



WIAD 2017

LOCAL CONNECTIONS. GLOBAL IMPACT.

LYON, FRANCE



LE FUTUR DES INTERFACES: UNIFIER POUR DIVERSIFIER

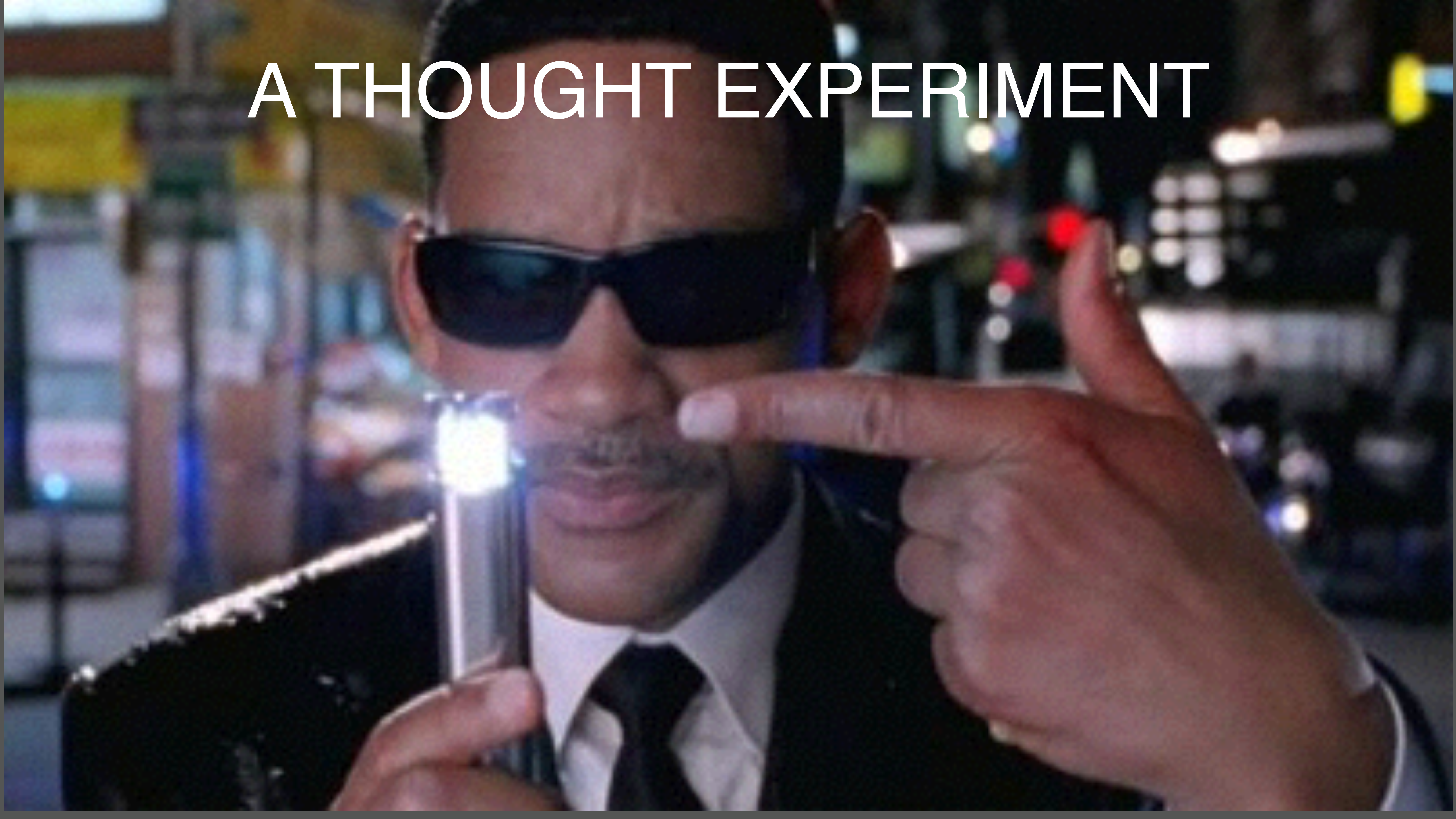
THE FUTURE OF INTERACTION UNIFY TO DIVERSIFY

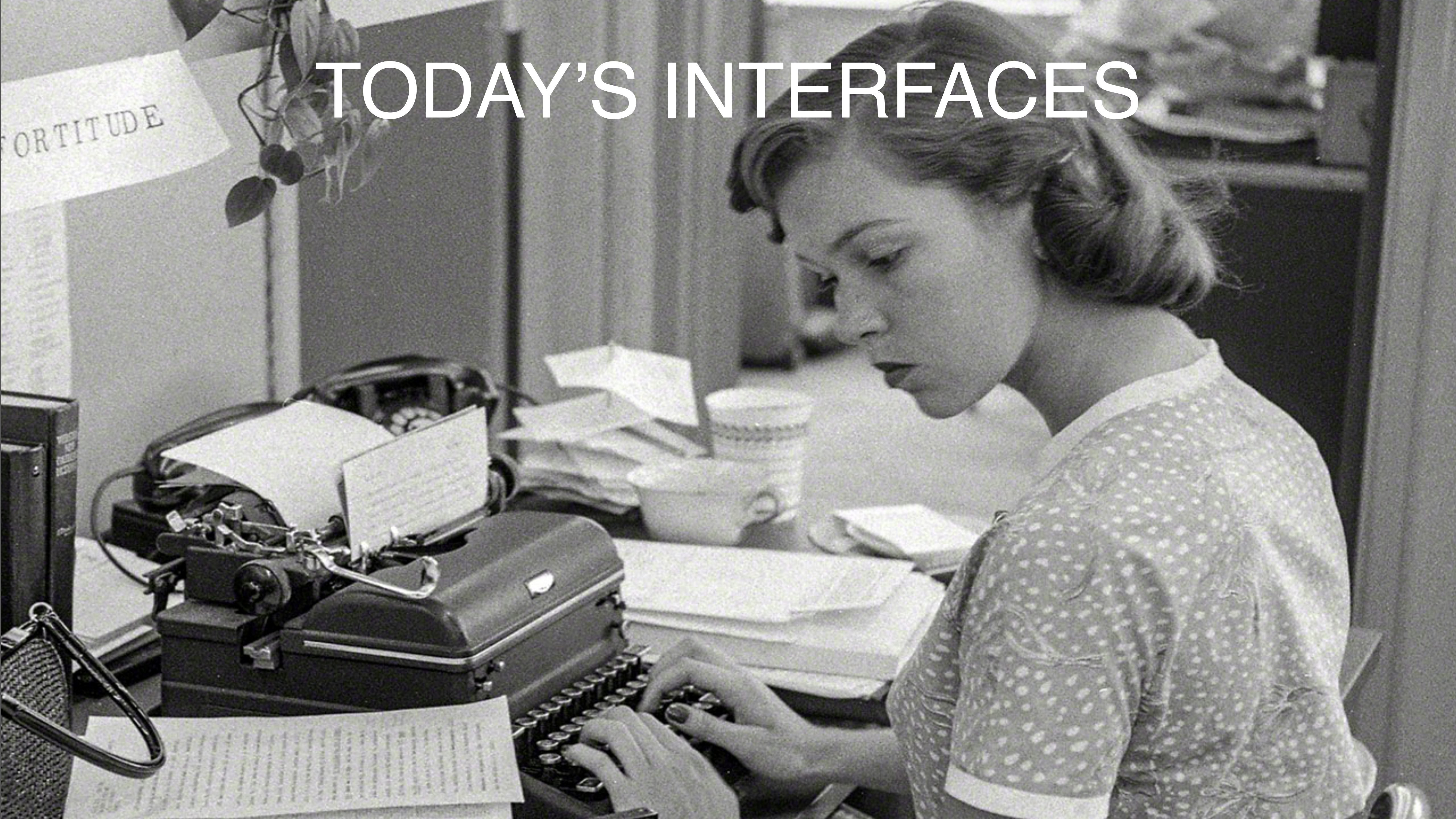
MICHEL BEAUDOUIN-LAFON
UNIVERSITÉ PARIS-SUD

INTERACTING WITH INFORMATION



A THOUGHT EXPERIMENT





TODAY'S INTERFACES

FORTITUDE

XEROX
6085 Workstation
User-Interface Design

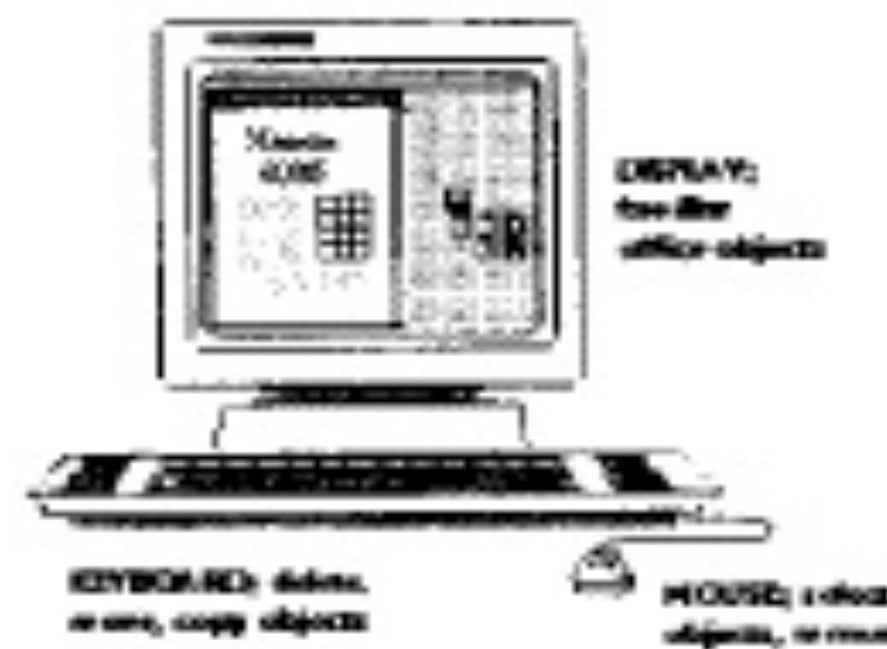
To make it easy to compose text and graphics, to do electronic filing, printing, and mailing all at the same workstation, requires a revolutionary user interface design.

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 touching the MOVE, COPY, DELETE or PROPERTIES command keys. Text and graphics are edited with the same keys.



Shorter Production Times

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

ARE LIKE YESTERDAY'S

Year	Method 1 (%)	Method 2 (%)
1980	41.1	39.9
1982	45	55
1984	30	70
1986	10	90
1988	5	95

Table 1: Percentages of use of methods.

Activity under the old and the new

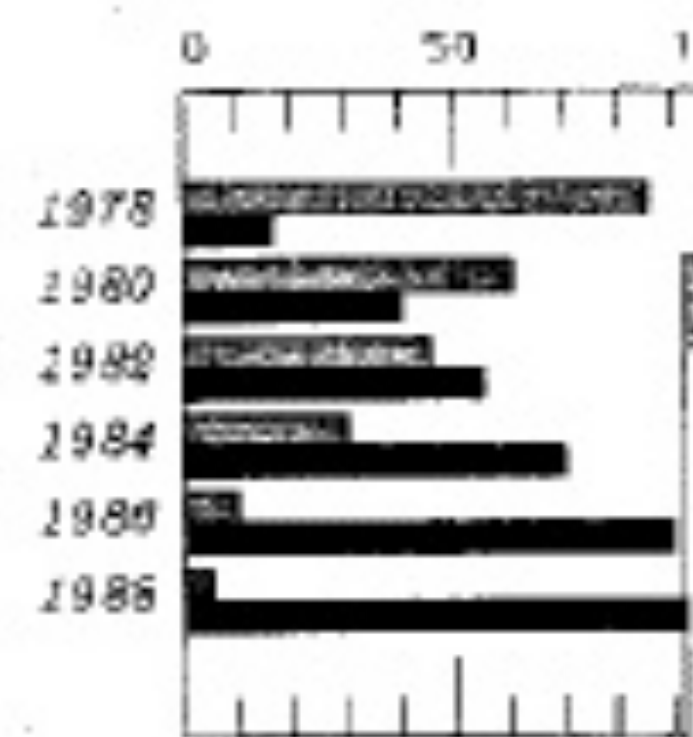


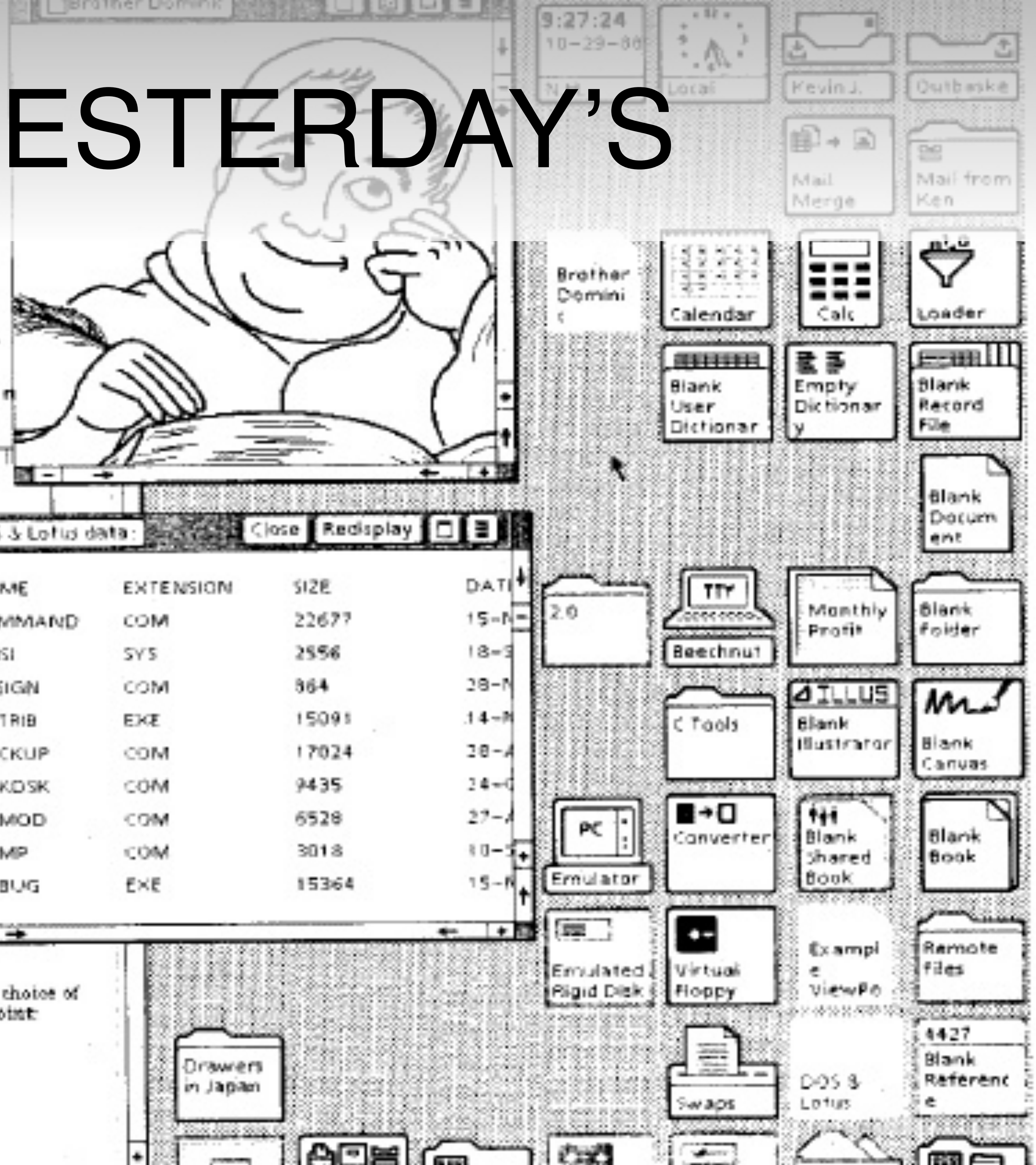
Figure 2: Data from Table 1 drive

$$20 \times 10 = \sum_{i=1}^n \int_a^b \frac{1}{x^2 + y^2} dx$$

Workstation usage percentages Table 1 and illustrated in Figure 6085 users are likely to do more composition and layout, control process including printing and di

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 6-point text.
 Here is a sentence of 12-point text.
 18-point text.
 24-point text.



BUT OUR USES HAVE CHANGED



WHAT IS THE FUTURE?



WHAT IS THE FUTURE?



INTERACTION PARADIGMS

**FIRST PERSON
COMPUTER AS TOOL**



**SECOND PERSON
COMPUTER AS PARTNER**



**THIRD PERSON
COMPUTER AS MEDIA**



TODAY'S INTERACTION STYLES

GRAPHICAL (MOSTLY)



TODAY'S INTERACTION STYLES

VOCAL (A BIT)



TODAY'S INTERACTION STYLES

VIRTUAL (EMERGING?)



TOMORROW'S INTERACTION STYLES

AUGMENTED

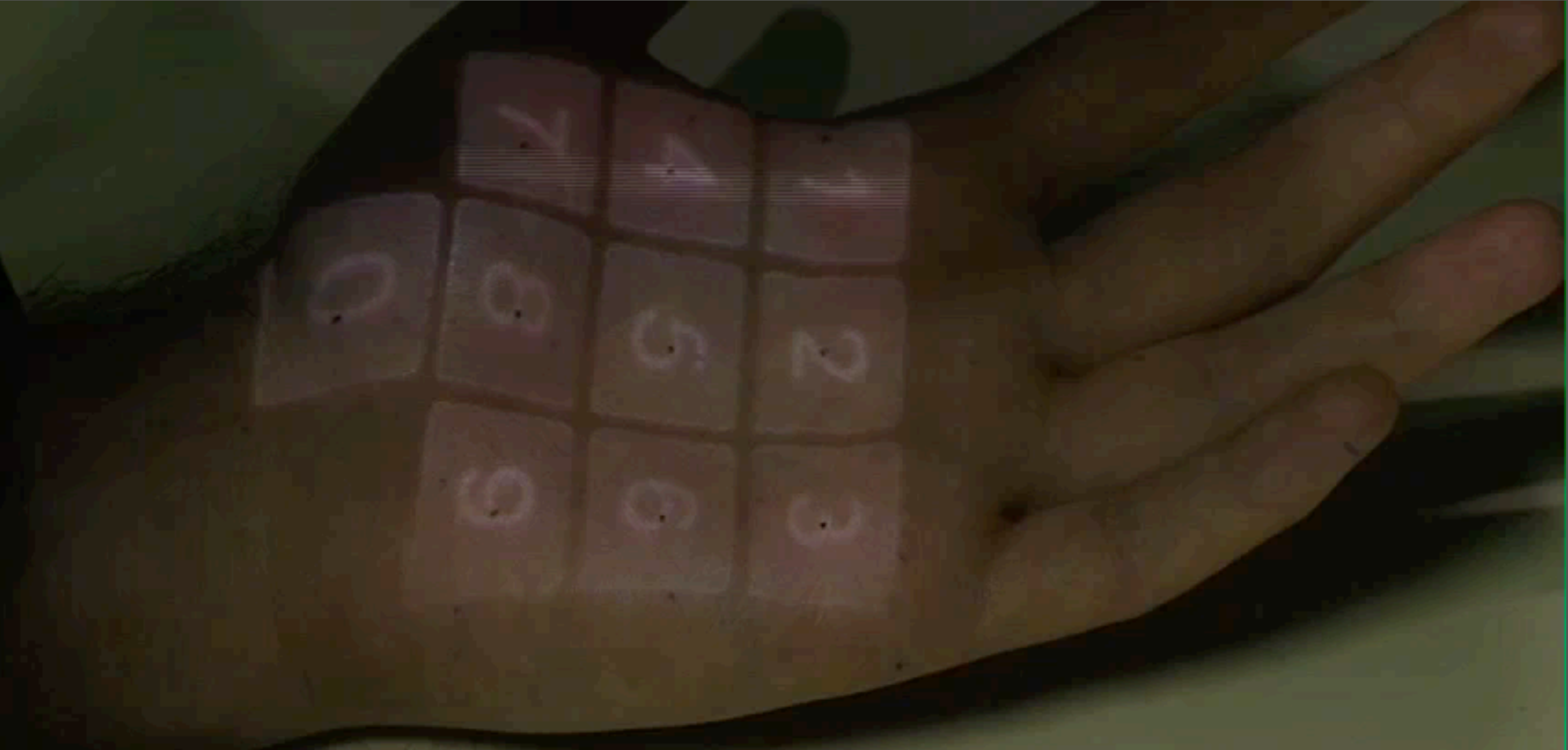
TANGIBLE

EMBODIED

...

DIGITAL DESK PIERRE WELLNER






SKINPUT - CHRIS HARRISON

GRASPABLE INTERFACES

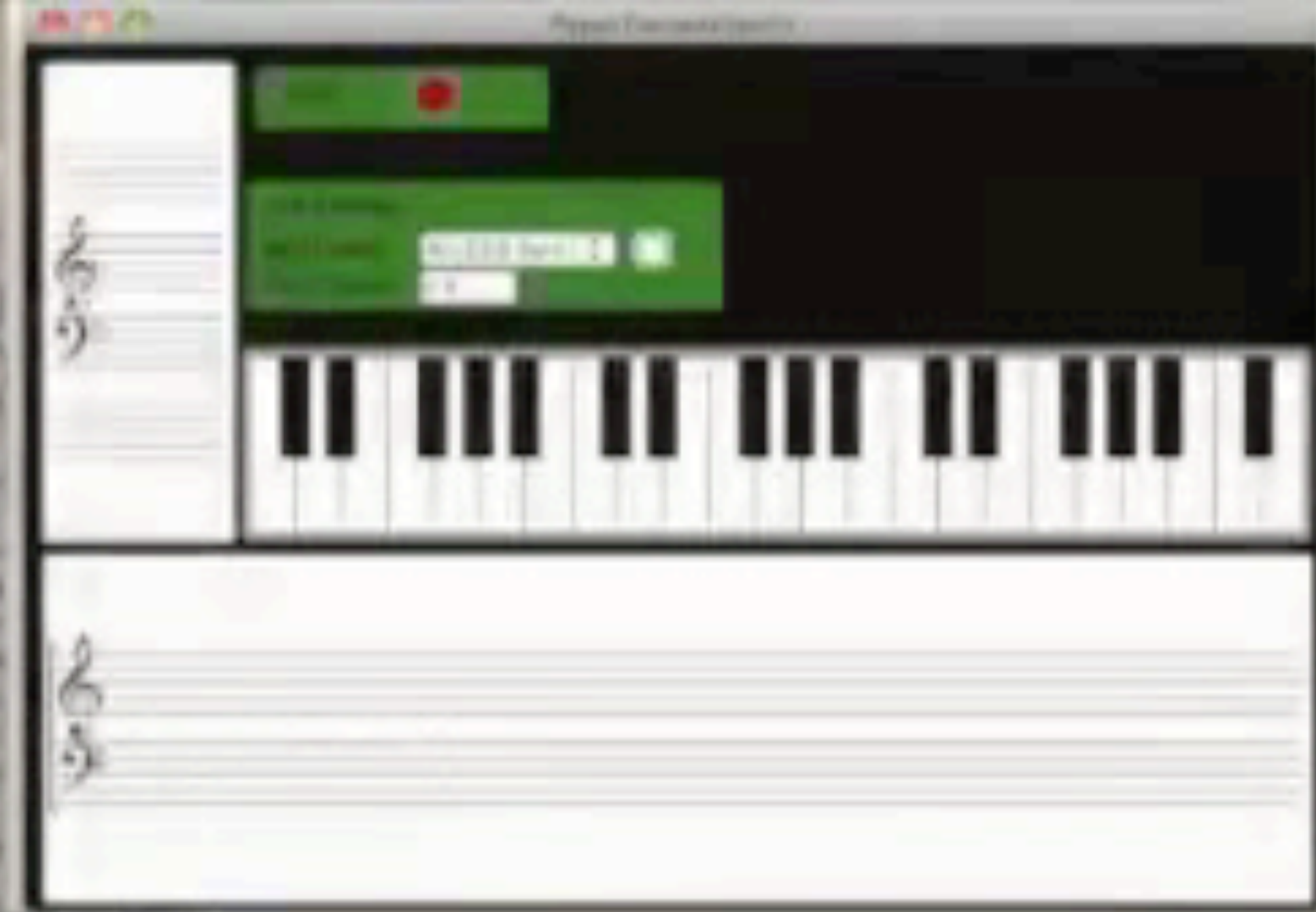
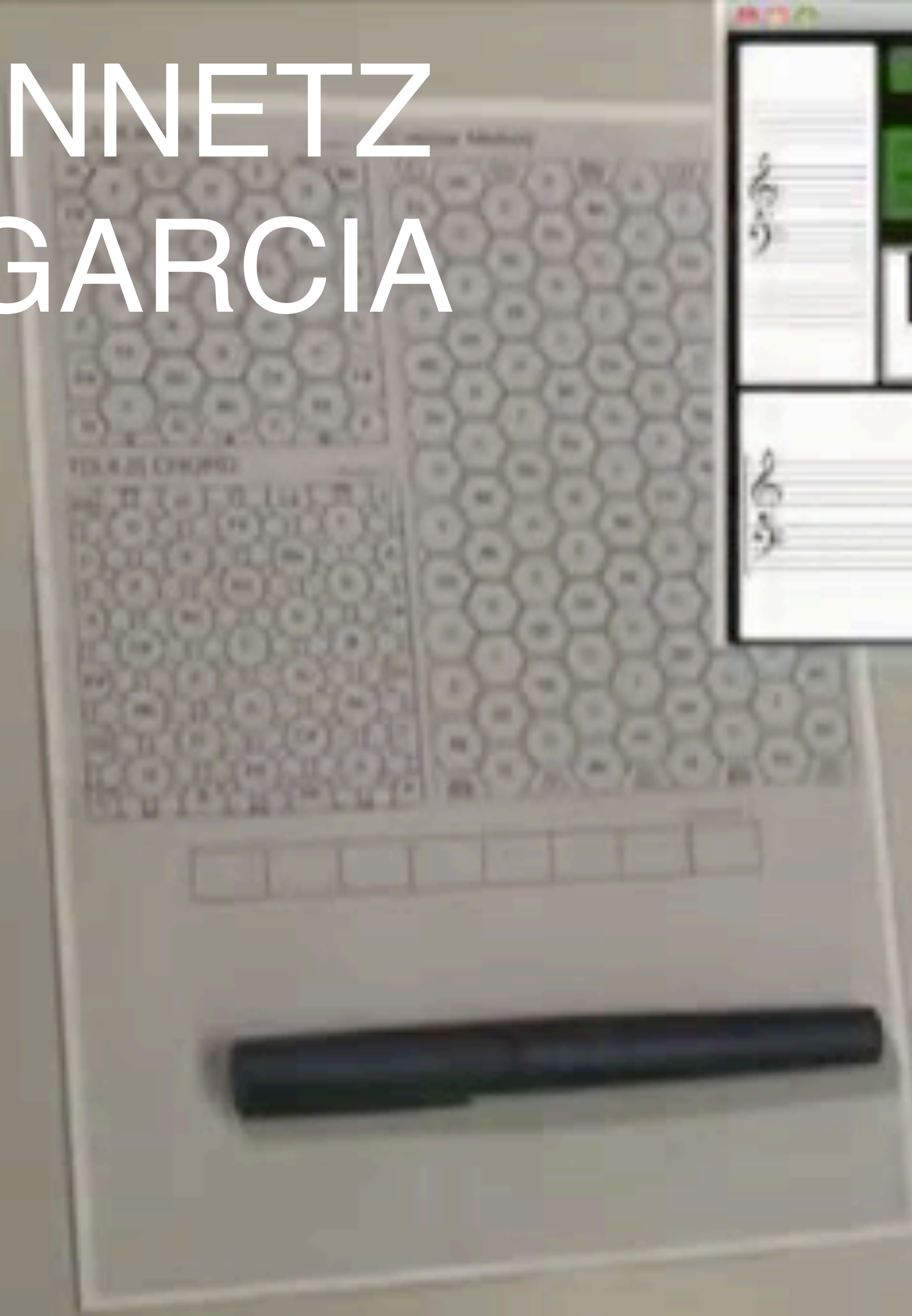
GEORGE FITZMAURICE



B) Mock-up simulation

PAPER TONNETZ

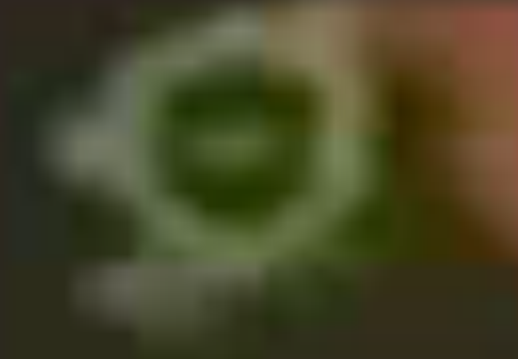
JÉRÉMIE GARCIA



PUT-THAT-THERE
RICH BOLT




VIDEOPLACE MYRON KRUGER



HOLODESK - OTMAR HILLIGES

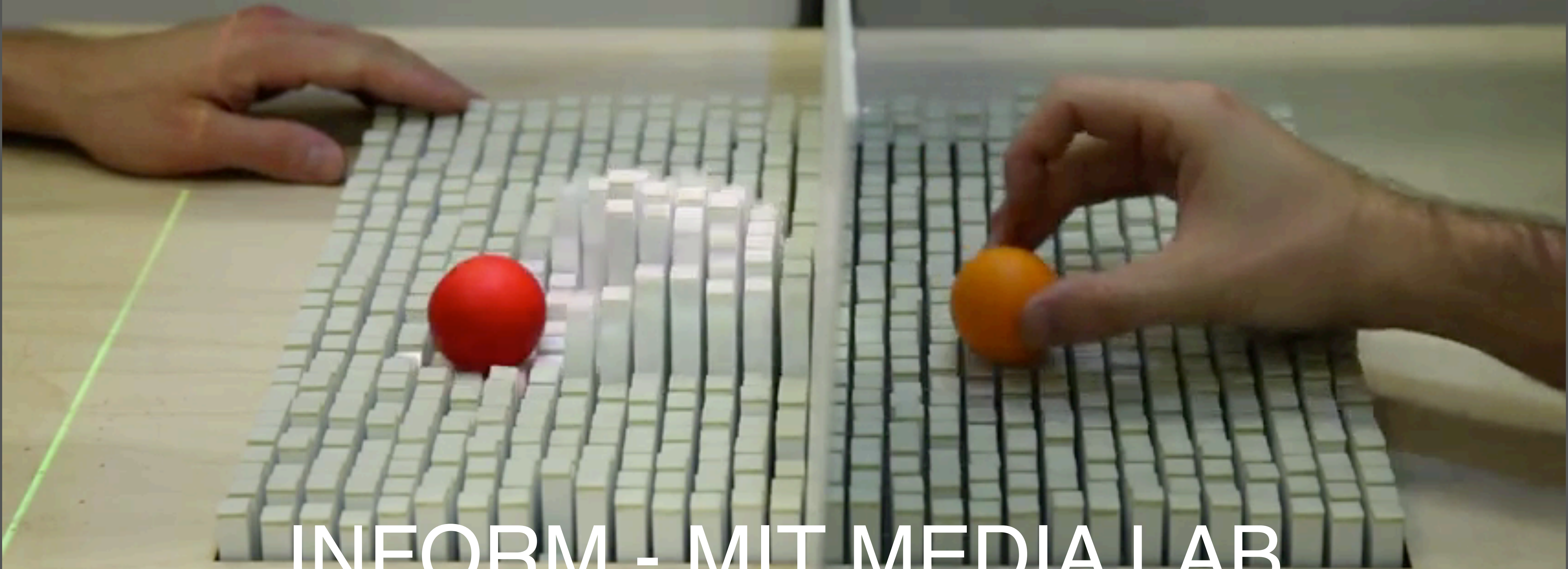


ROOMALIVE - MICROSOFT



With RoomAlive, users can touch, shoot, and dodge augmented content.

LINKED PHYSICAL OBJECTS



INFORM - MIT MEDIA LAB

—
WHICH
STYLE WILL
REPLACE
GUIS?

NONE!

TWO TRENDS:

MIXED REALITY

MULTIMODALITY

—
THE REAL
QUESTION IS:

**HOW CAN THESE
INTERACTION STYLES
COEXIST
AND
ENRICH EACH OTHER?**

ISSUES
WITH
CURRENT
APPROACHES

WALLED GARDENS

INFORMATION SILOS

EMAIL

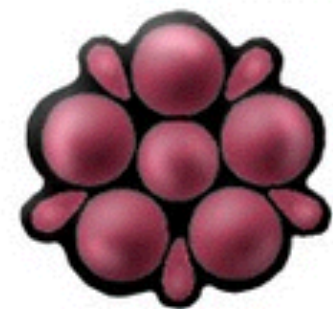
Gmail



AOL



Outlook.com



YAHOO! MAIL



Microsoft Office Outlook



FACEBOOK



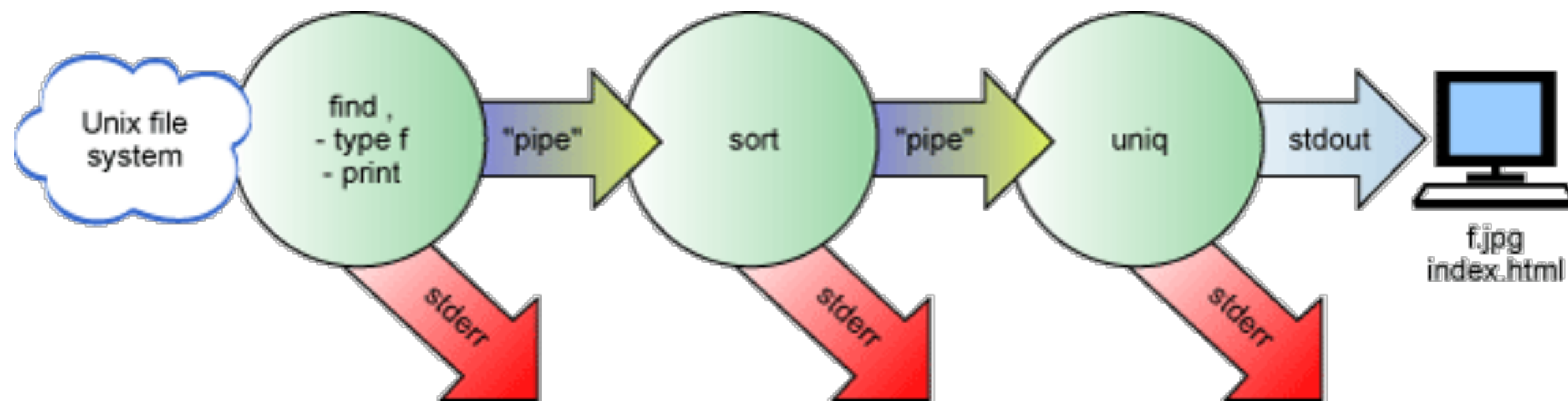
ISSUES WITH CURRENT APPROACHES

LACK OF FLEXIBILITY

**USERS CANNOT
APPROPRIATE THEIR TOOLS**

SOFTWARE IS NOT SOFT!

UNIX



APPS

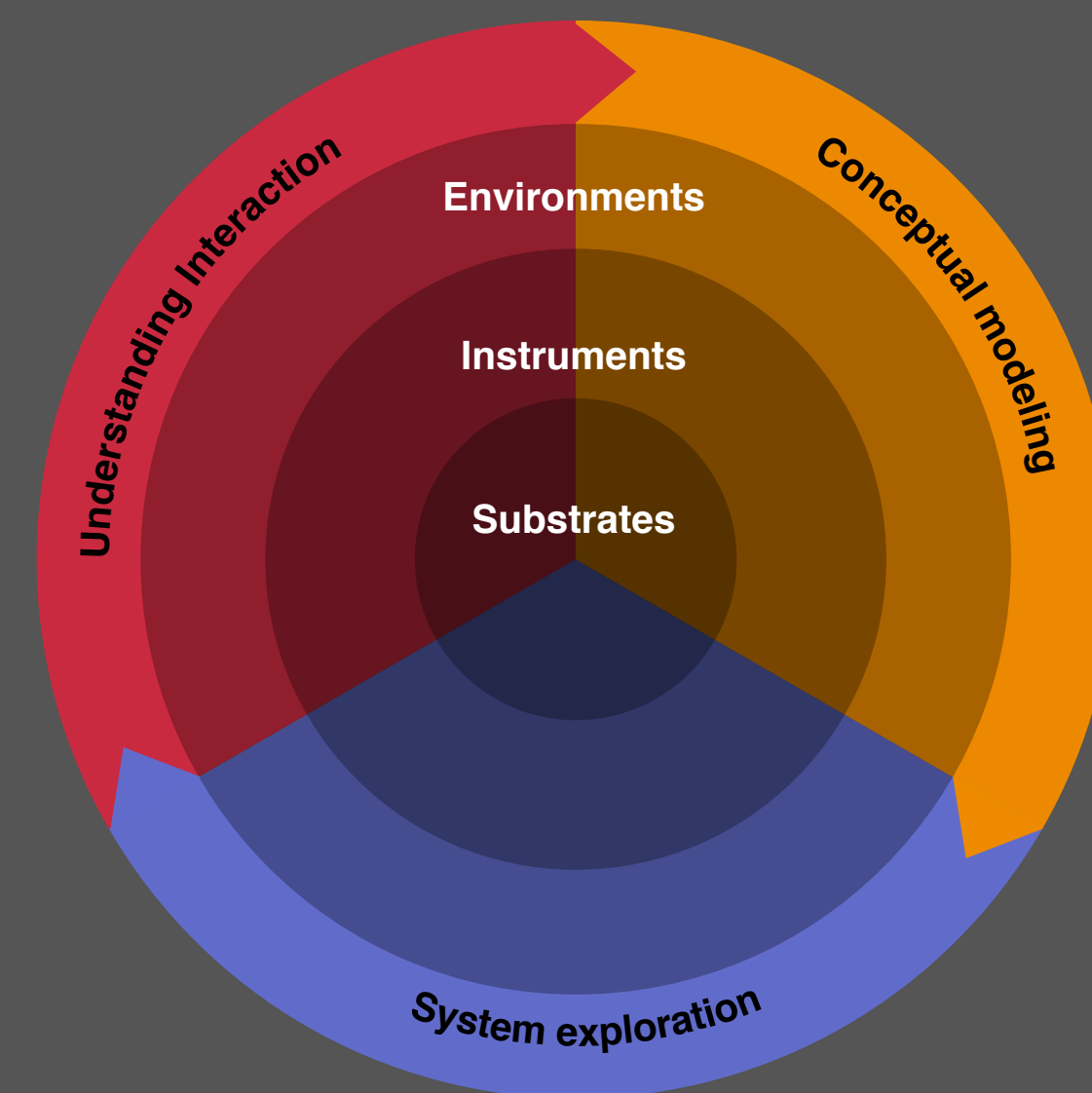
Expenses	Jul	Aug	Sep	Oct	Nov	Dec	Total	Trend
Advertising	\$1,200	\$7,200	\$5,700	\$6,900	\$3,800	\$5,563	\$30,363	
Digital Marketing	\$3,400	\$2,300	\$5,000	\$7,300	\$5,600	\$2,512	\$26,112	
Events - Conferences	\$4,700	\$9,300	\$8,600	\$7,900	\$7,900	\$1,456	\$35,656	
Events - Seminars	\$5,000	\$5,600	\$3,400	\$4,200	\$832	\$2,600	\$21,632	
Public Relations	\$5,000	\$5,000	\$2,560	\$2,000	\$3,700	\$3,700	\$21,960	
Promotions	\$5,200	\$5,900	\$2,100	\$2,300	\$4,800	\$2,300	\$22,600	
Total	\$24,500	\$35,300	\$22,460	\$31,300	\$26,632	\$18,131	\$158,323	

HOW TO SUPPORT
INTEROPERABILITY
AND END-USER
APPROPRIATION?

**TO SUPPORT DIVERSITY,
WE NEED UNIFICATION**

ONE: ONE IS NOT ENOUGH

UNIFIED PRINCIPLES OF INTERACTION





ONE APP IS NOT ENOUGH

ONE DEVICE IS NOT ENOUGH



A group of young women are gathered around, looking at their smartphones. The text "ONE USER IS NOT ENOUGH" is overlaid in the center. The women are of various ethnicities and are dressed in casual attire. They are all smiling and appear to be engaged with their devices. The background is a plain, light-colored wall. The text is in a bold, white, sans-serif font.

ONE USER IS NOT ENOUGH

HOW TO IDENTIFY UNIFYING PRINCIPLES?

HOW DO WE
INTERACT
IN THE
PHYSICAL
WORLD?

LANGUAGE



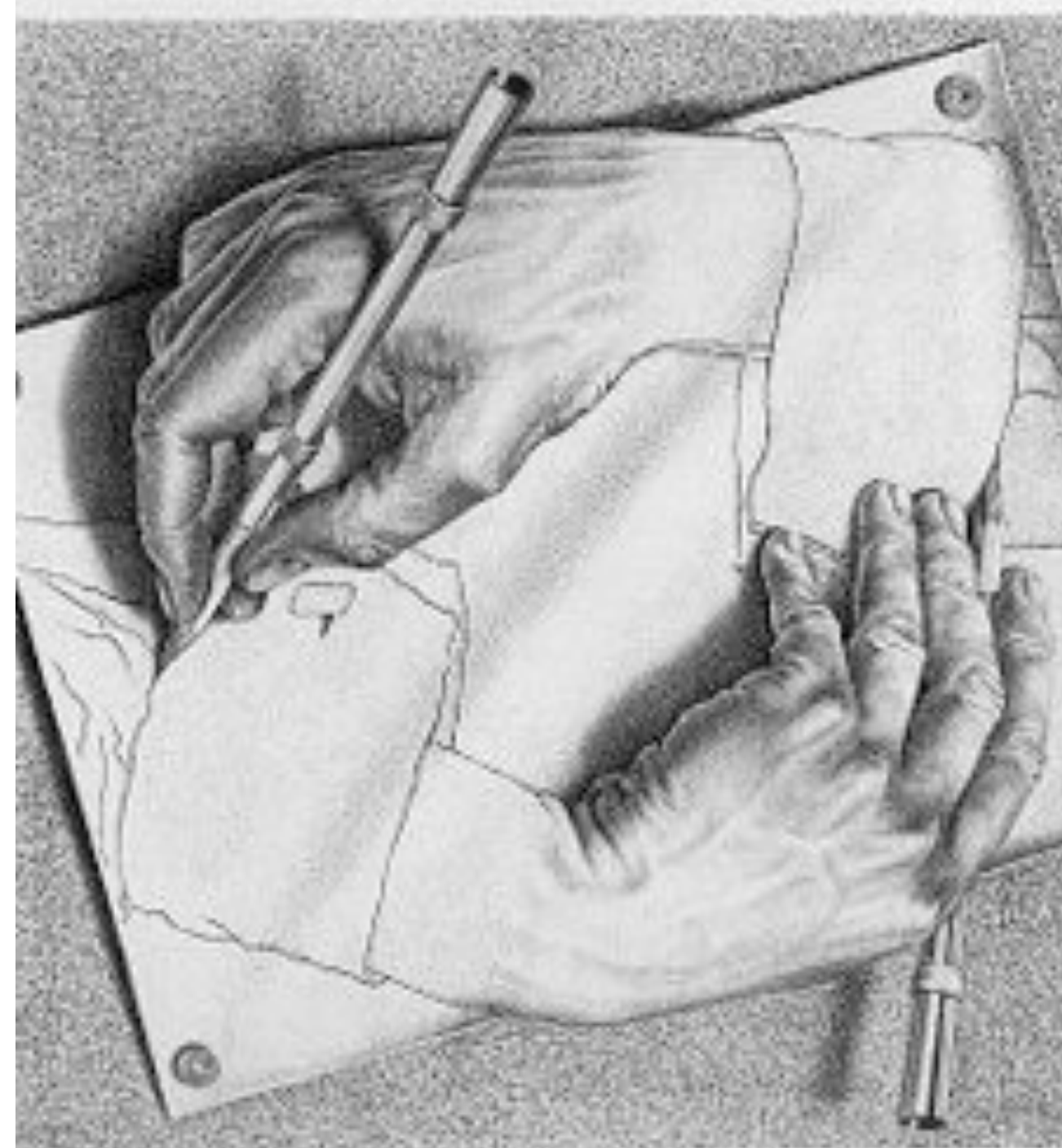
HOW DO WE INTERACT IN THE PHYSICAL WORLD?

WORLD IA DAY 2017

PHYSICAL ACTION



PHYSICAL ACTION IS OFTEN MEDIATED BY TOOLS



THE POWER OF TOOLS





THE PHYSICAL WORLD IS FLEXIBLE

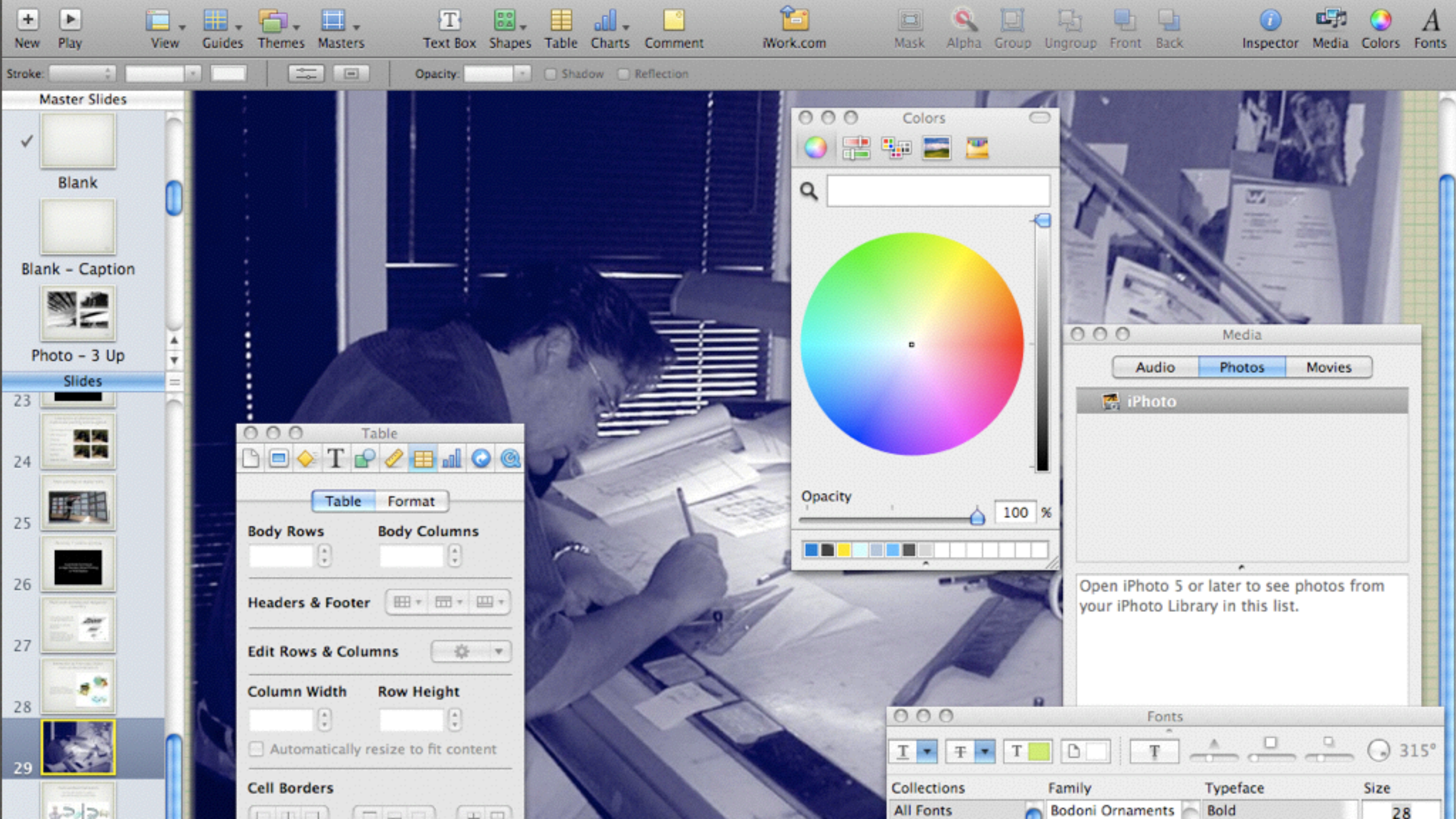
A PEN? A RULER?



A MUG? A PAPER WEIGHT?





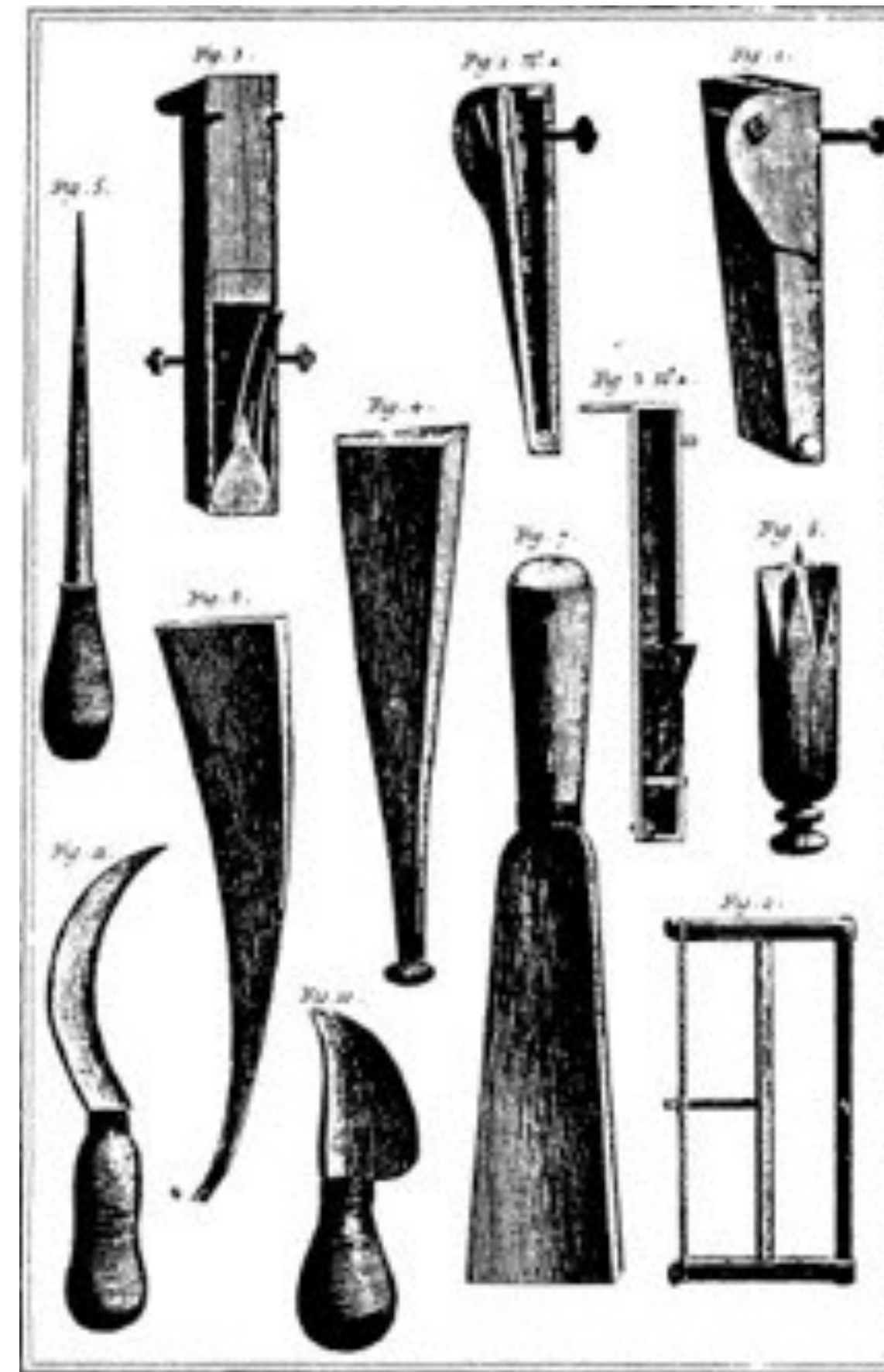
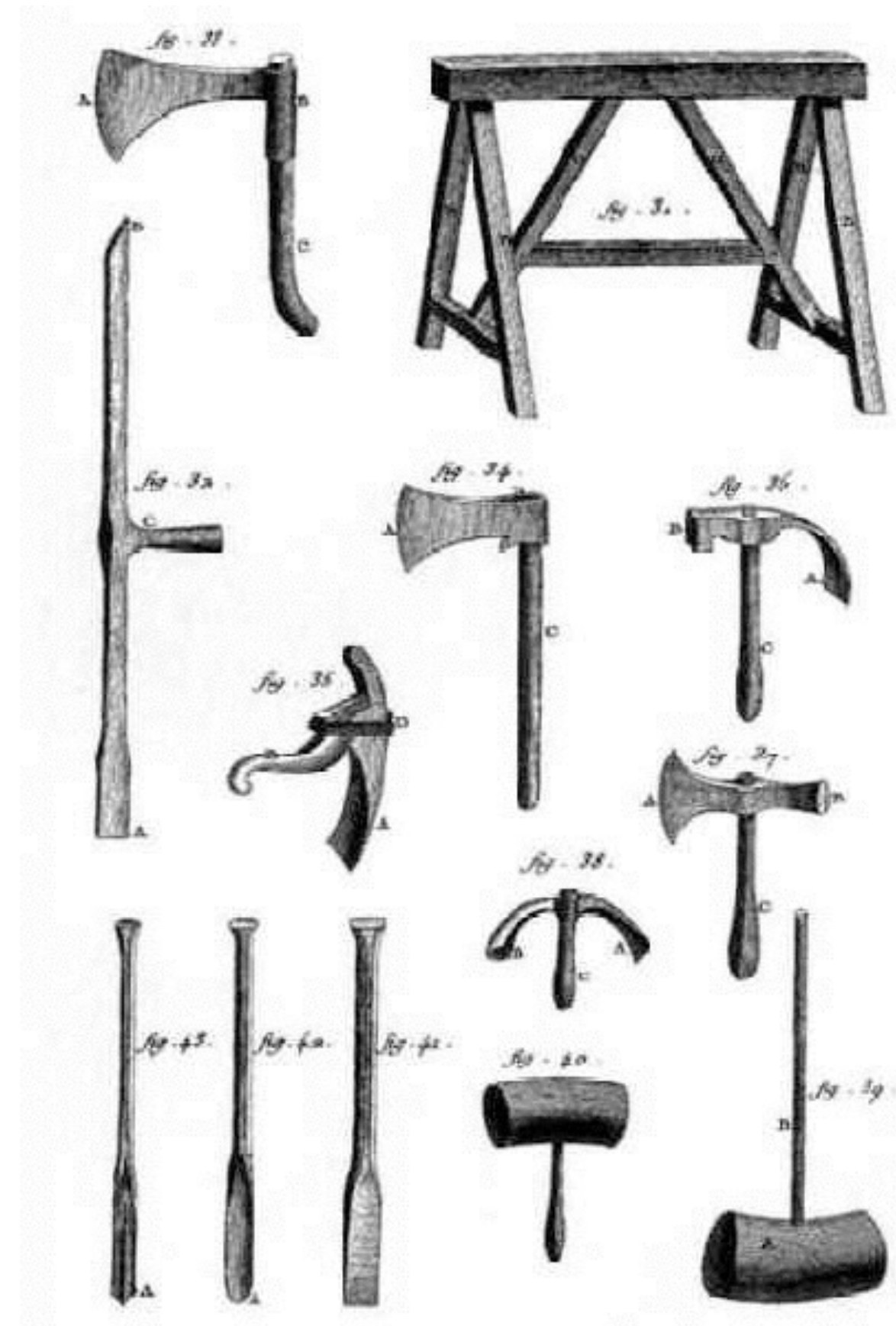
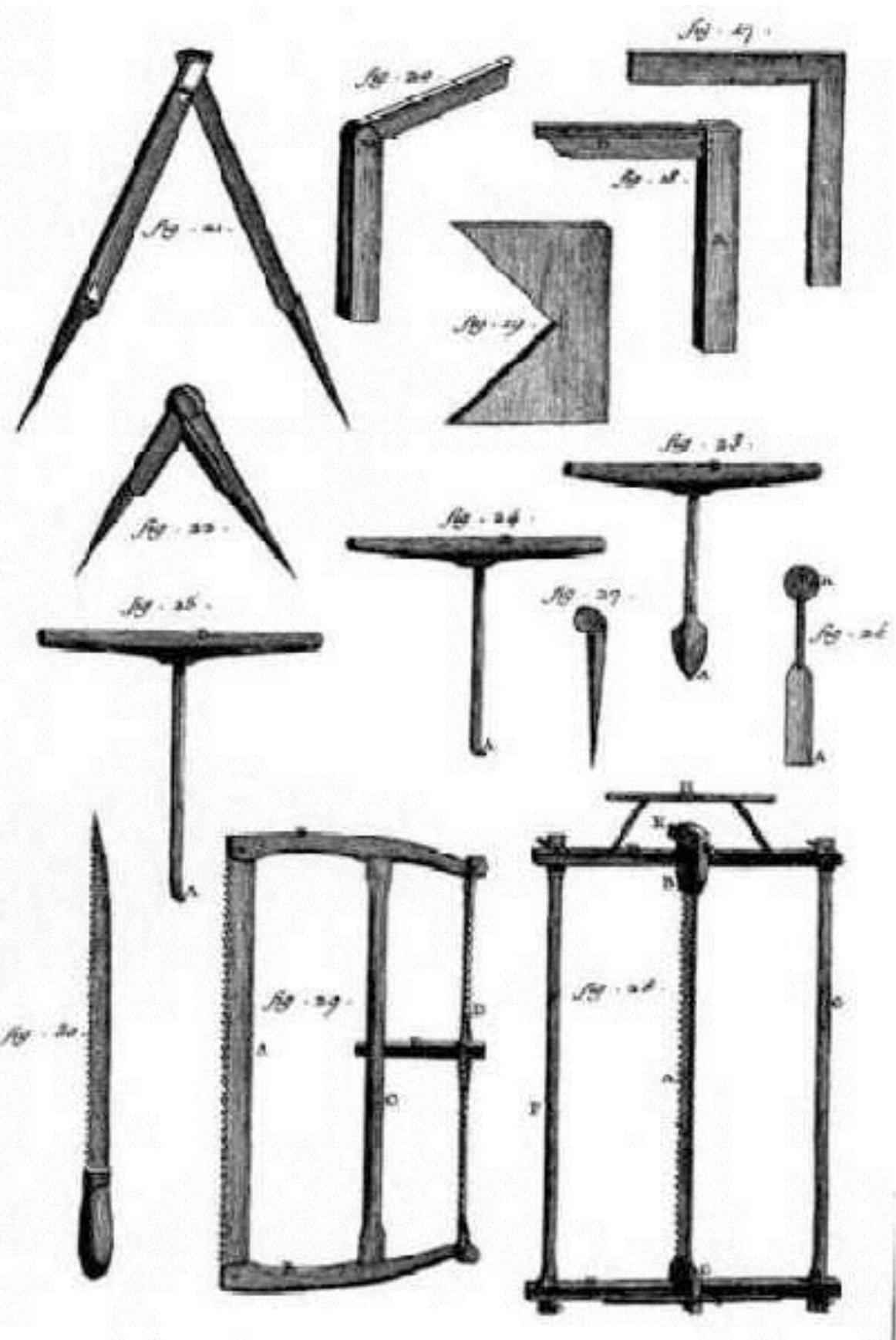


—
BIG GAP
BETWEEN
PHYSICAL
AND DIGITAL
TOOLS

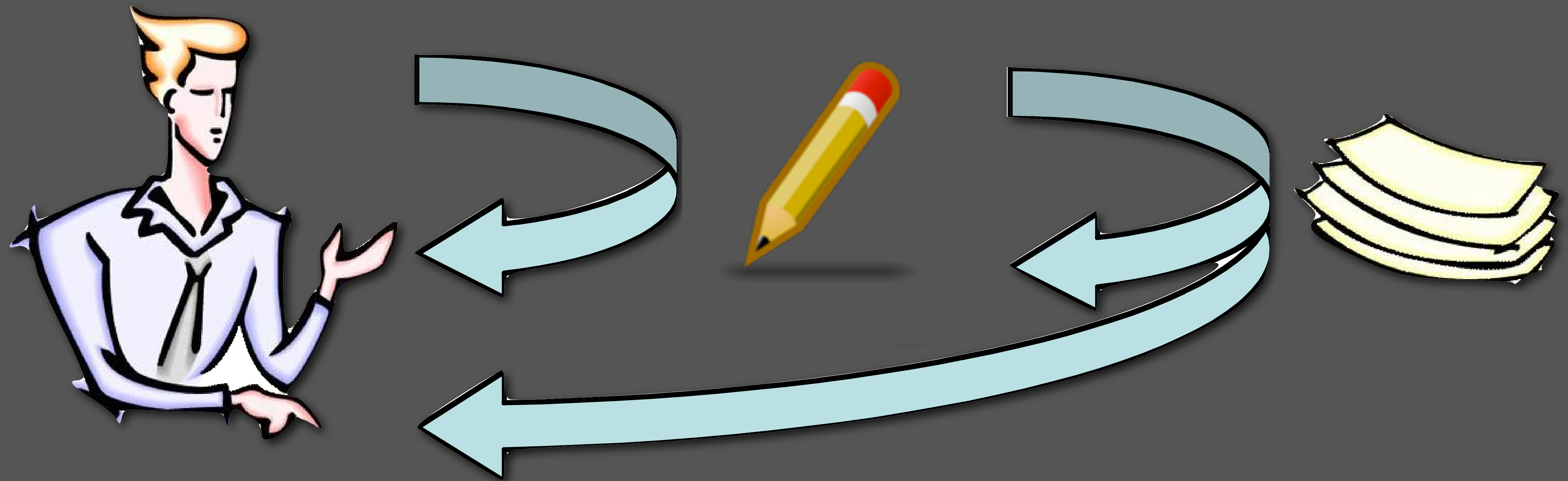
**TO SUPPORT DIVERSITY,
WE NEED UNIFICATION**

**THINK OF
THE LAWS OF PHYSICS**

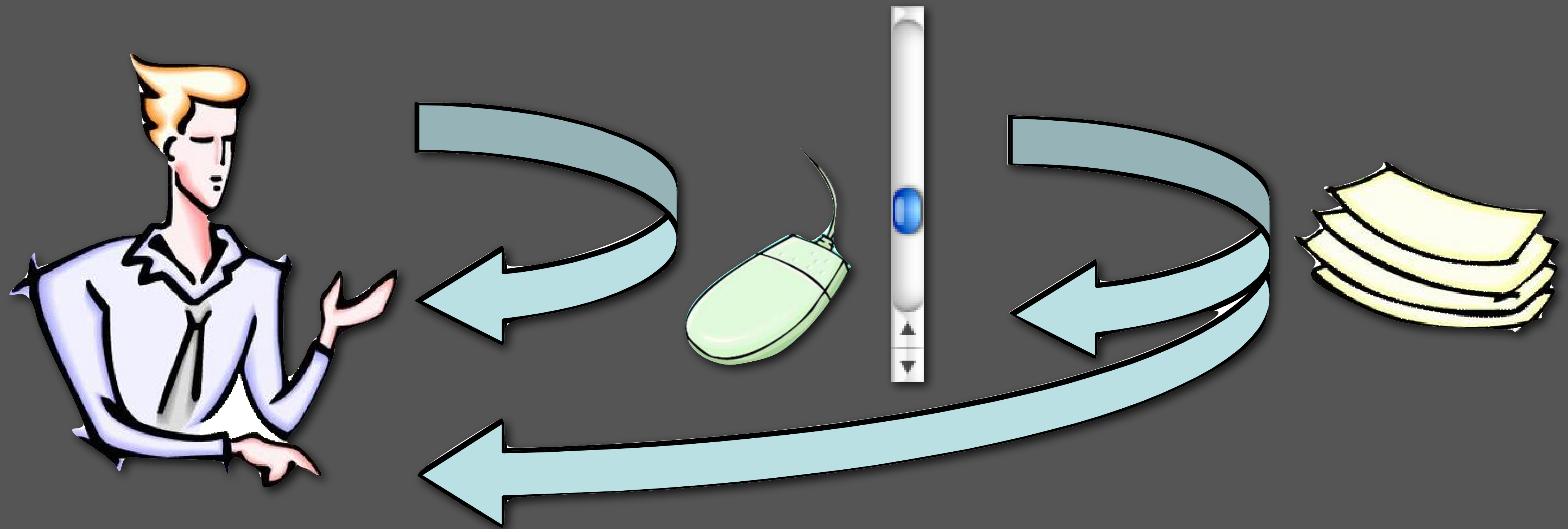
INSTRUMENTAL INTERACTION



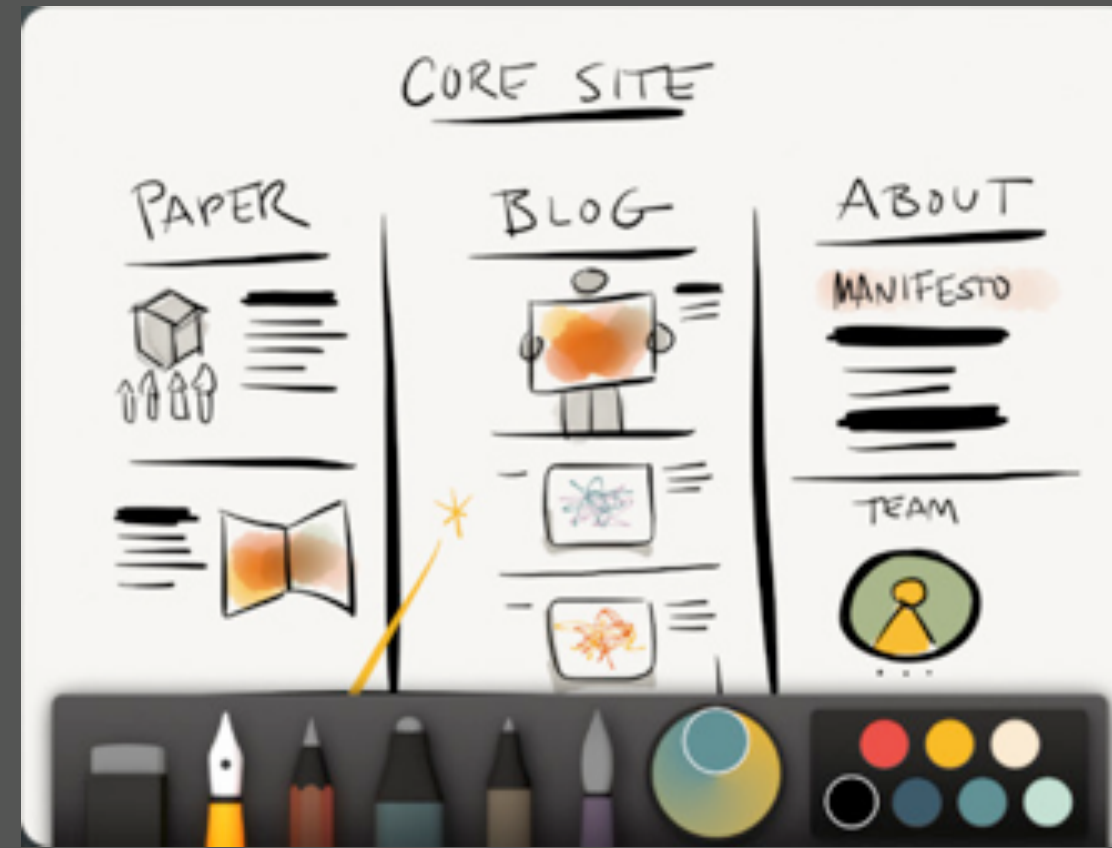
TOOLS MEDIATE INTERACTION



INSTRUMENTAL INTERACTION



INSTRUMENTAL INTERFACES

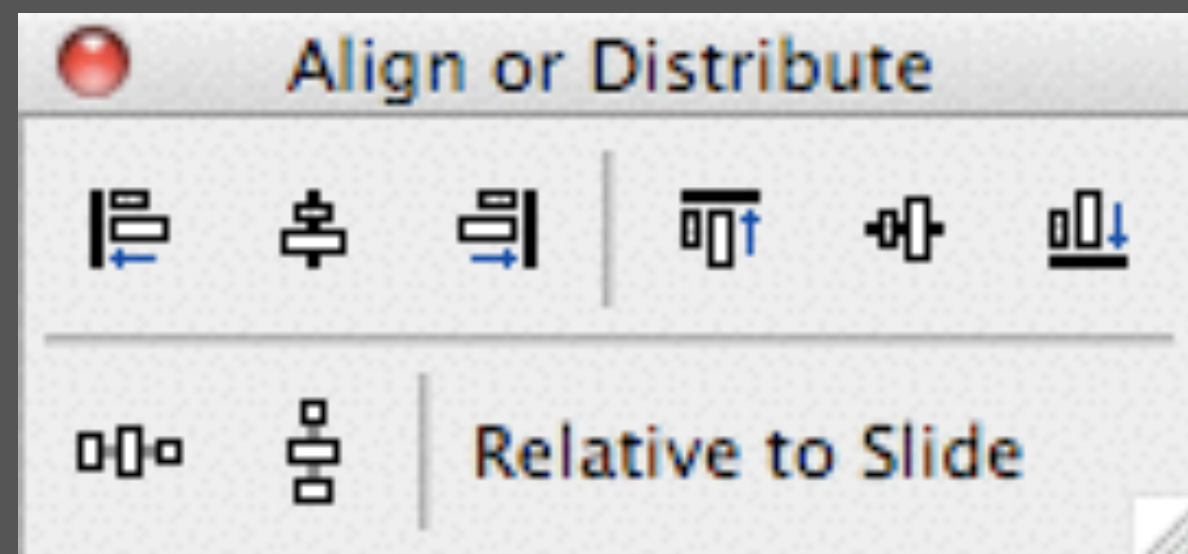


DESIGN
PRINCIPLE:

REIFICATION

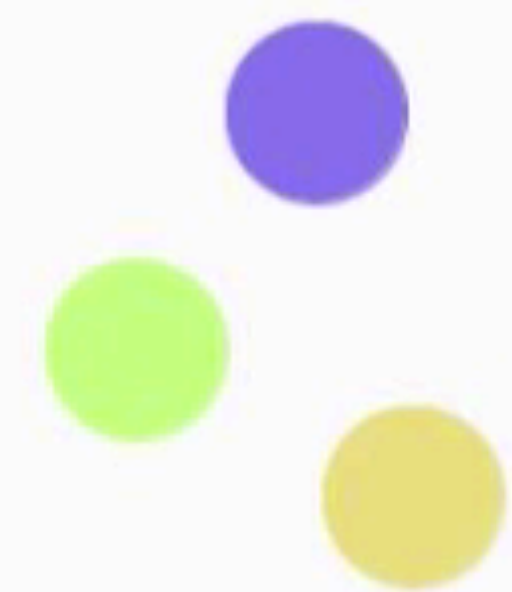
**TURN
ABSTRACT COMMANDS
INTO
CONCRETE OBJECTS
(INSTRUMENTS)**

MAGNETIC GUIDELINES





**aligning an object
to more than one
StickyLine**

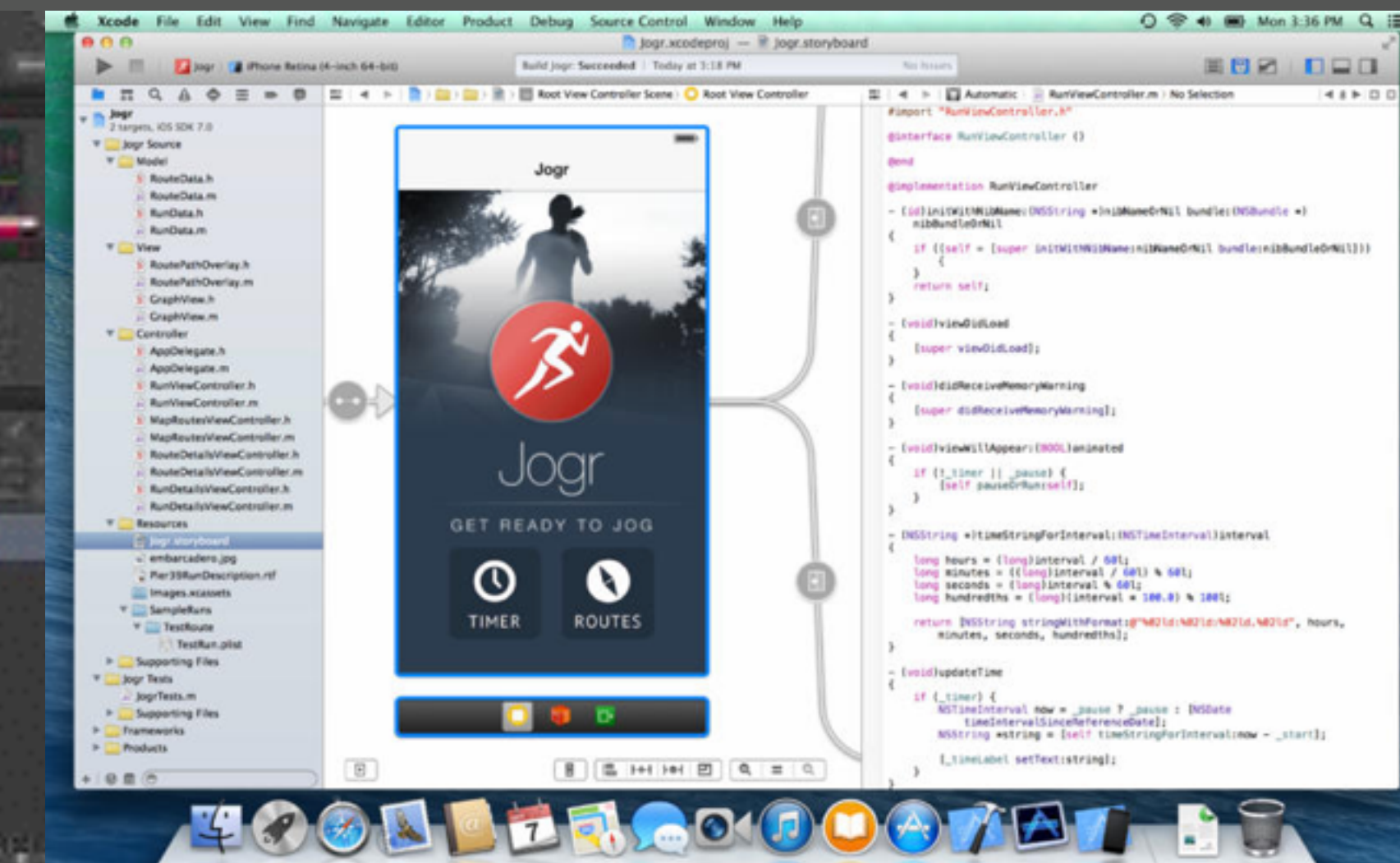
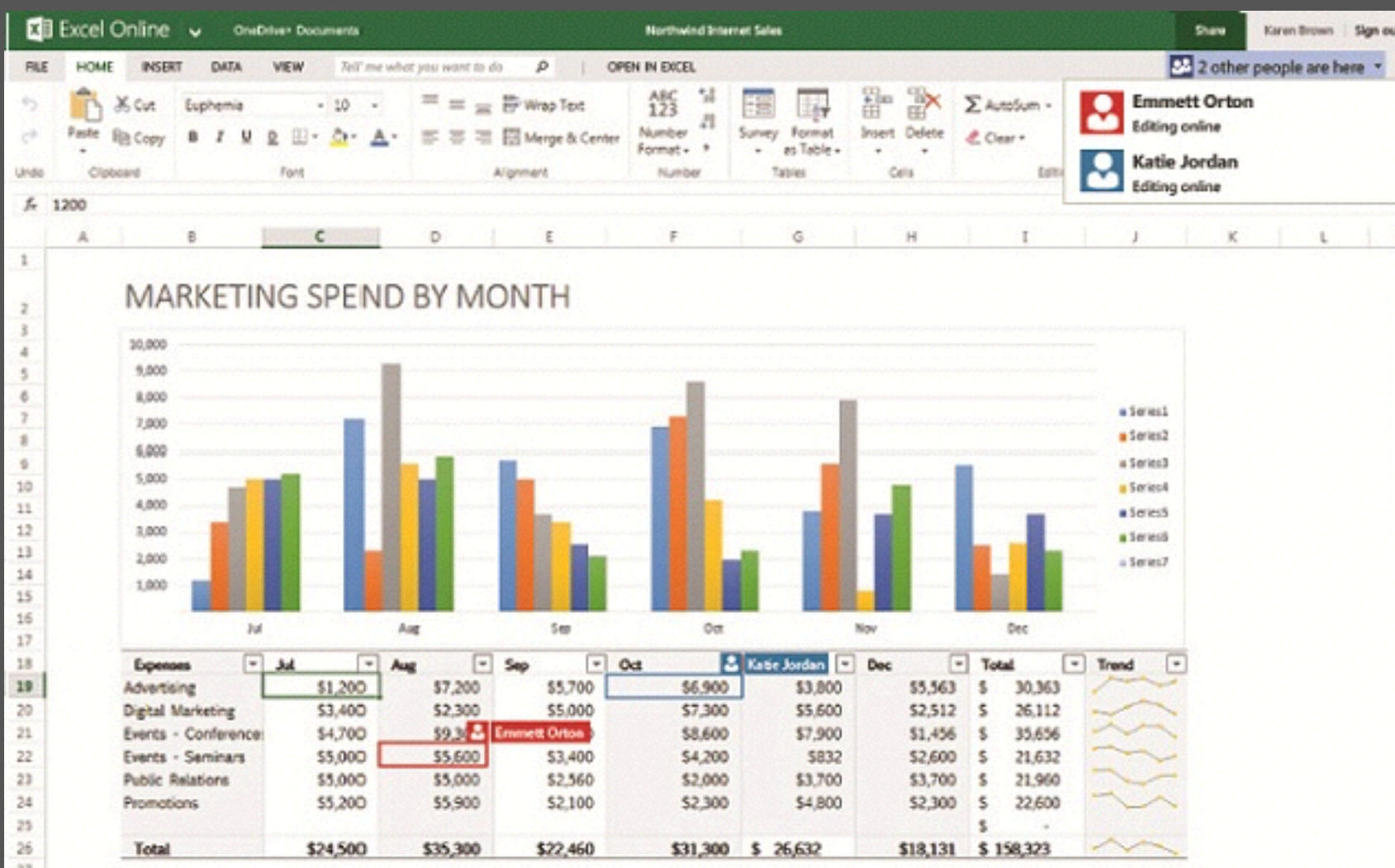


—
DESIGN
PRINCIPLE:

POLYMORPHISM

**MAKE INSTRUMENTS
WORK WITH DIVERSE
CONTENT (SUBSTRATES)**

POLYMORPHISM



—
DESIGN
PRINCIPLE:

REUSE

**CAPTURE AND REUSE
INTERACTION PATTERNS**

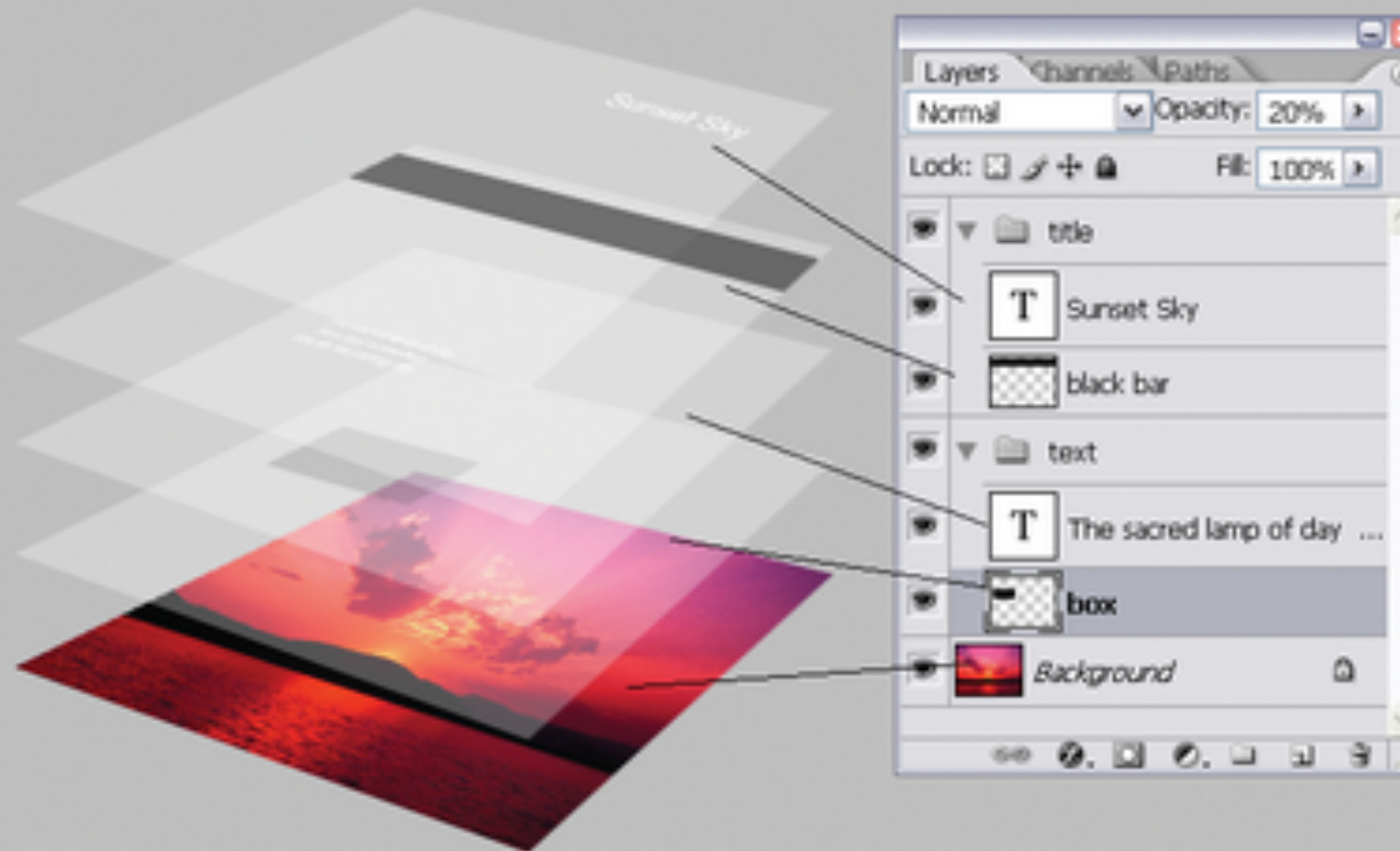
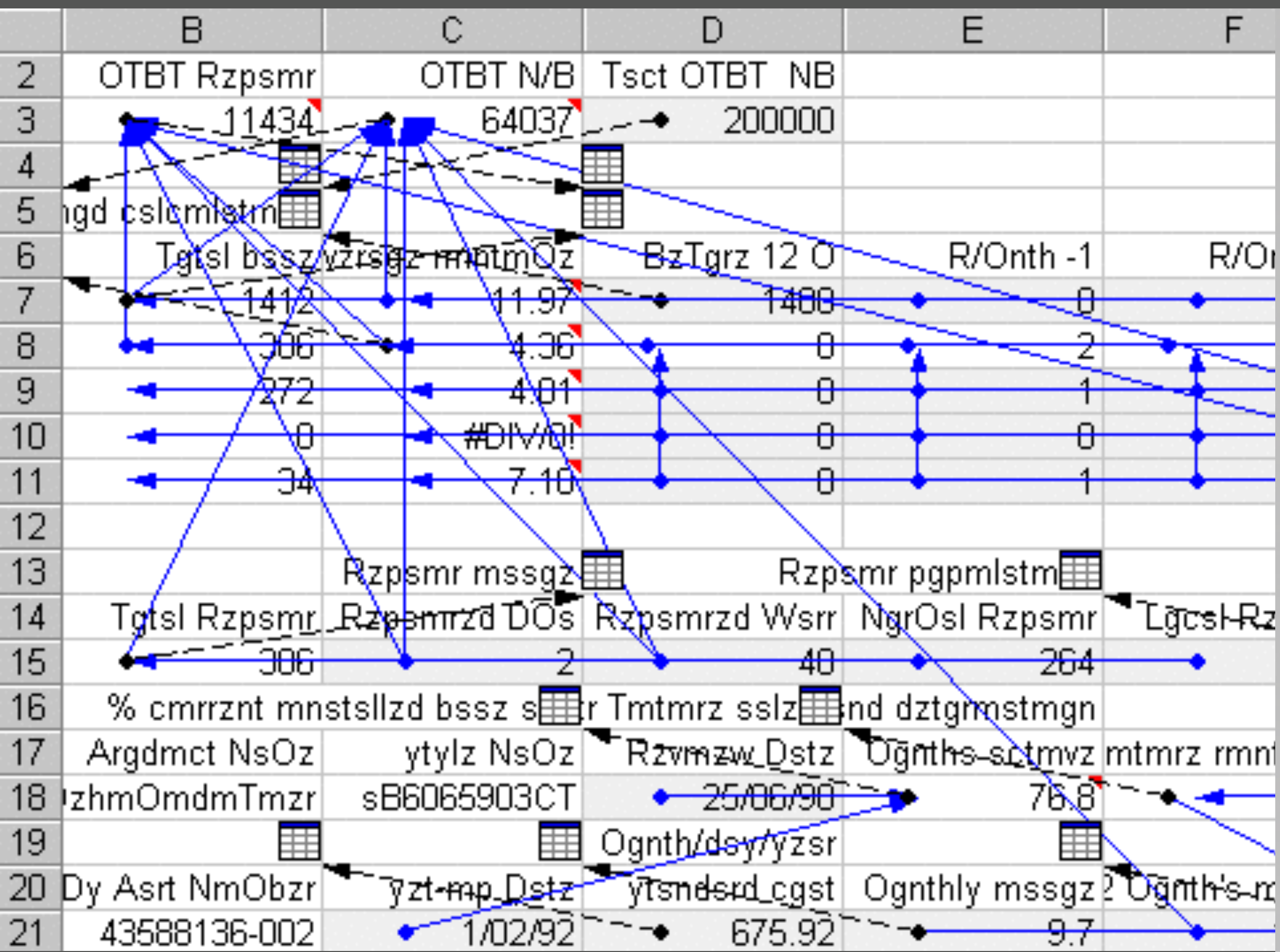
INFORMATION SUBSTRATES



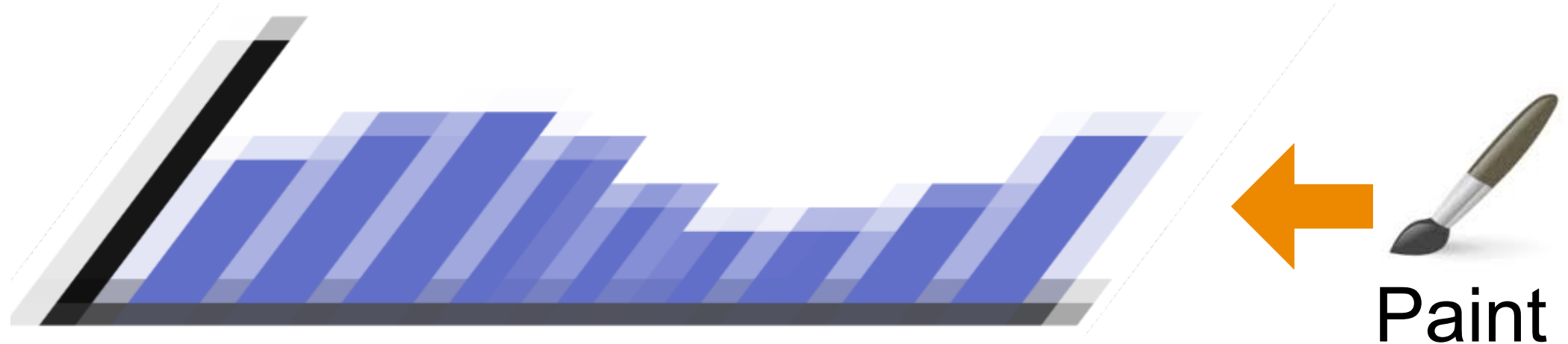
INFORMATION SUBSTRATES



INFORMATION SUBSTRATES

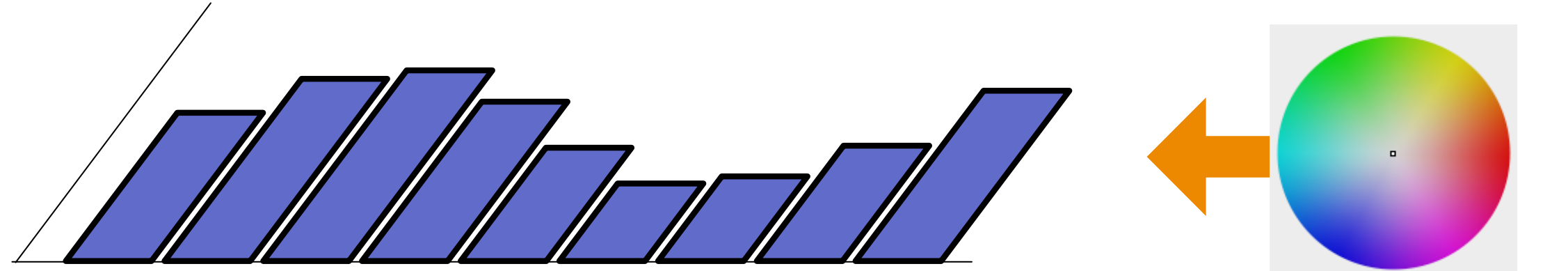


LEVELS OF INTERPRETATION



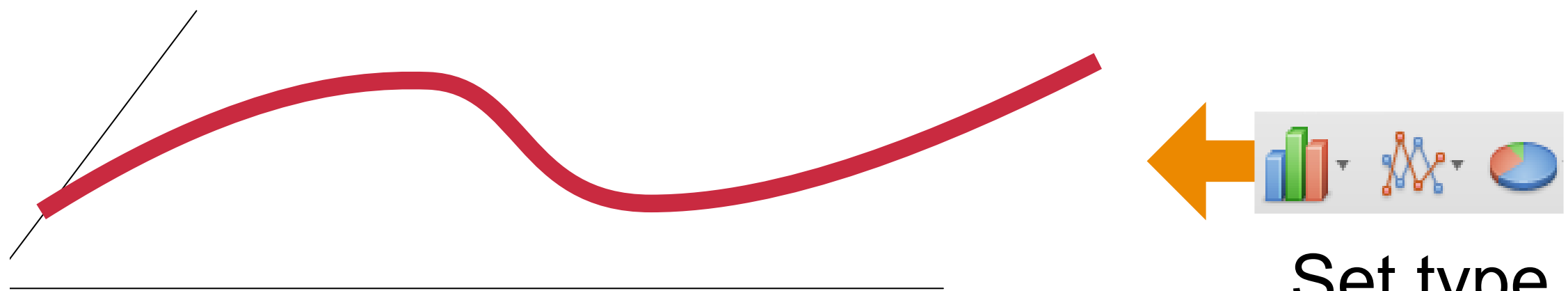
Pixels

Paint



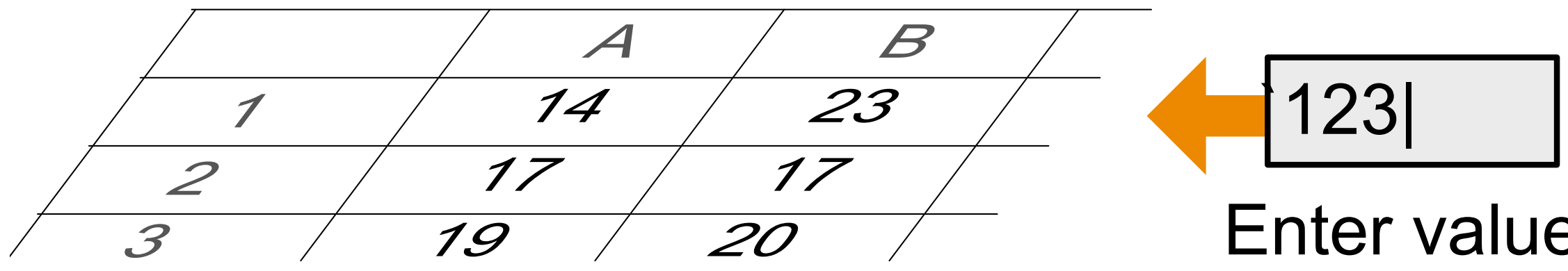
Shapes

Set color



Graph

Set type



	A	B
1	14	23
2	17	17
3	19	20

Table

Enter values

A handwritten musical score consisting of three staves. The top staff has a blue arrow pointing to the first measure, a blue zigzag line under the second measure, and two blue boxes connected by a line under the fifth and sixth measures. The middle staff has a blue heart-shaped outline around the first three measures and a blue box around the fourth measure. The bottom staff has a blue line connecting the first measure to a circled 'r' in the fifth measure. A yellow shaded area with a red dashed border covers the bottom staff from the fifth measure to the end, containing a circled '2' and the handwritten text '(viol...)'.

textual & numerical elements

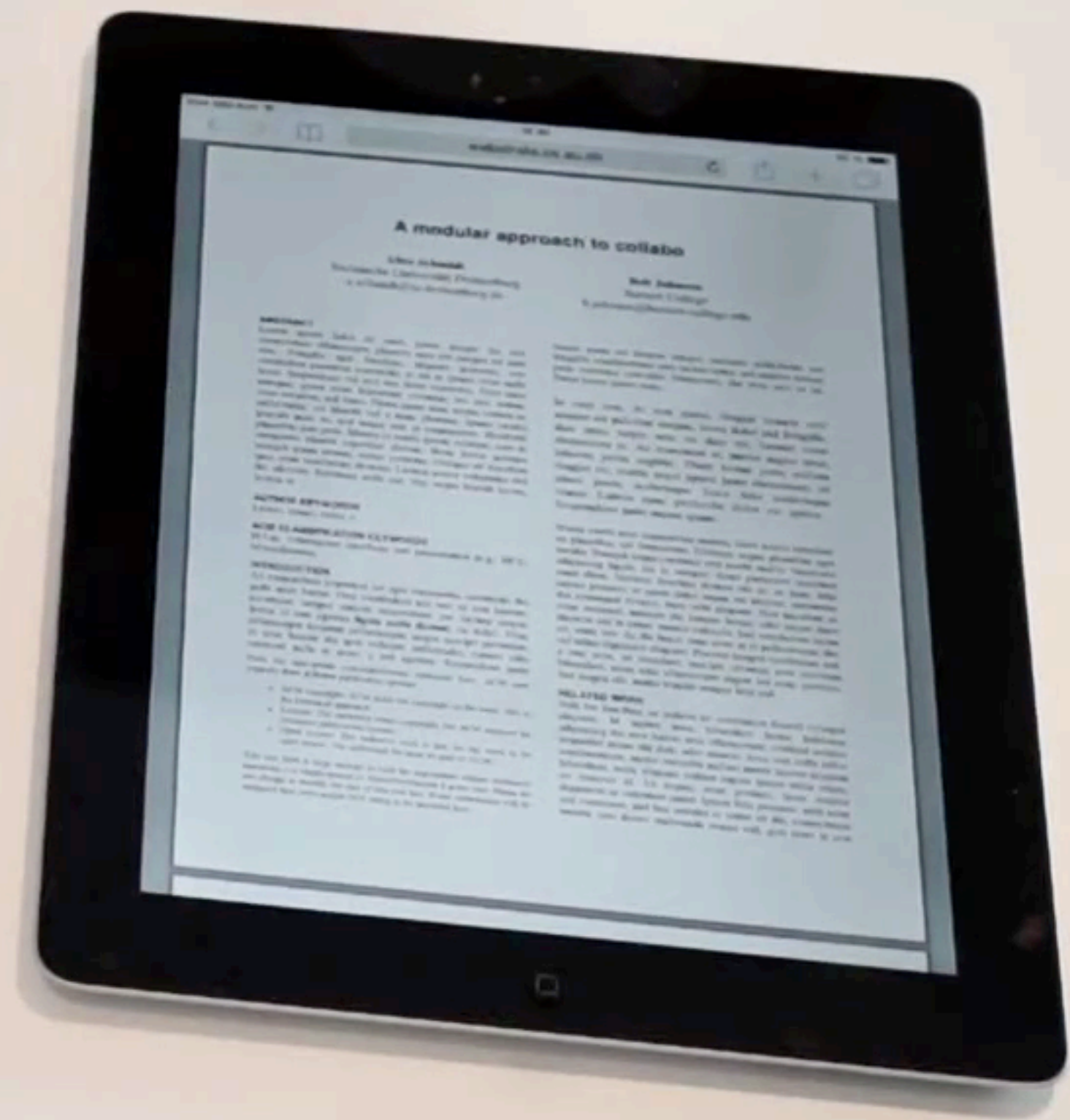
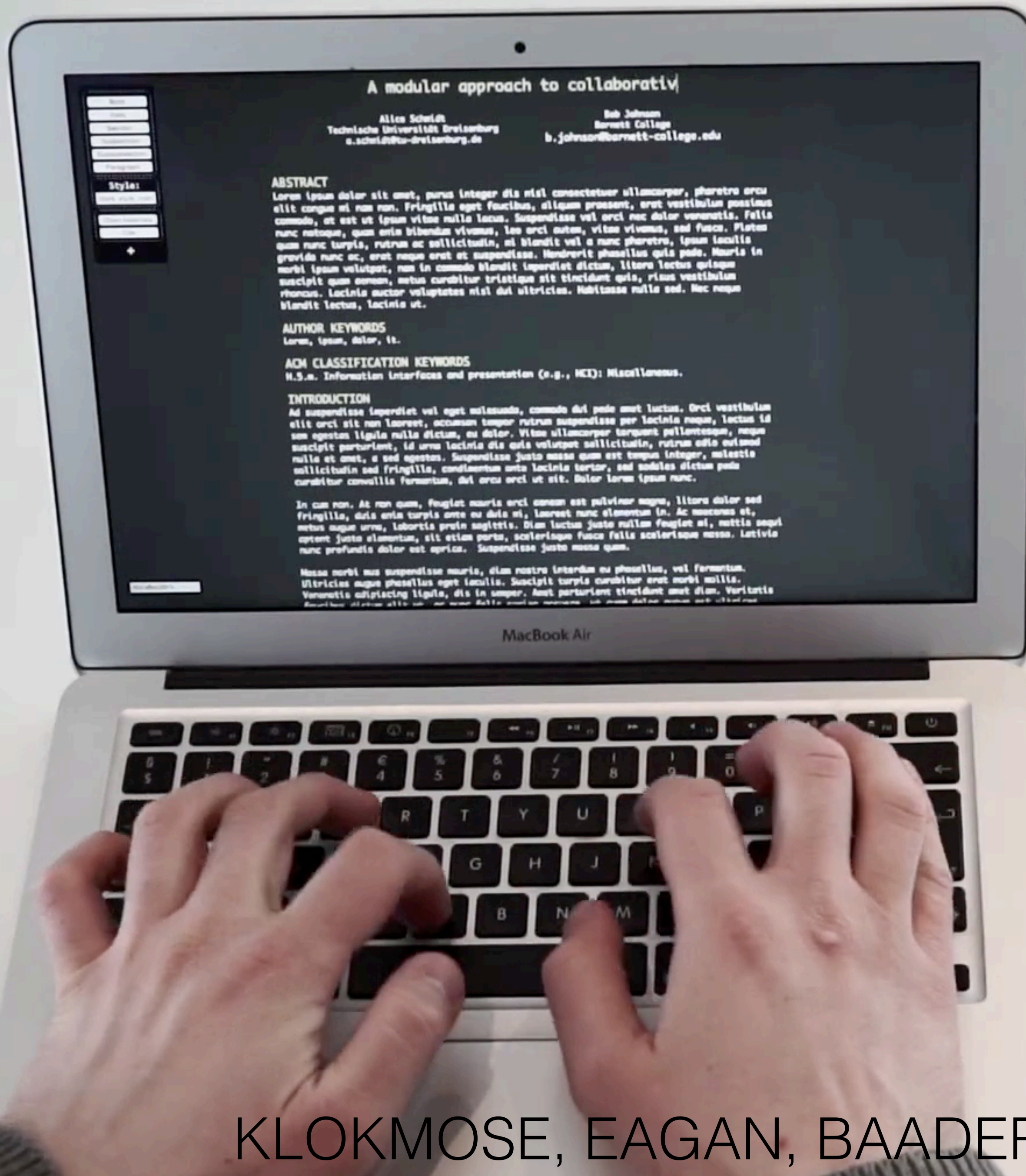
TSANDILAS, LETONDAL, MACKAY

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

—
DESIGN
PRINCIPLE:

UNIVERSAL
SHARING

**MAKE CONTENT
AND INSTRUMENTS
SHAREABLE**



KLOKMOSE, EAGAN, BAADER, MACKAY, BEAUDOUIN-LAFON

INTERACTIVE ENVIRONMENTS



DIGISCOPE

ÉQUIPEMENT D'EXCELLENCE

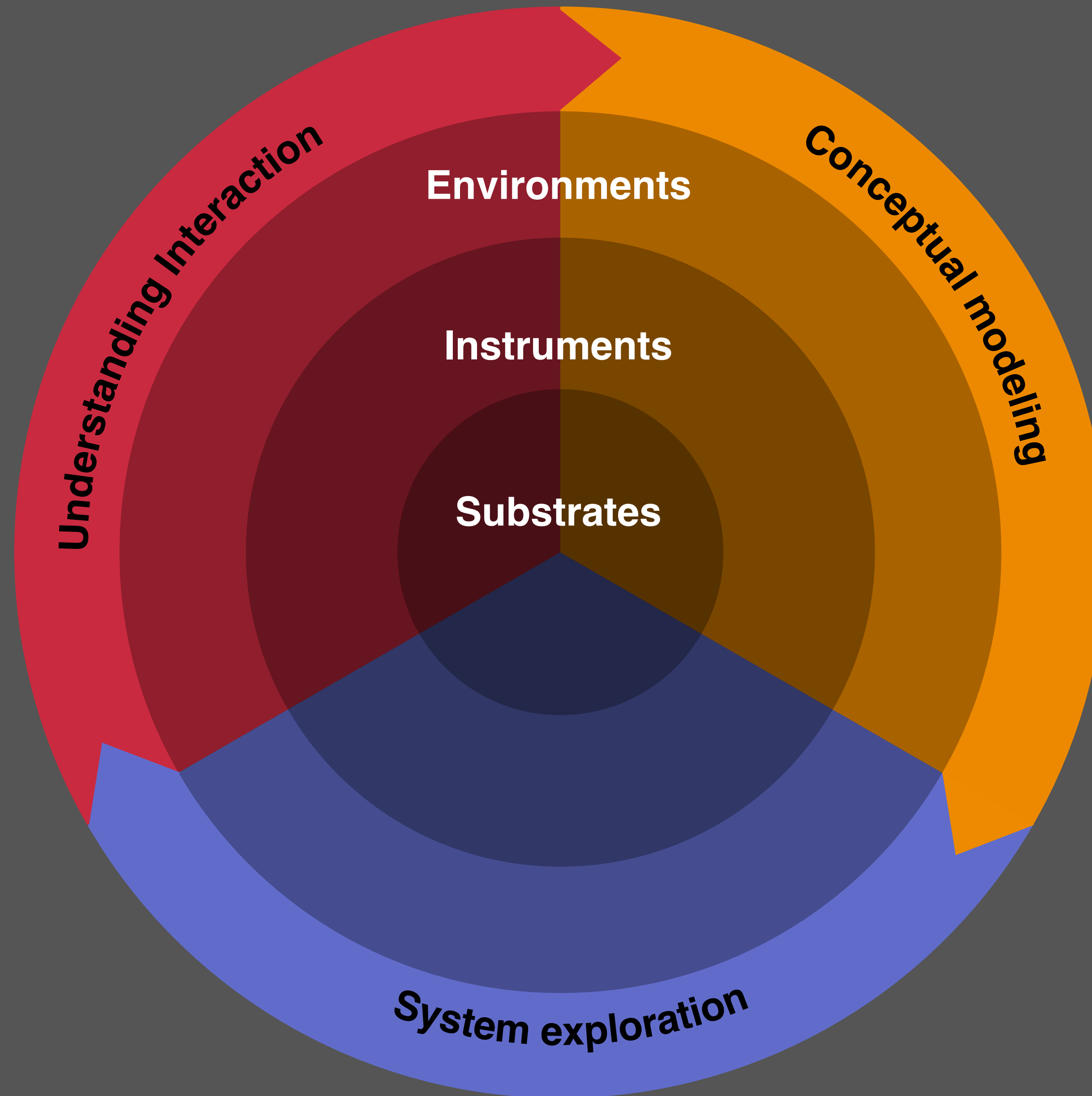






GJERLUFSEN, KLOKMOSE, EAGAN, PILLIAS, BEAUDOUIN-LAFON

ONE



CONCLUSION

AUGMENTING HUMAN INTELLECT

SOUP
PRODUCE
2A: CARROTS
2B: BANANAS
2B1: SKINLESS
2C: ORANGES
2D: APPLES
NEWS
LETTUCE
FRENCH BREAD
BEAN SOUP
TOMATO SOUP
PAPER TOWELS
ASPIRIN
NOODLES (ELBOW FIND)
BEANS
SCOTCH TAPE



CONCLUSION

**HUMAN IN THE LOOP
VS
COMPUTER IN THE LOOP**



CONCLUSION

**OPEN ARCHITECTURES &
UNIFIED PRINCIPLES TO
PROMOTE CREATIVITY**

QUID SIT MUSICUS?
BY PHILIPPE LEROUX



MERCI !

QUESTIONS ?

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LYON, FRANCE