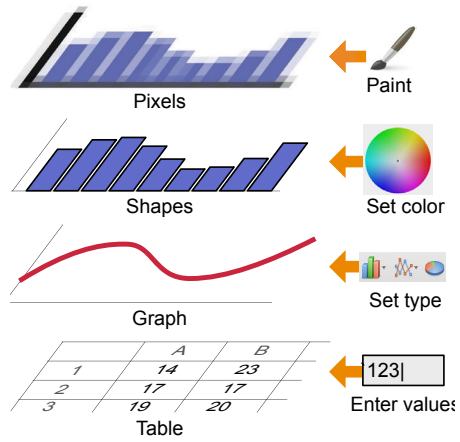
LEVELS OF INTERPRETATION



	A	B
1	14	23
2	17	17
3	19	20

Table

LEVELS OF INTERPRETATION



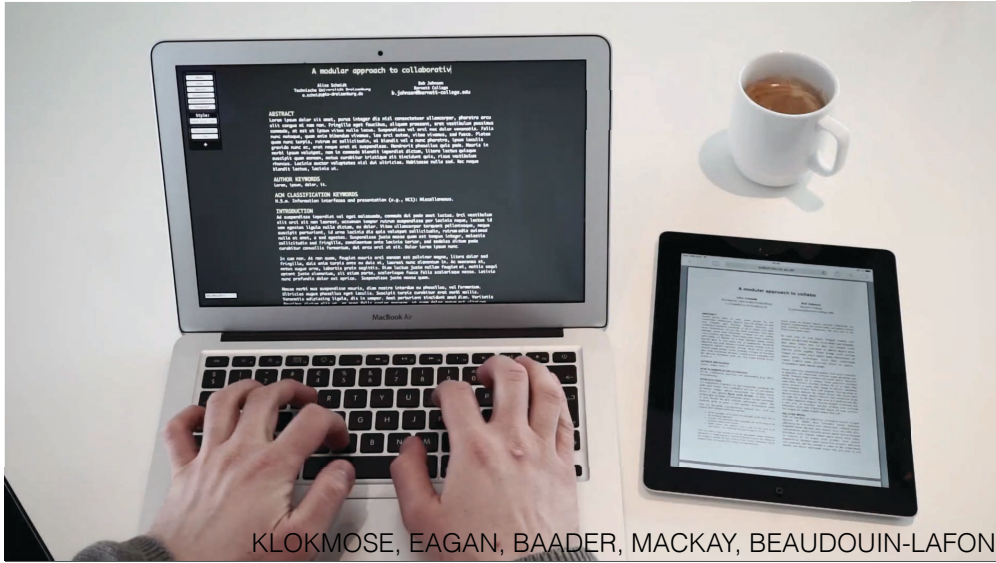
Prototype demonstrating a simple scenario:
Working on a piece for piano and electronics

GARCIA, TSANDILAS, AGON, MACKAY

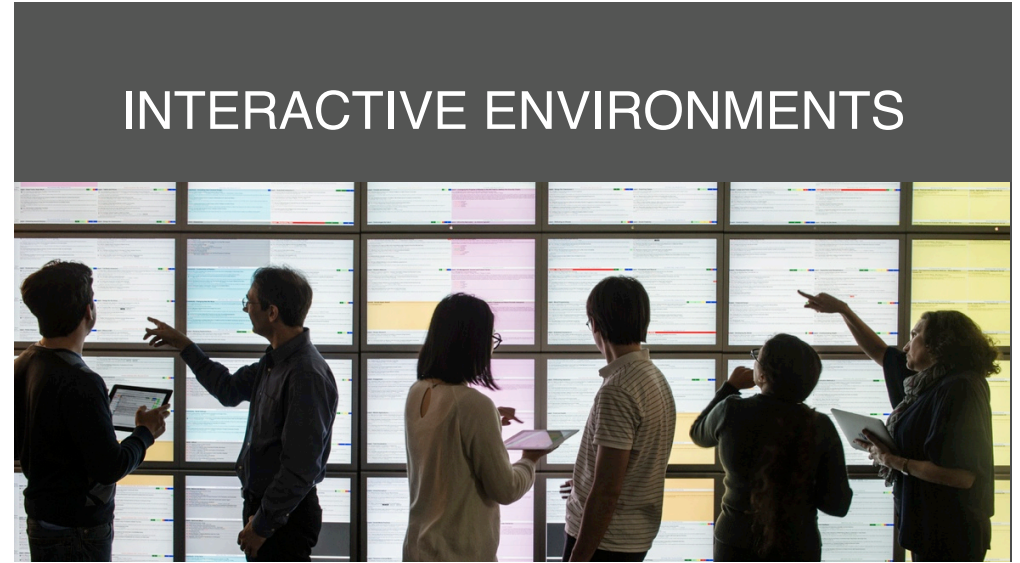
DESIGN
PRINCIPLE:

UNIVERSAL
SHARING

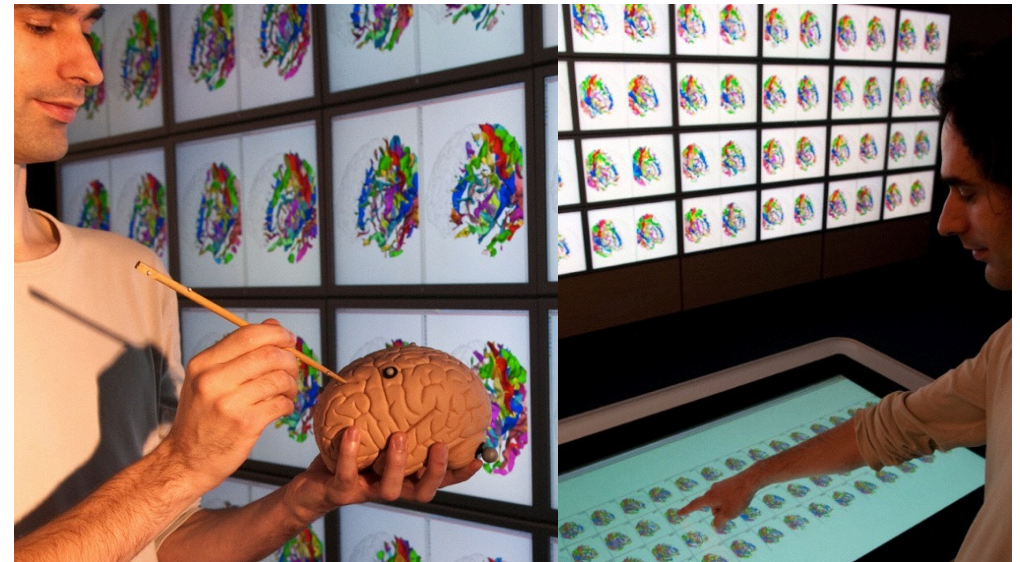
MAKE CONTENT
AND INSTRUMENTS
SHAREABLE

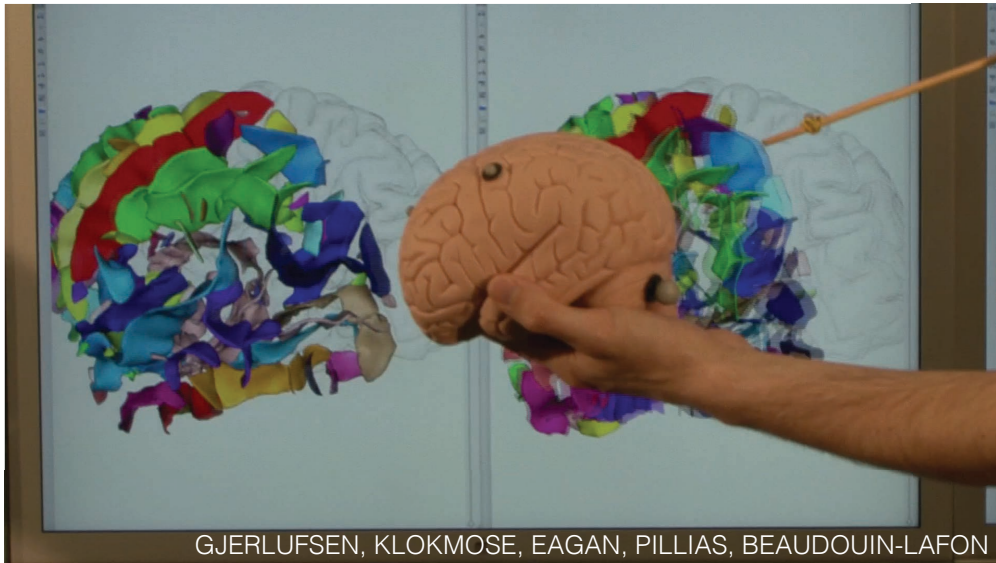


KLOKMOSE, EAGAN, BAADER, MACKAY, BEAUDOUIN-LAFON



INTERACTIVE ENVIRONMENTS





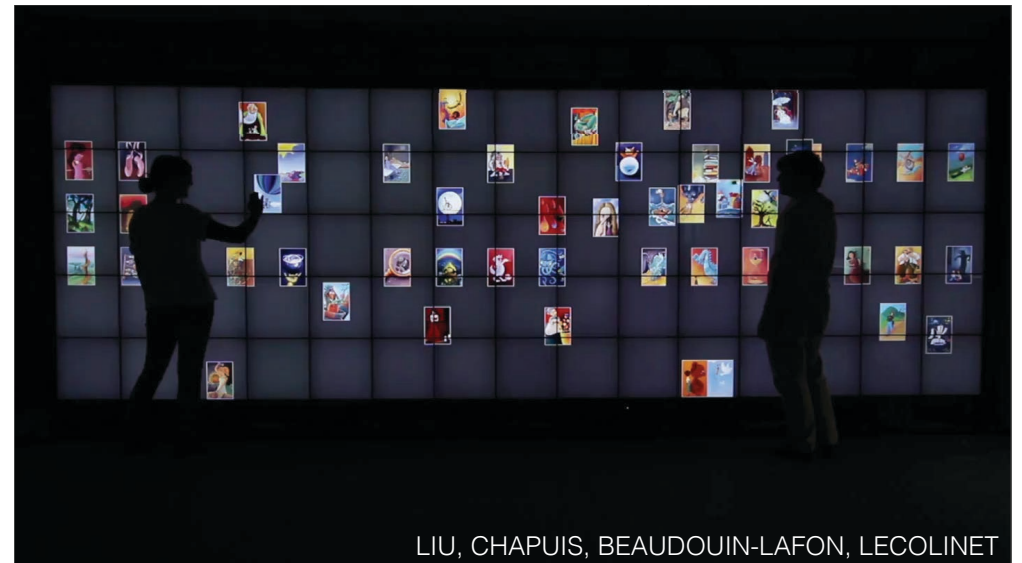
GJERLUFSEN, KLOKMOSE, EAGAN, PILLIAS, BEAUDOUIN-LAFON



AVELLINO, FLEURY, MACKAY, BEAUDOUIN-LAFON

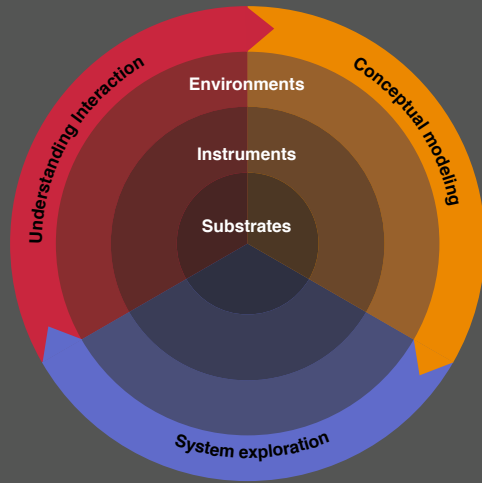


GJERLUFSEN, KLOKMOSE, EAGAN, PILLIAS, BEAUDOUIN-LAFON



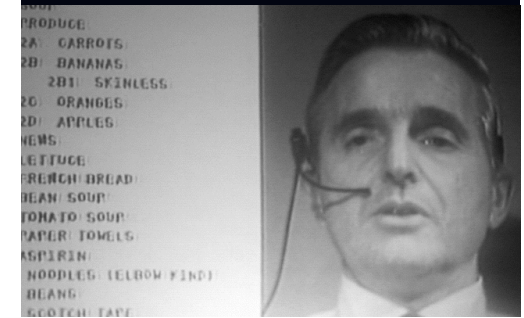
LIU, CHAPUIS, BEAUDOUIN-LAFON, LECOLINET

ONE



CONCLUSION

AUGMENTING HUMAN INTELLECT
DOUGLAS ENGELBART



CONCLUSION

HUMAN IN THE LOOP



CONCLUSION

HUMAN IN THE LOOP
VS
COMPUTER IN THE LOOP



CONCLUSION

OPEN ARCHITECTURES &
UNIFIED PRINCIPLES TO
PROMOTE CREATIVITY

GRAZIE !

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MBL@LRI.FR

