

Data Vis for Empowerment and Inclusion

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Innovations in Visualization (InnoVis)

Interactive Experiences Lab (ixLab)

School of Computer Science,

Simon Fraser University

British Columbia, Canada



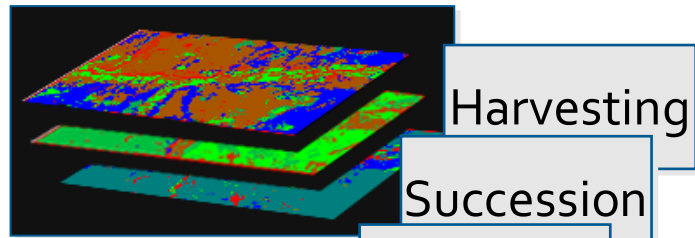
Lessons ...

- Observation is a skill
- Words are not sufficient
- Hard work can lead to new insights
- This is our data!
- Mutual respect is both overt and covert
- Externalization: Empowerment, Engagement, Expression
- Claiming our data heritage

Lessons ...

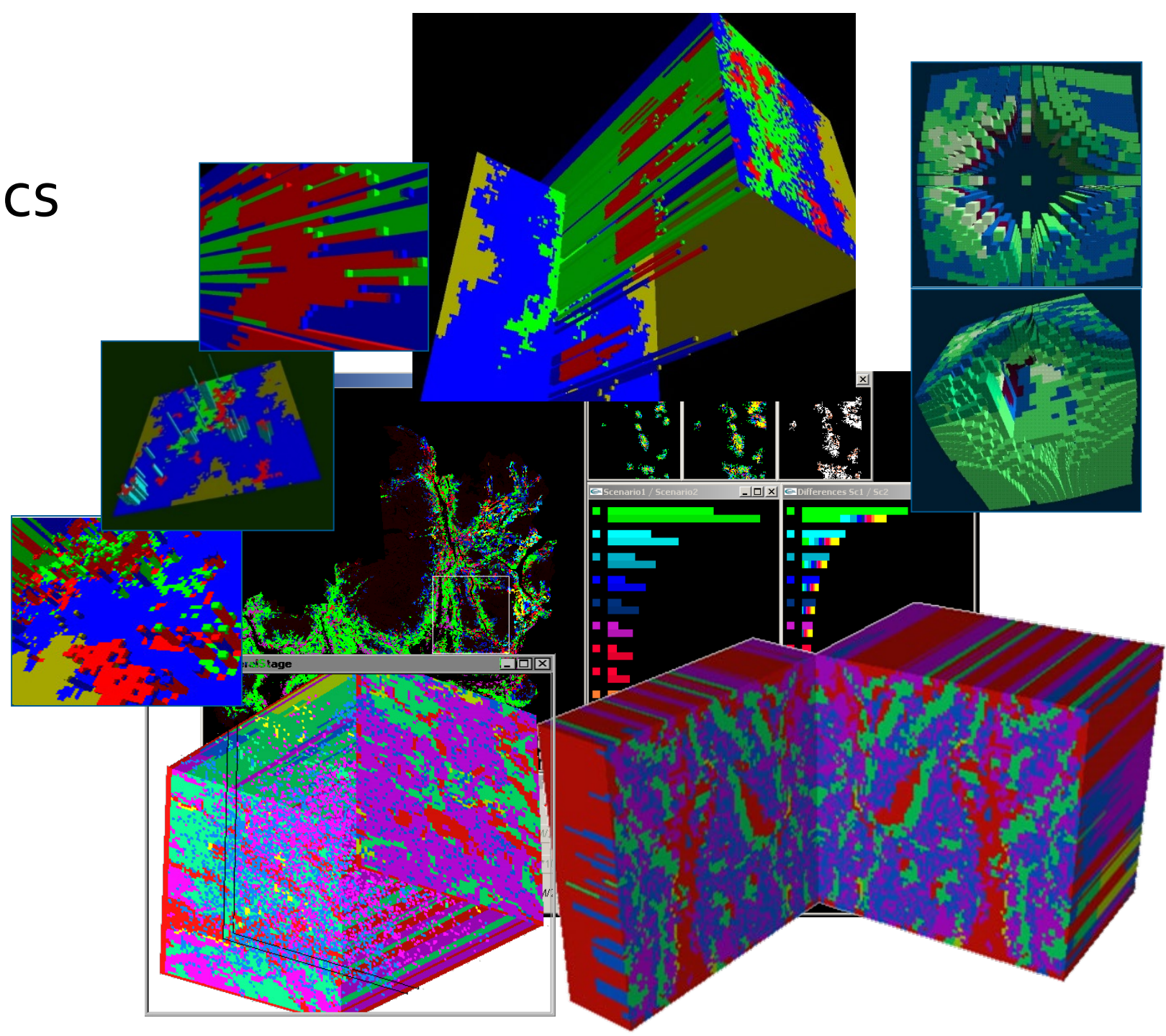
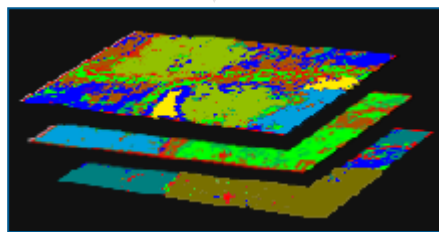
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Forest Renewal BC Landscape Dynamics



SELES

An oval containing the text 'SELES' with an orange arrow pointing down from the input factors and another orange arrow pointing down to the output map.



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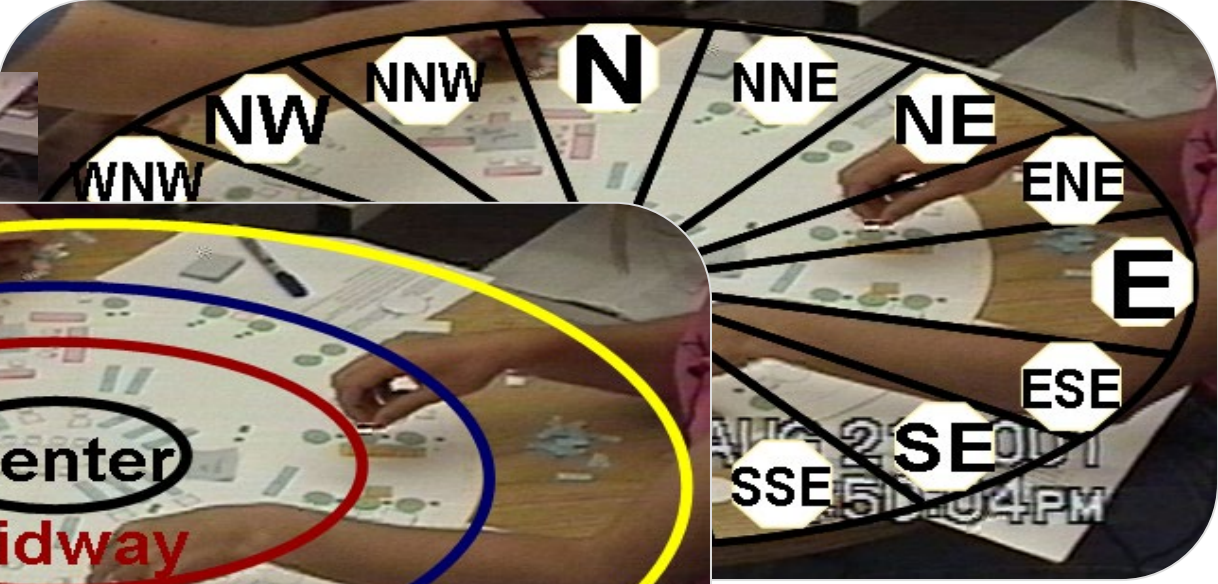
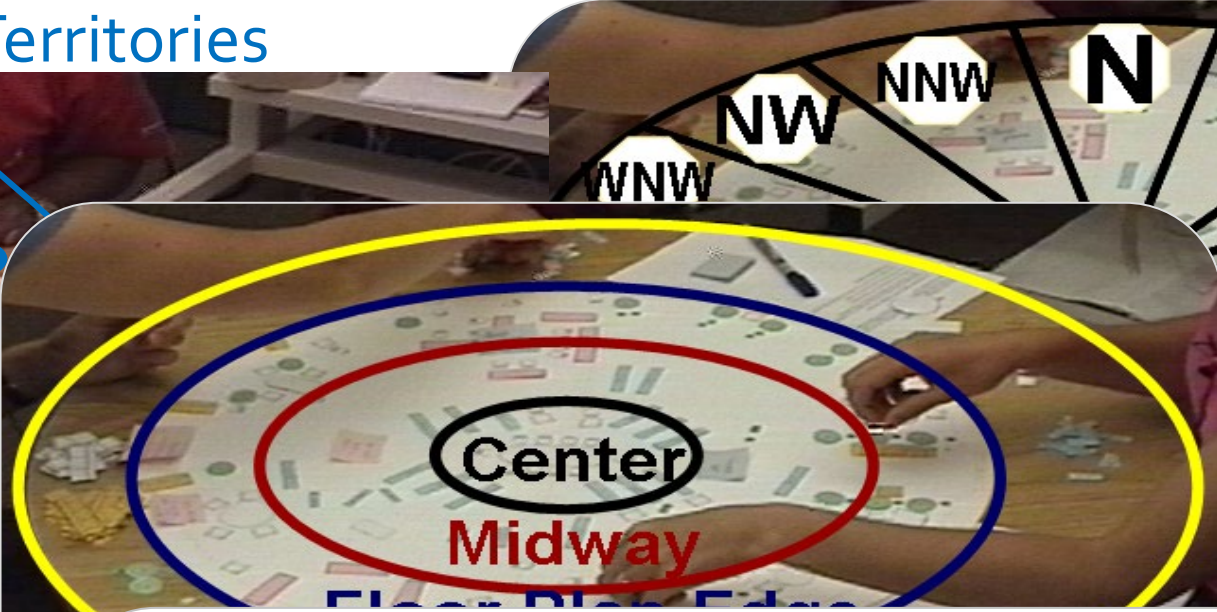
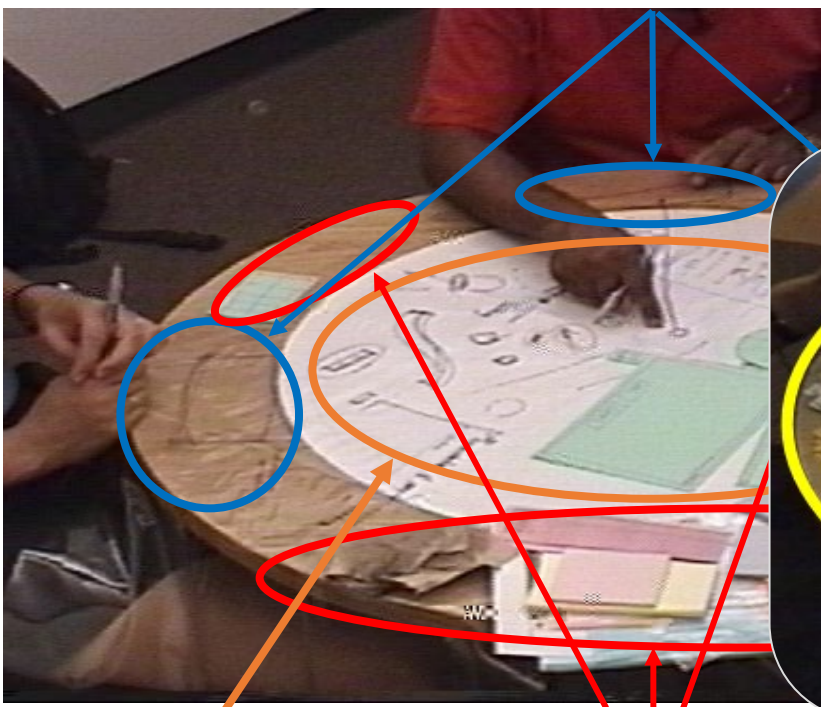
Information on Tables





Tabletop Territoriality

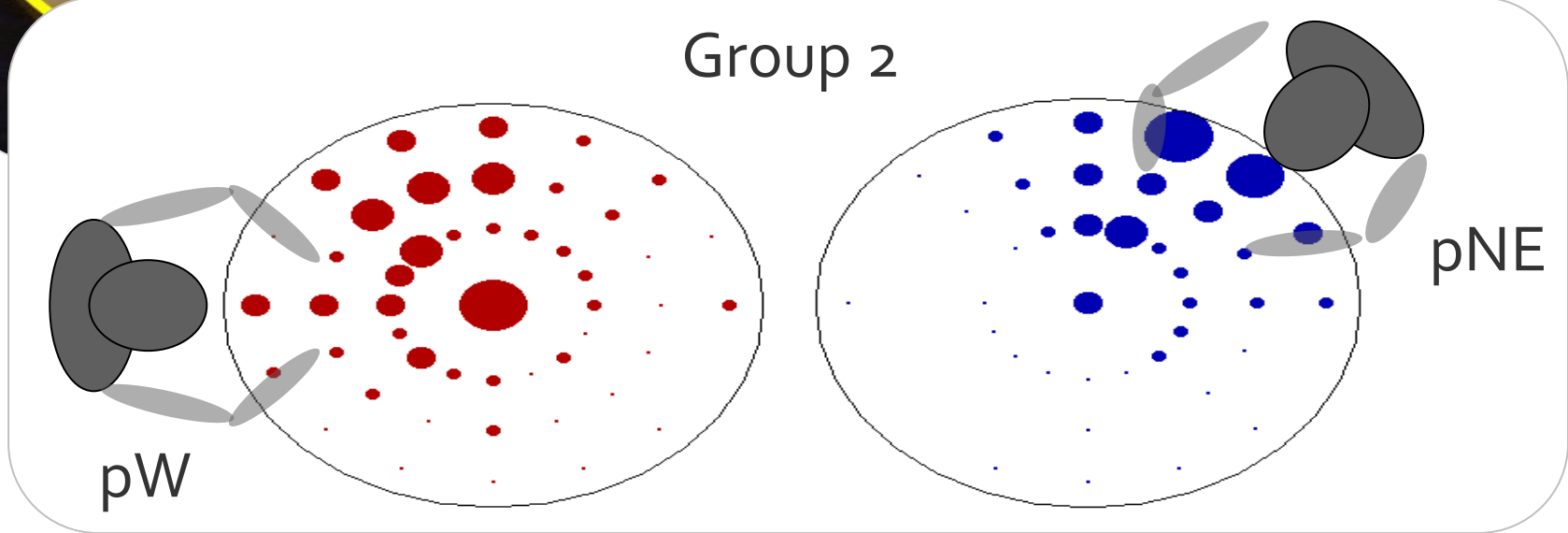
Personal Territories



Group Territory

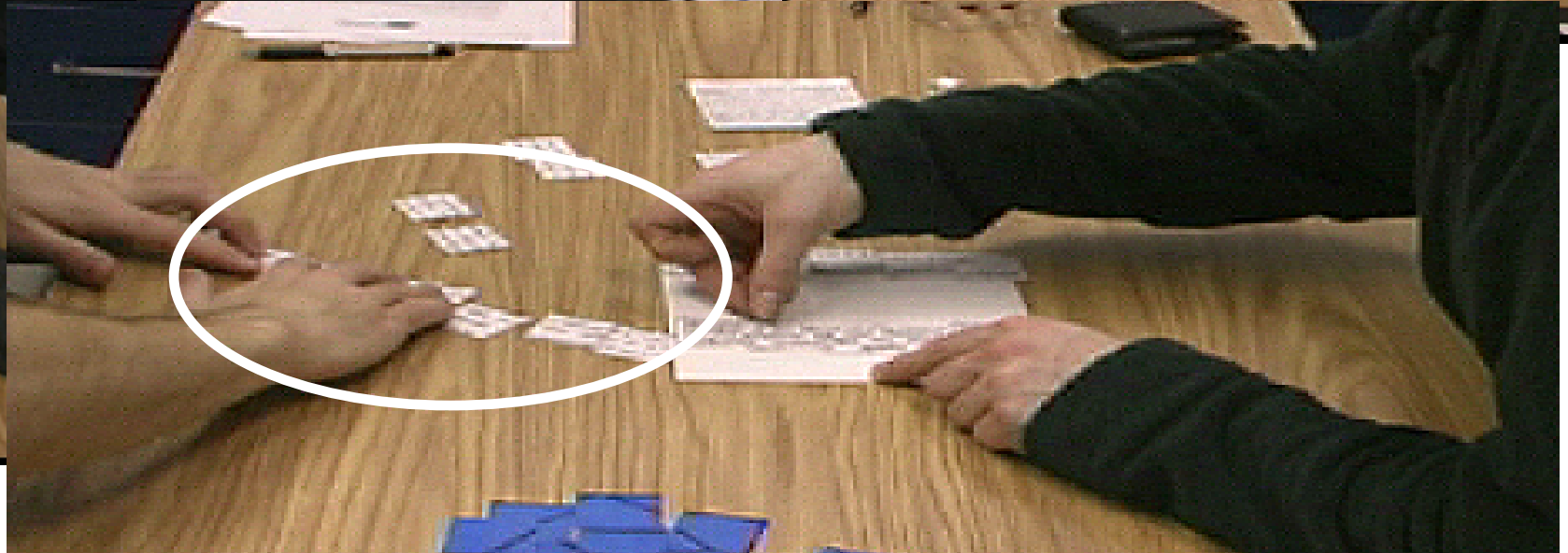
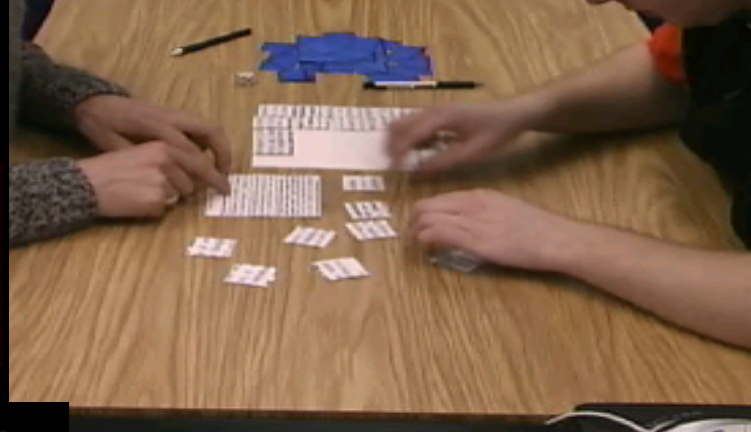
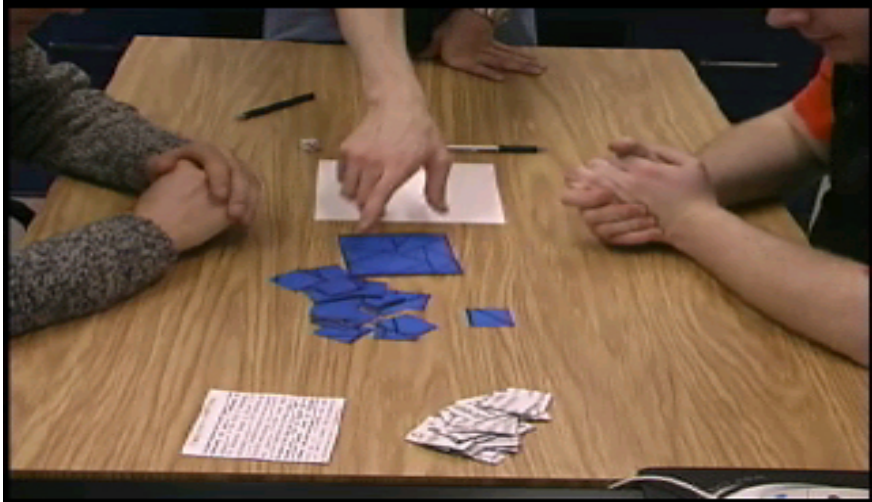
Storage Territories

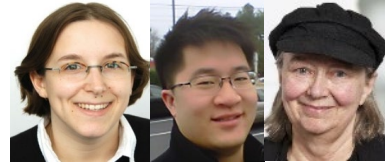
Group 2



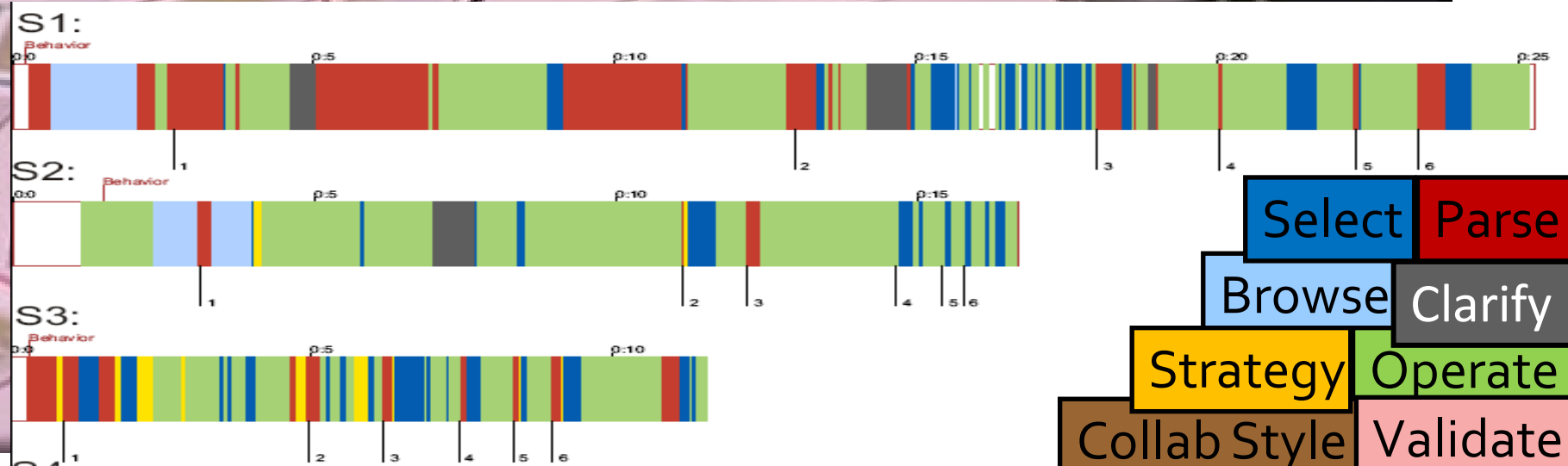


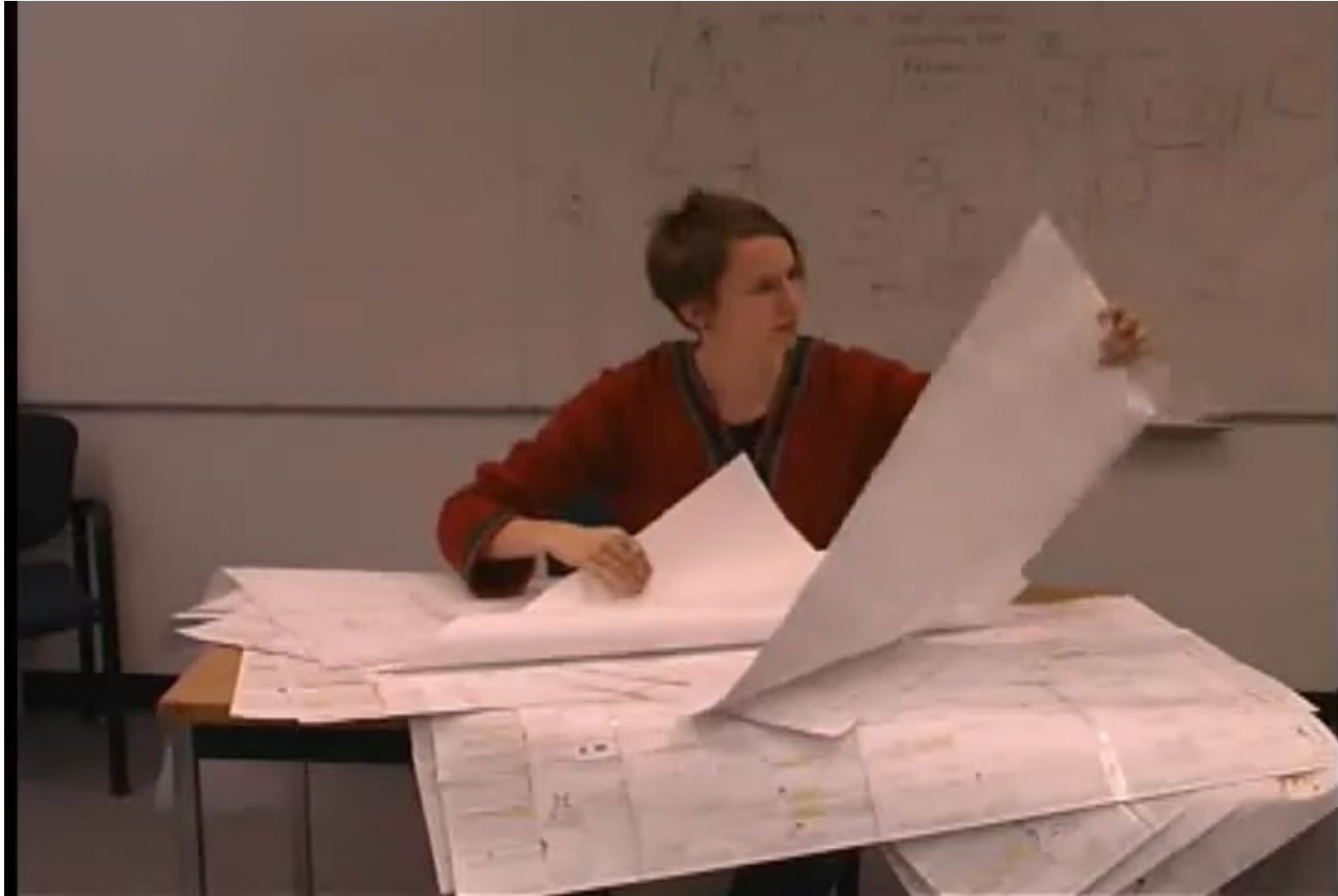
Item orientation as communication

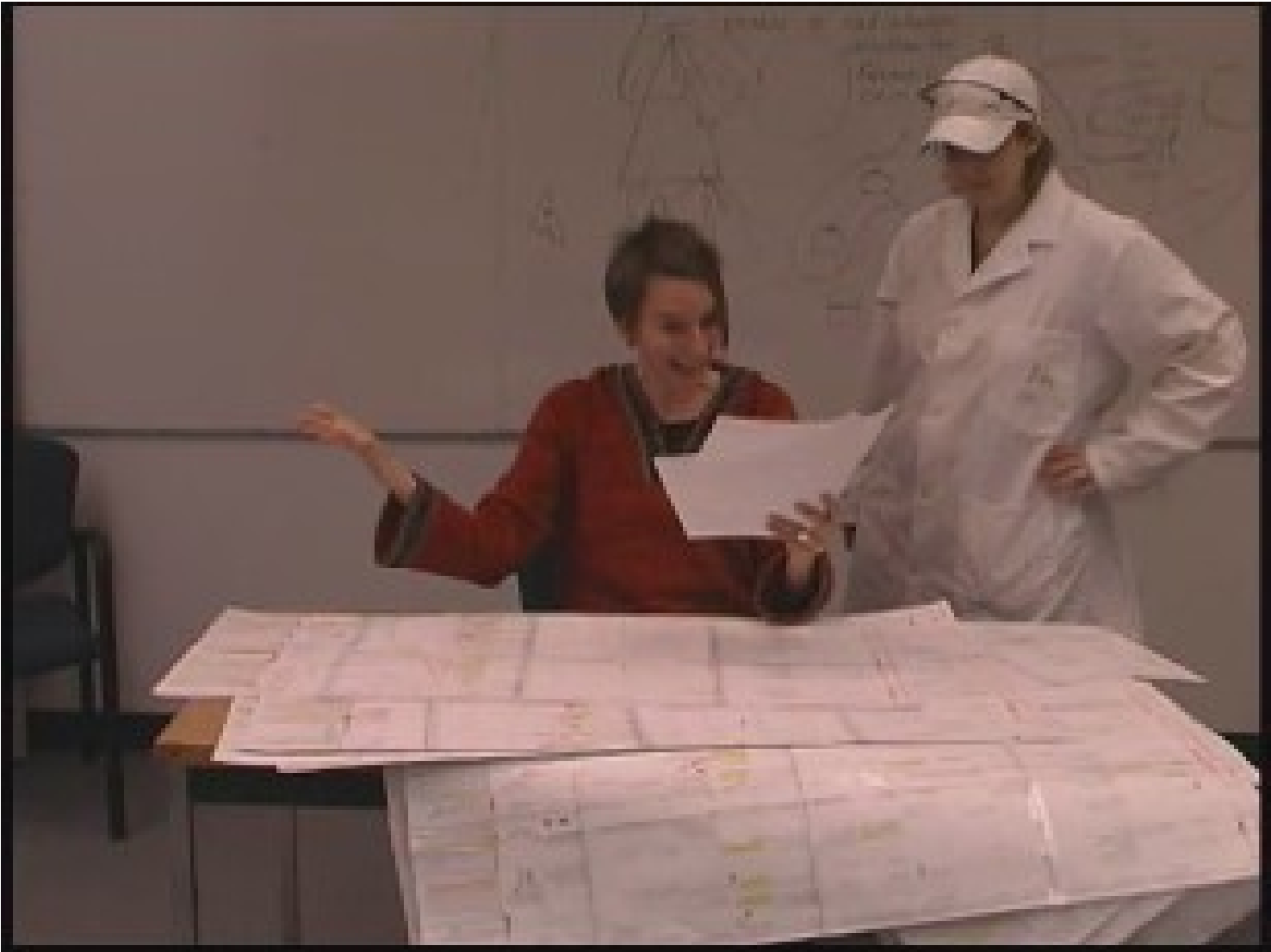




Information analysis is atemporal







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new elite

those who work with data ...

'big data'

data society

????

digital feudalism

data barons

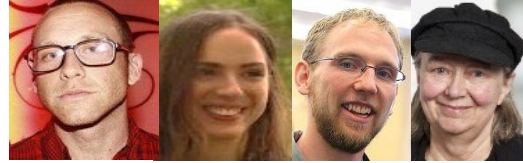
terms: David Karger, MIT

data serfs

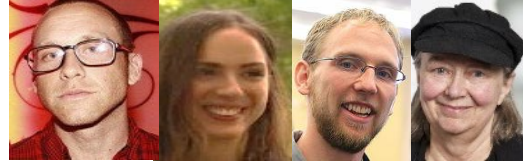
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Lessons ...

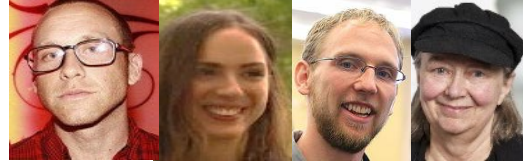
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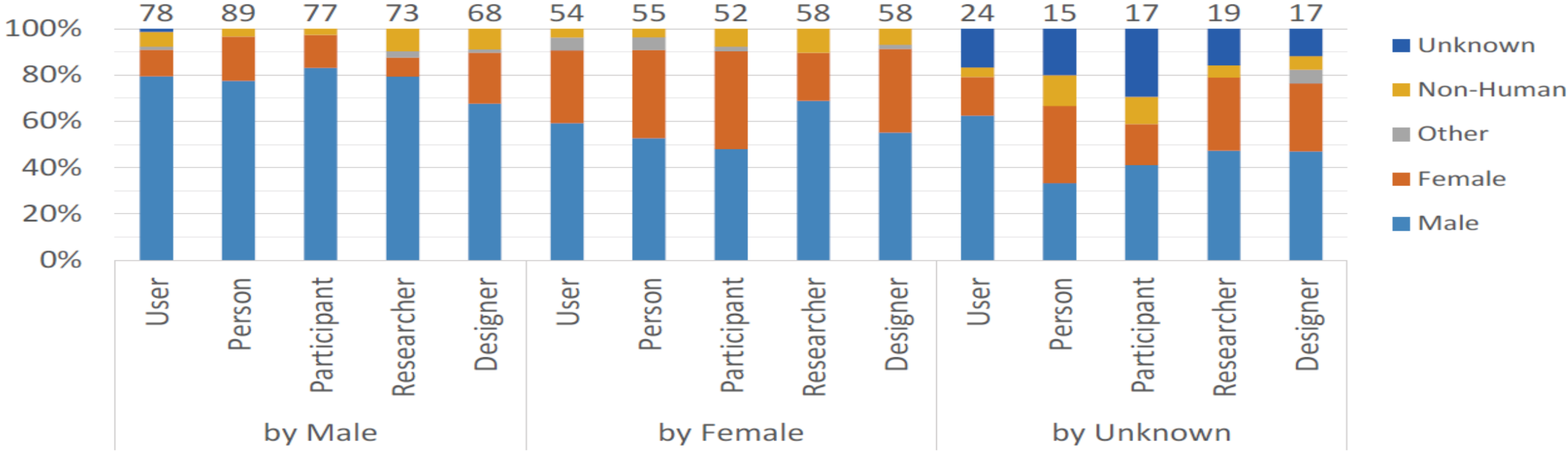


'people' words at CHI



user
participant
person
researcher
designer





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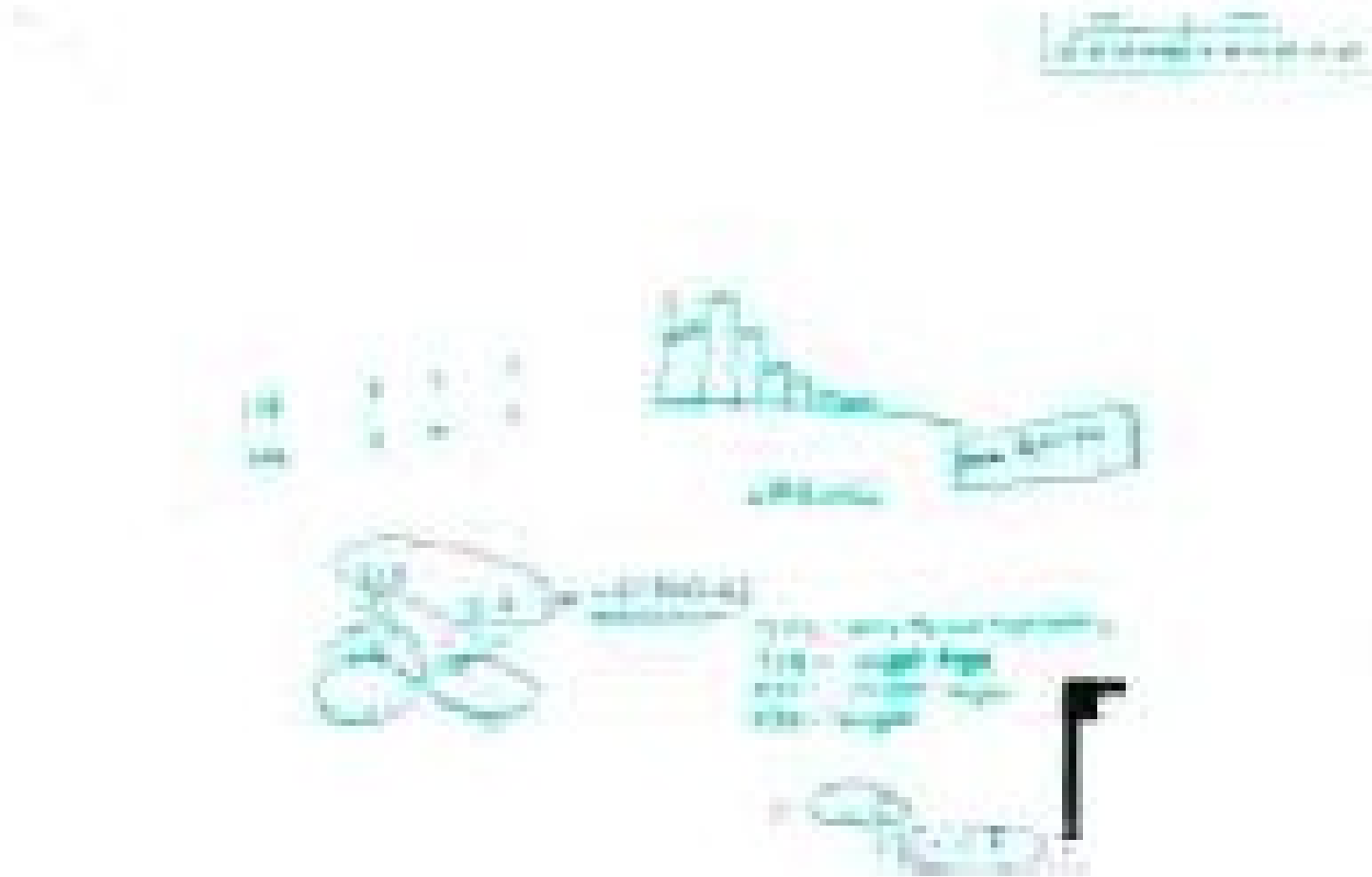


Vis on Whiteboards



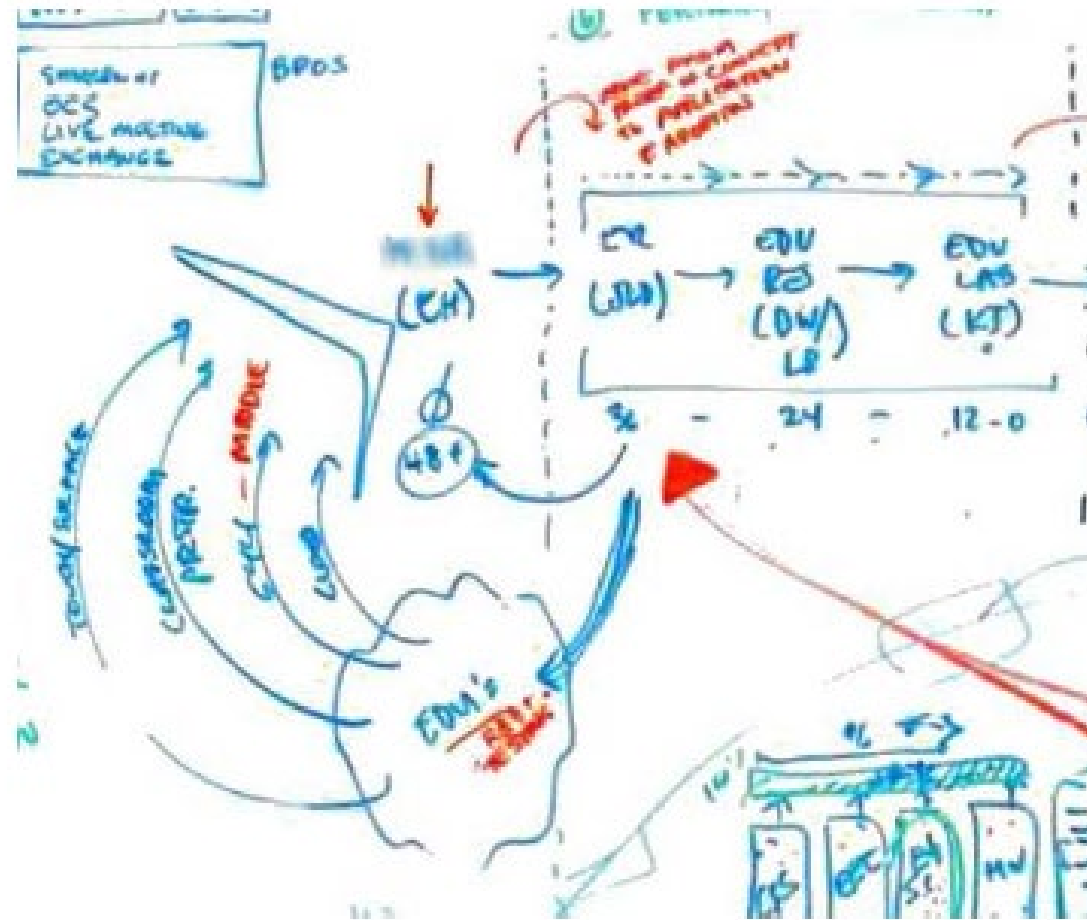


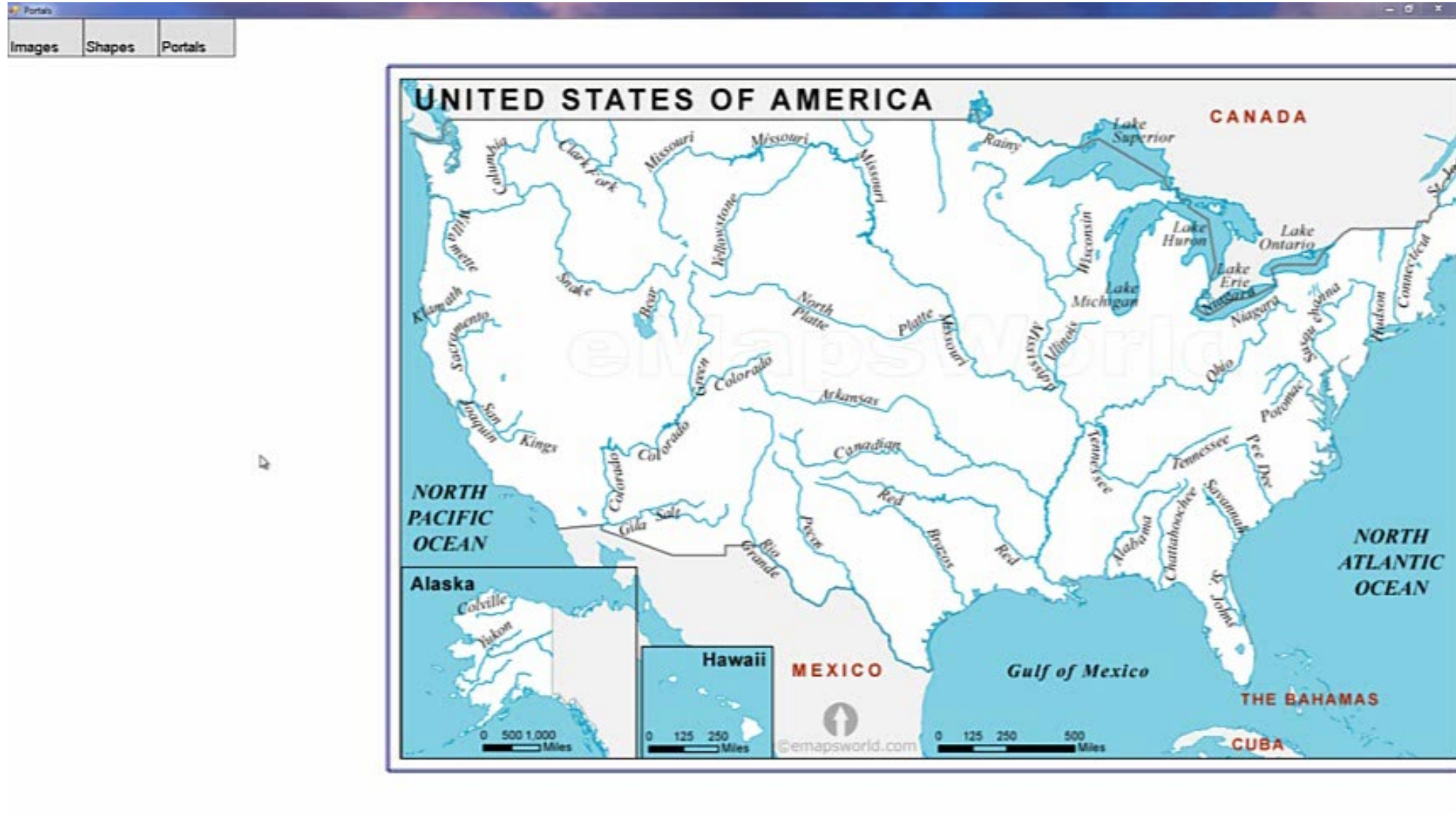
Vis on Whiteboards

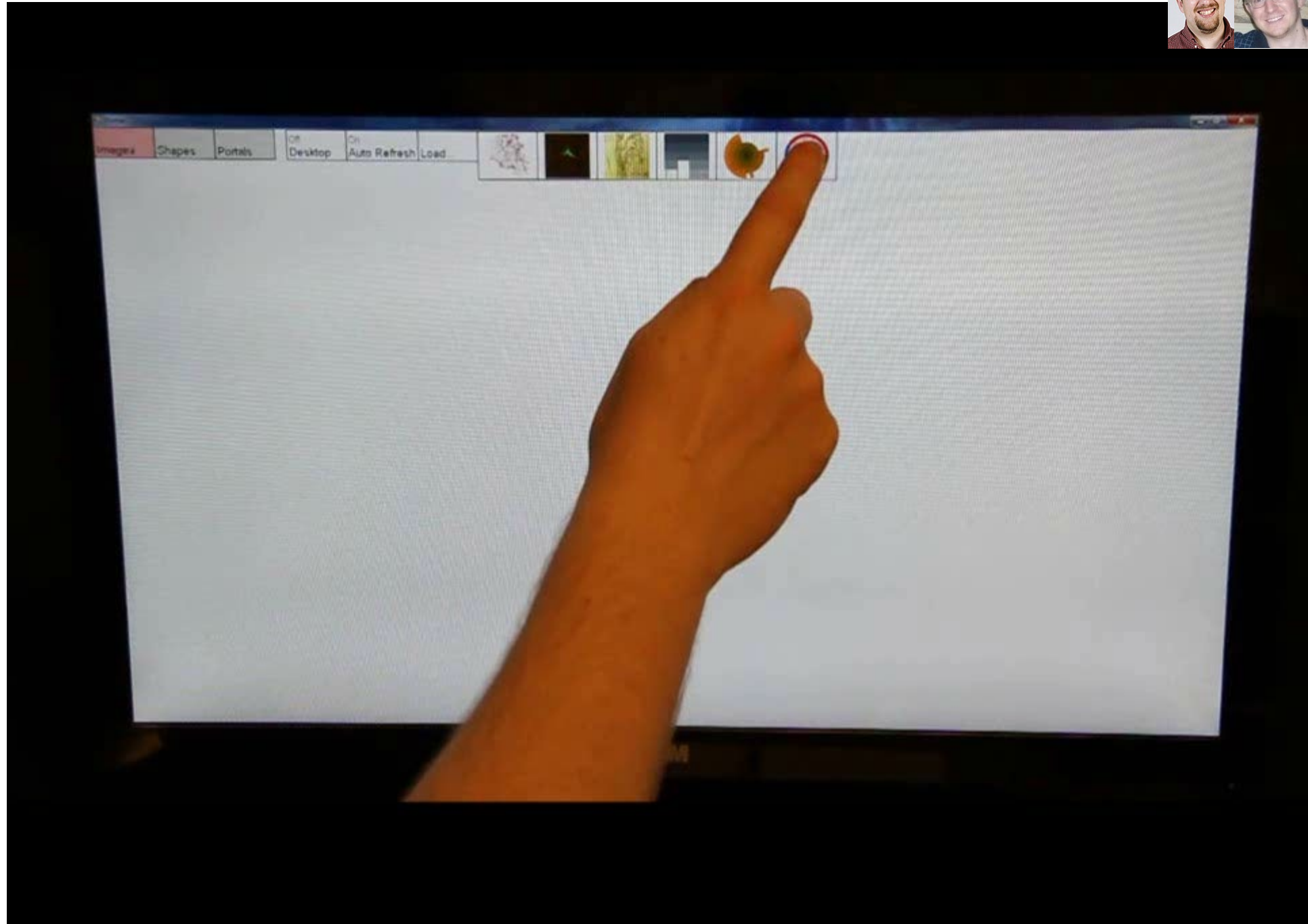




Vis on Whiteboards







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S. Lay, J. Vermeulen, C. Perin, R. Dachzelt,
E. Donovan, S. Carpendale



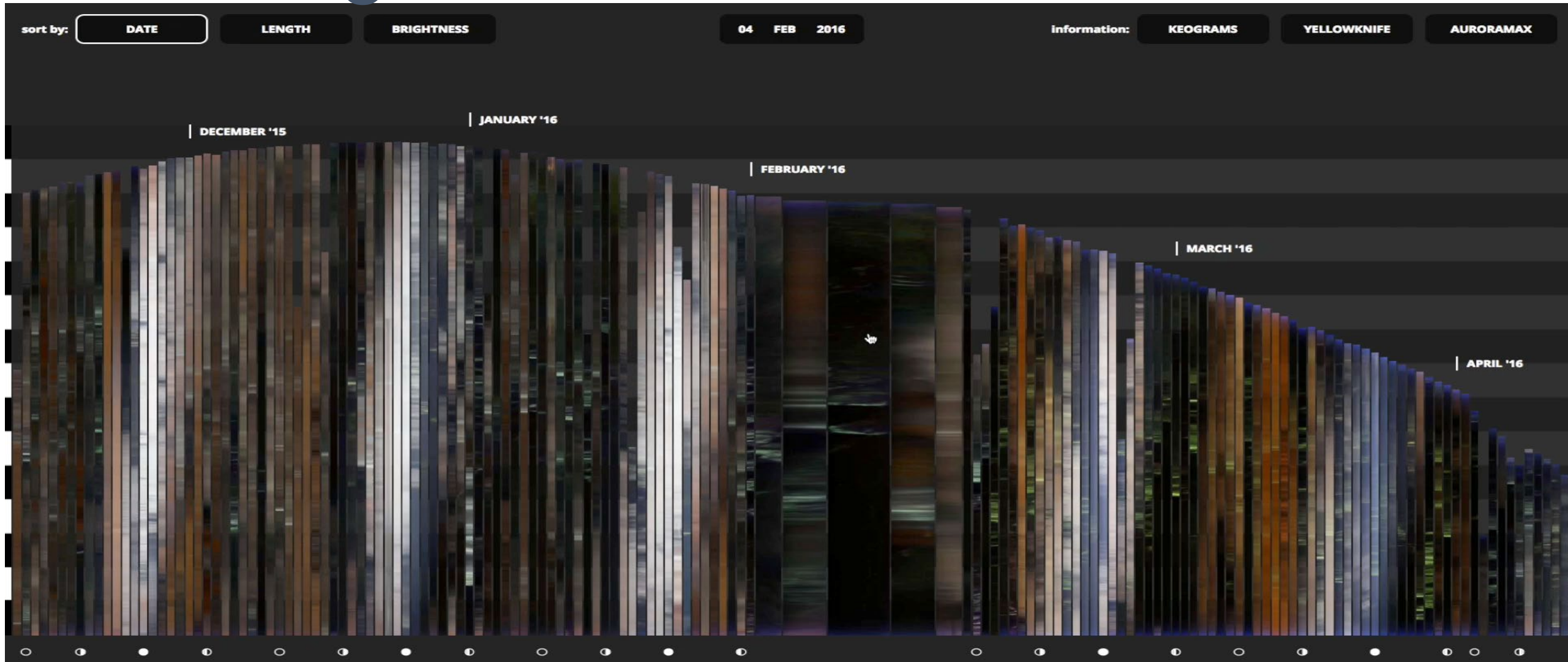
Slicing the Aurora



S. Lay, J. Vermeulen, C. Perin, R. Dachsel,
E. Donovan, S. Carpendale



Slicing the Aurora



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**empowering people with data
... inspiration**



Kindergarten
Frederich Froebel

Constructivism
Jean Piaget

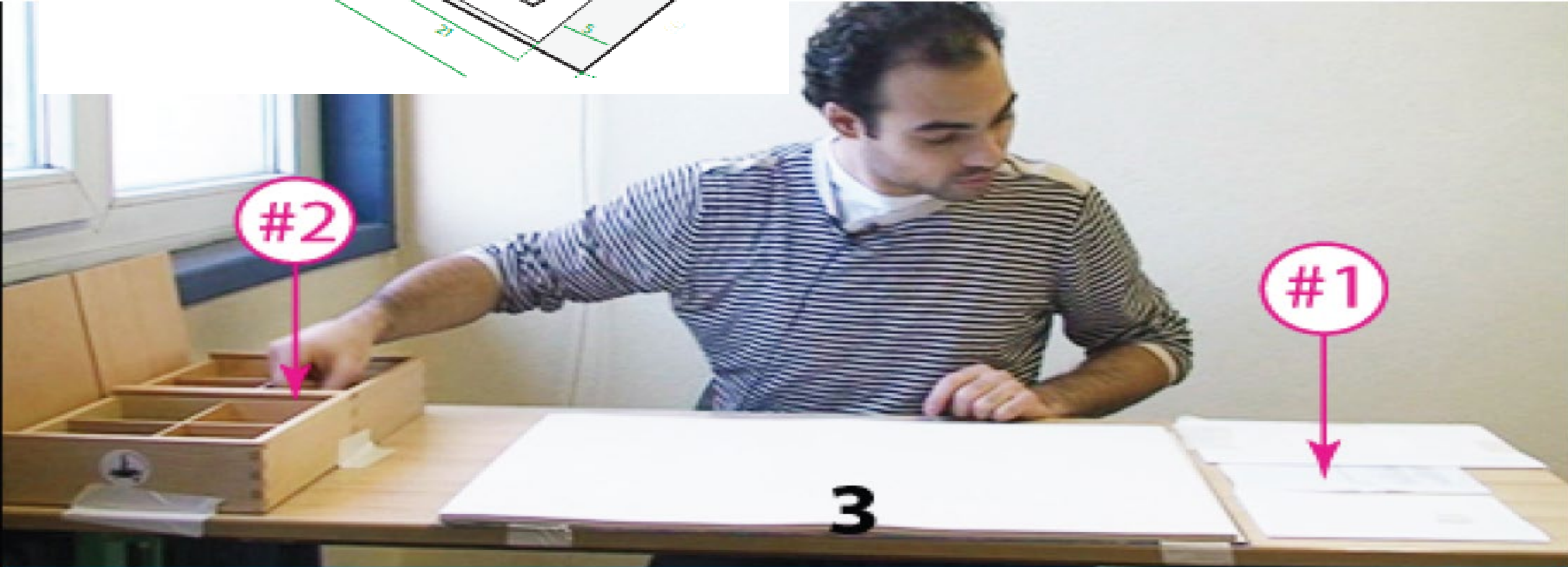
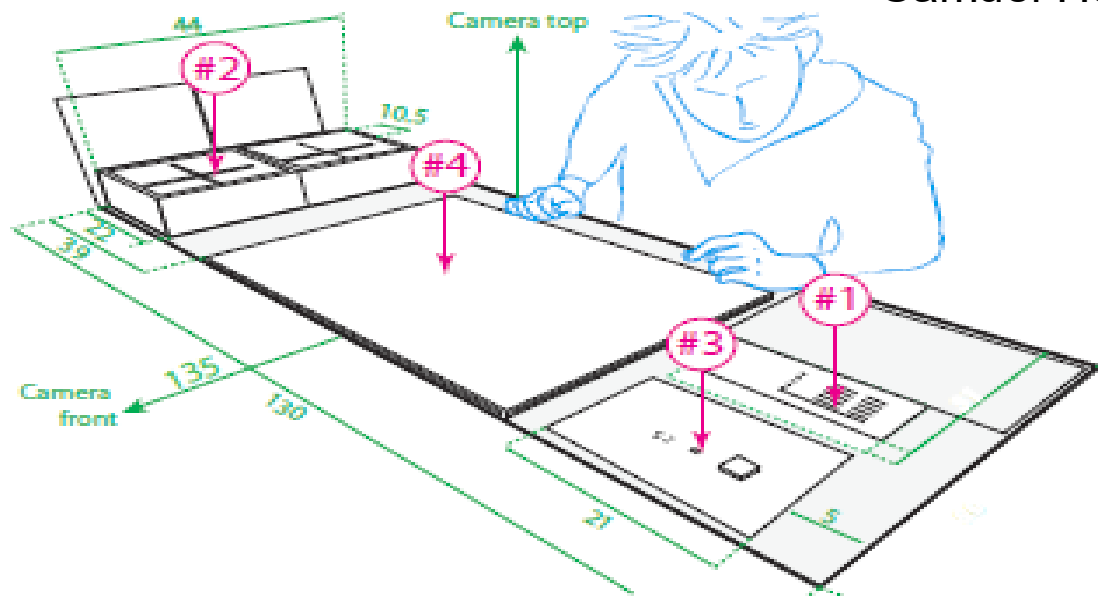
Constructionism
Seymour Papert

Samuel Huron, Sheelagh Carpendale, Alice Thudt, Tony Tang, Michael Mauerer



constructive visualization







3 Tasks

CREATE

A- CREATE



B- UPDATE



C- ANNOTATE

Video x16



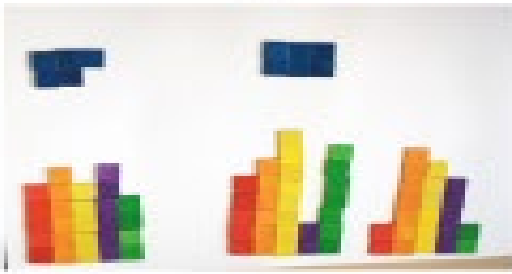
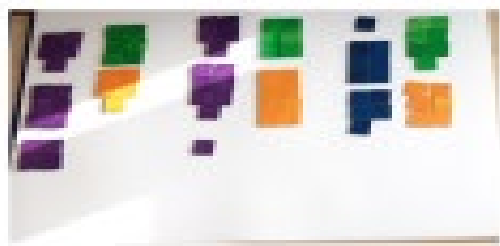
1

2

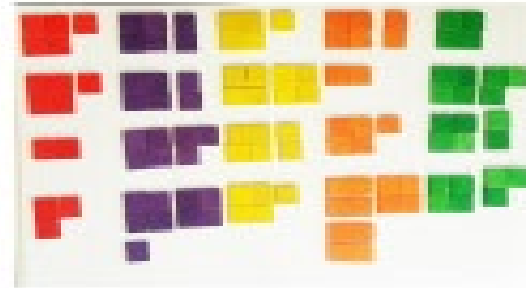
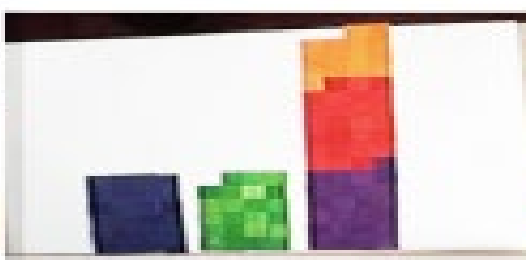
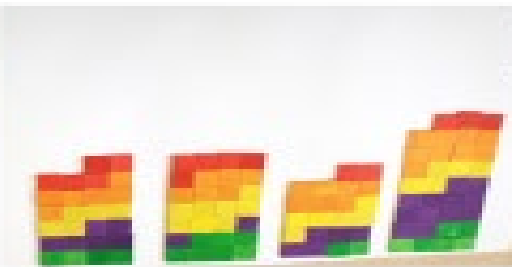
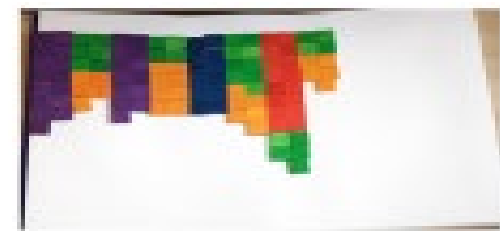
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4

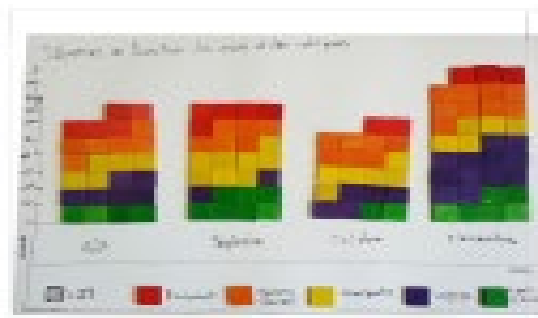
A



B



C





Bottom-up and Top-down Procedures

Bottom up 10/12

From data case to higher level of structures



Top down 2/12

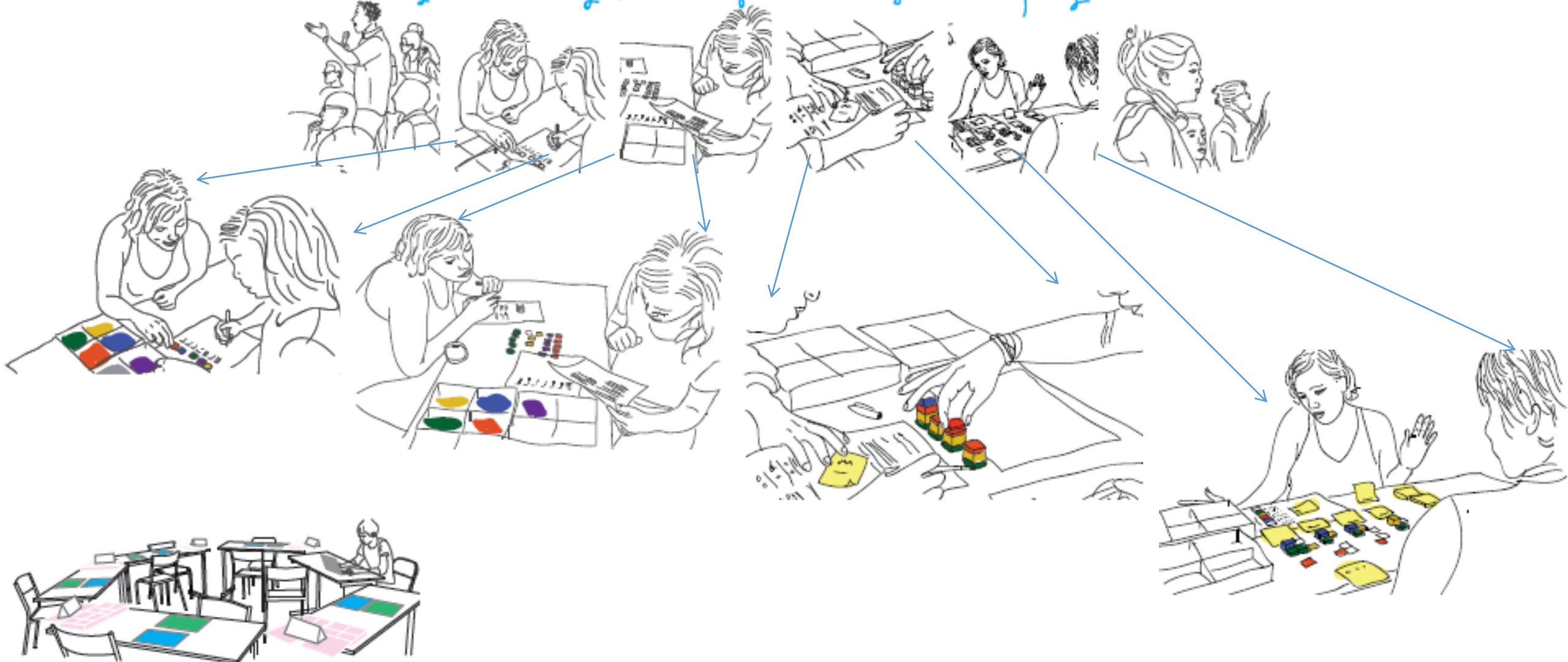
From higher level of structures to data cases





Constructive Vis -> VizKit

1 Presenting 2 Authoring 3 Reading 4 Editing 5 Critiquing 6 Conclusion



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Hadamard's Book - 100 famous mathematicians and physicists

- creative scientific thought is worked out with 'visuals'
- externalizations of still vaguely formed ideas
- images and diagrams initially described as 'cloudy'
- not communicating to others,
- For expressing what is still partially formed in their minds.

USE

A template

- Easy
- Quick
- Scalable
- dynamic
- **NOT** EXPRESSIVE

DRAW

Free form

- Easy
- **NOT** so quick
- **NOT** scalable
- **NOT** dynamic
- EXPRESSIVE

CODE

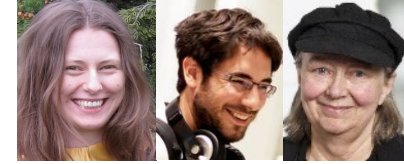
Freedom

- Effort-learned skill
- **NOT** so quick
- Scalable
- Dynamic
- EXPRESSIVE

Bret Victor's sentence

“We begin our derivation by disregarding the effect of _____, and inquire into the condition _____ associated with the interaction of _____ and _____. The theory _____ asserts that _____ must be equal to _____, as indicated by the equation _____.”

data sketching



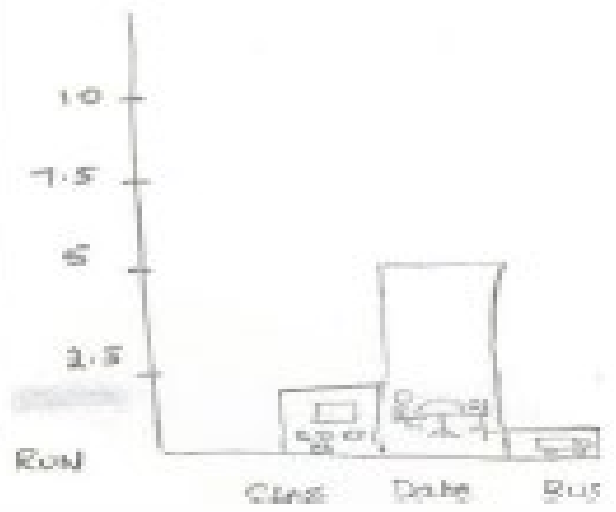
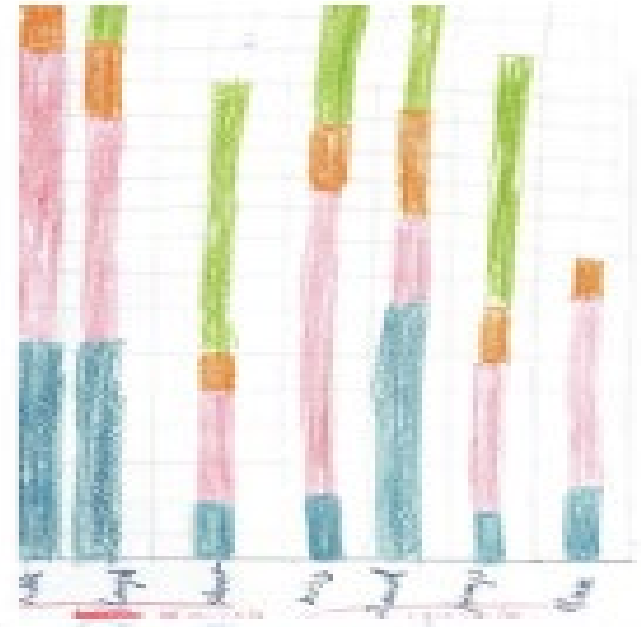
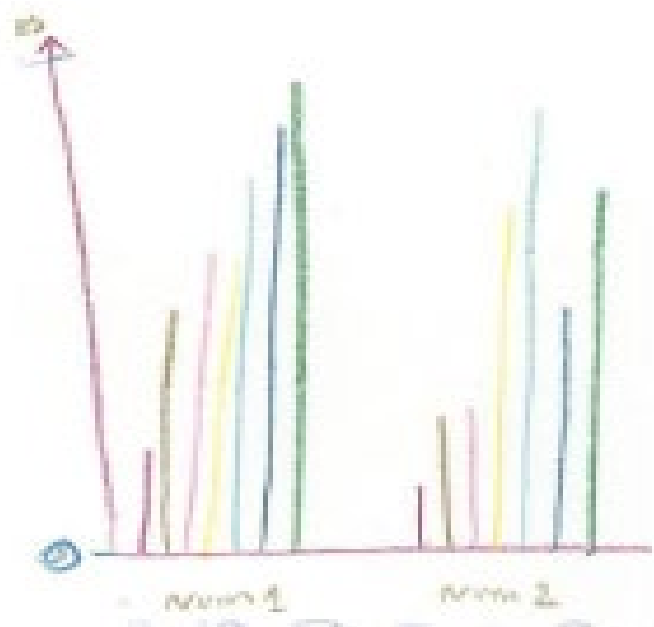
Mean Appropriateness Ratings for 225 Behavior-Situation Combinations

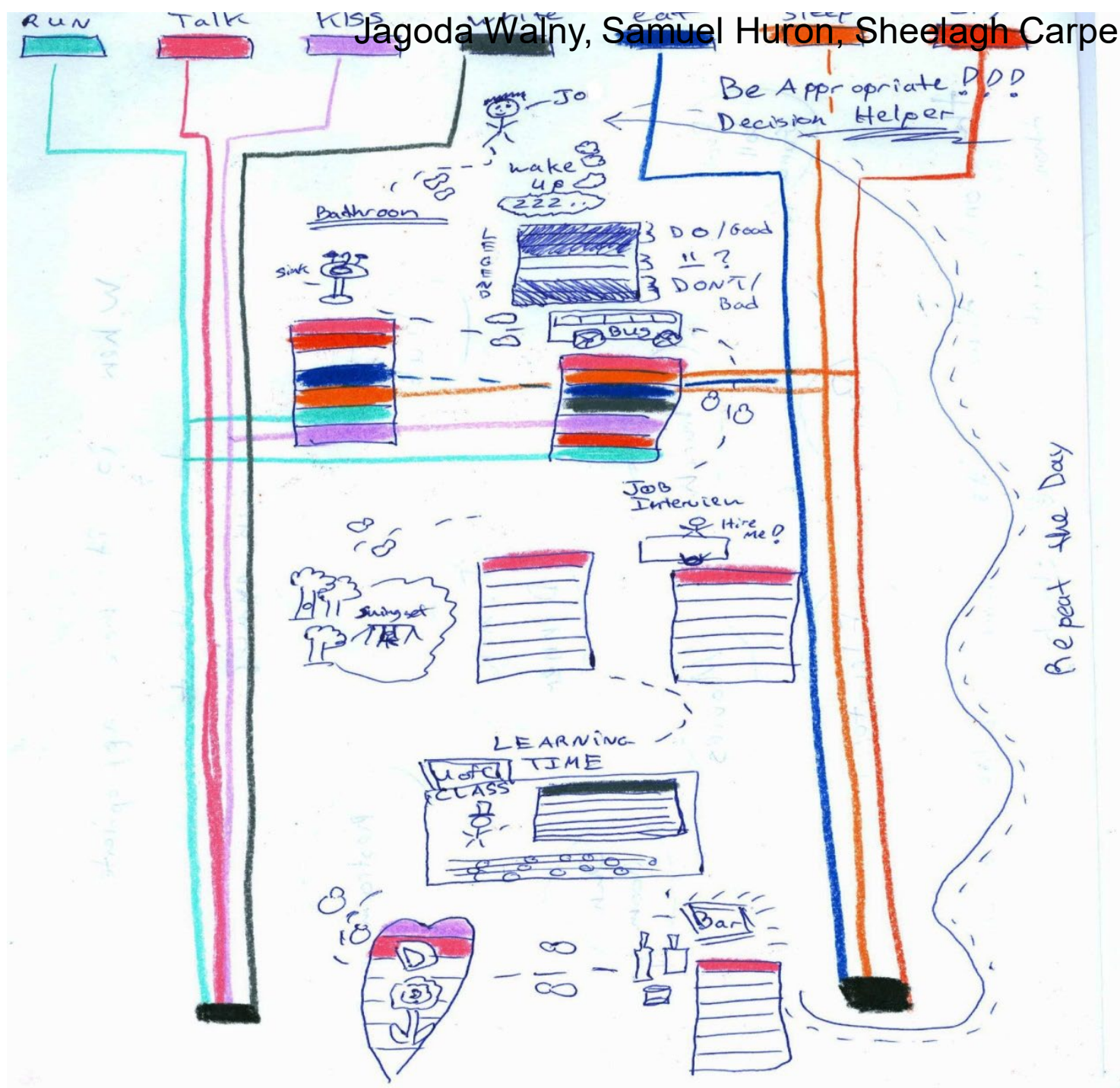
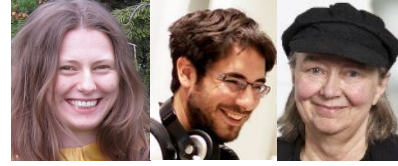
Situation	Behavior														
	<i>Run</i>	<i>Talk</i>	<i>Kiss</i>	<i>Write</i>	<i>Eat</i>	<i>Sleep</i>	<i>Mumble</i>	<i>Read</i>	<i>Fight</i>	<i>Belch</i>	<i>Argue</i>	<i>Jump</i>	<i>Cry</i>	<i>Laugh</i>	<i>Shout</i>
<i>Class</i>	2.52	6.21	2.10	8.17	4.23	3.60	3.62	7.27	1.21	1.77	5.33	1.79	2.21	6.23	1.94
<i>Date</i>	5.00	8.56	8.73	3.62	7.79	3.77	3.12	2.88	3.58	2.23	4.50	4.42	3.04	8.00	3.79
<i>Bus</i>	1.44	8.08	4.27	4.87	5.48	7.04	5.17	7.17	1.52	2.15	4.17	3.12	3.08	7.10	3.00
<i>Family dinner</i>	2.56	8.52	4.92	2.58	8.44	2.29	2.54	3.96	1.67	2.50	3.25	2.29	3.21	7.13	1.96
<i>Park</i>	7.94	8.42	7.71	7.00	8.13	5.63	5.40	7.77	3.06	5.00	5.06	7.42	5.21	8.10	6.92
<i>Church</i>	1.38	3.29	2.38	2.85	1.38	1.77	3.52	3.58	0.62	1.42	1.92	1.71	3.13	2.60	1.33
<i>Job interview</i>	1.94	8.46	1.08	4.85	1.73	0.75	1.31	2.48	1.04	1.21	1.83	1.48	1.37	5.88	1.65
<i>Sidewalk</i>	5.58	8.19	4.75	3.38	4.83	1.46	4.96	4.81	1.46	2.81	4.08	3.54	3.71	7.40	4.88
<i>Movies</i>	2.46	4.98	6.21	2.73	7.48	4.08	4.13	1.73	1.37	2.58	1.71	2.31	7.15	7.94	2.42
<i>Bar</i>	1.96	8.25	5.17	5.38	7.67	2.90	6.21	4.71	1.90	5.04	4.31	3.75	3.44	8.23	4.13
<i>Elevator</i>	1.63	7.40	4.79	3.04	5.10	1.31	5.12	4.48	1.58	2.54	2.58	2.12	3.48	6.77	1.73
<i>Restroom</i>	2.83	7.25	2.81	3.46	2.35	2.83	5.04	4.75	1.77	5.12	3.48	3.65	4.79	5.90	3.52
<i>Own room</i>	6.15	8.58	8.52	8.29	7.94	8.85	7.67	8.58	4.25	6.81	7.52	6.73	8.00	8.17	6.44
<i>Dorm lounge</i>	4.40	7.88	6.54	7.73	7.19	6.08	5.50	8.56	2.40	4.00	4.88	4.58	3.88	7.75	3.60
<i>Football game</i>	4.12	8.08	5.08	4.56	8.04	2.98	5.23	3.69	2.04	3.85	4.98	7.12	4.31	7.90	7.94

Note:

0 = "The behavior is *extremely inappropriate* in this situation."

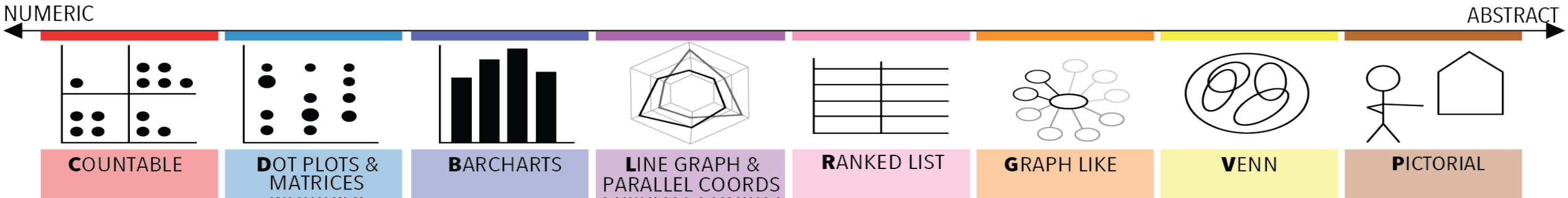
9 = "The behavior is *extremely appropriate* in this situation."







Jagoda Walny, Samuel Huron





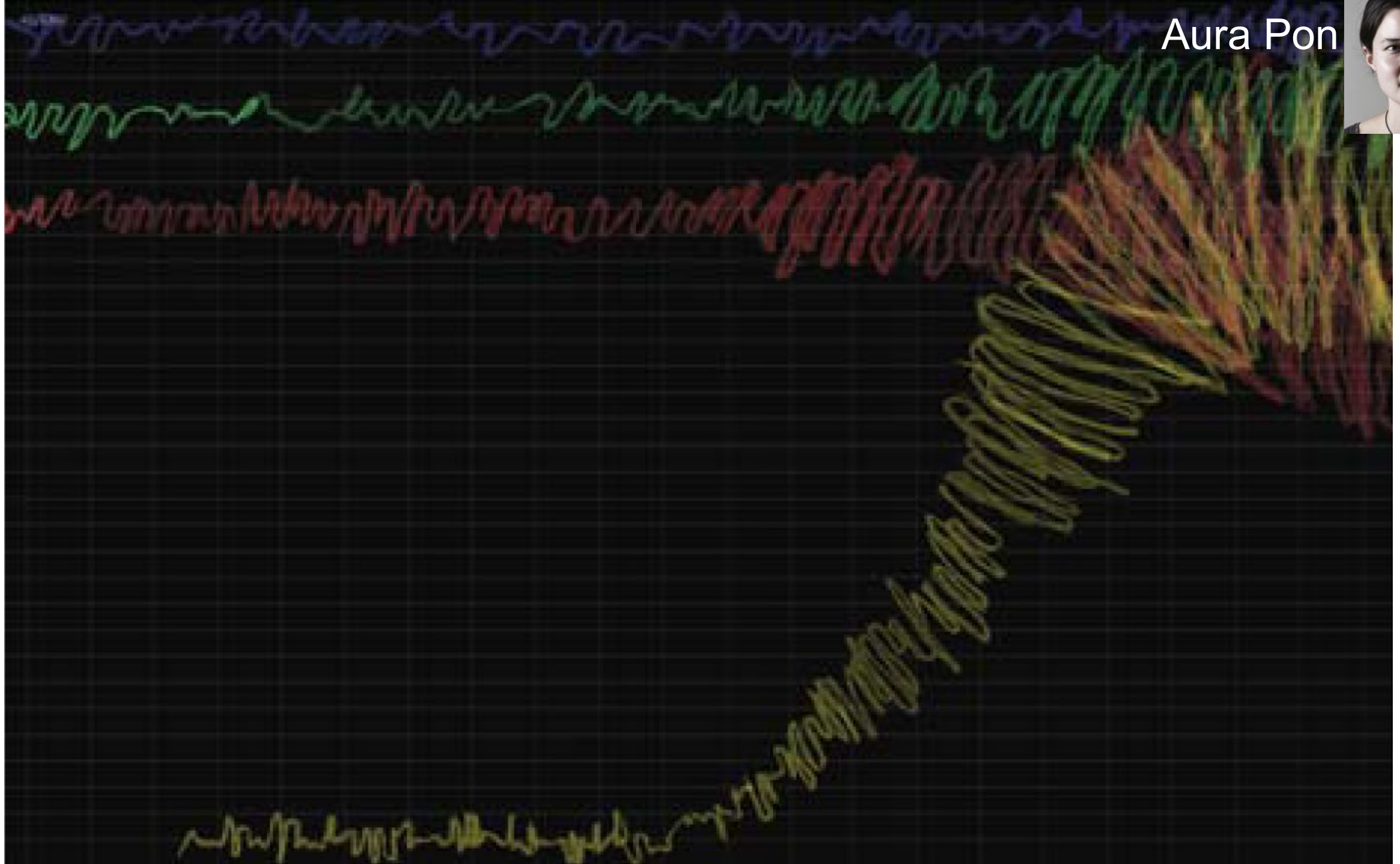
Sketching Data

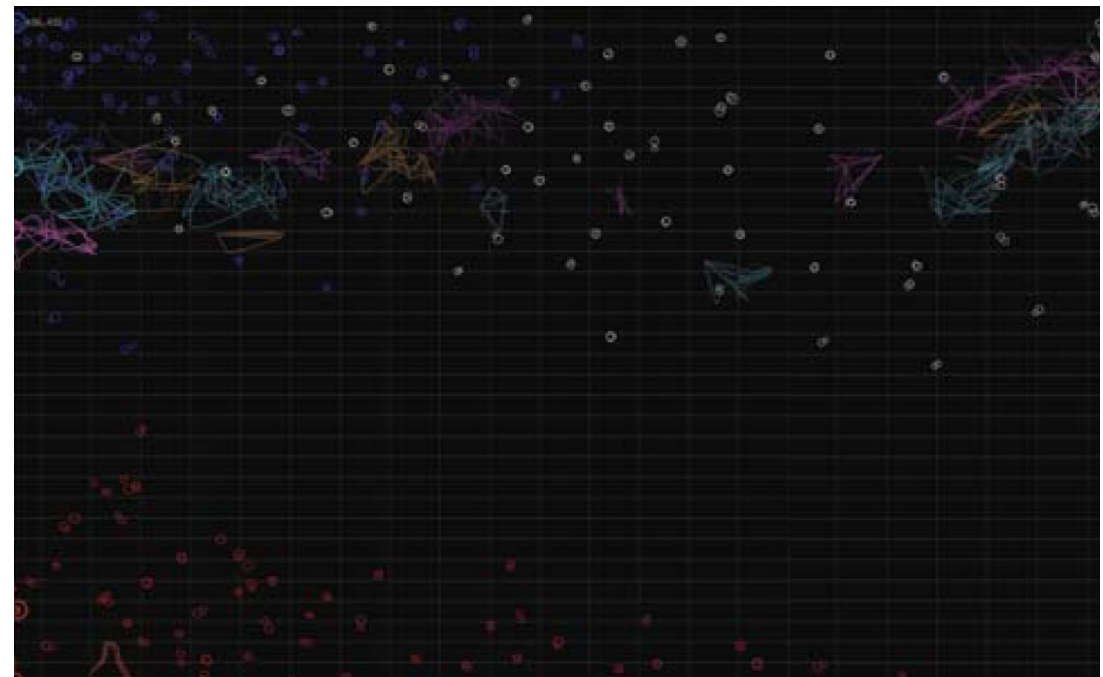
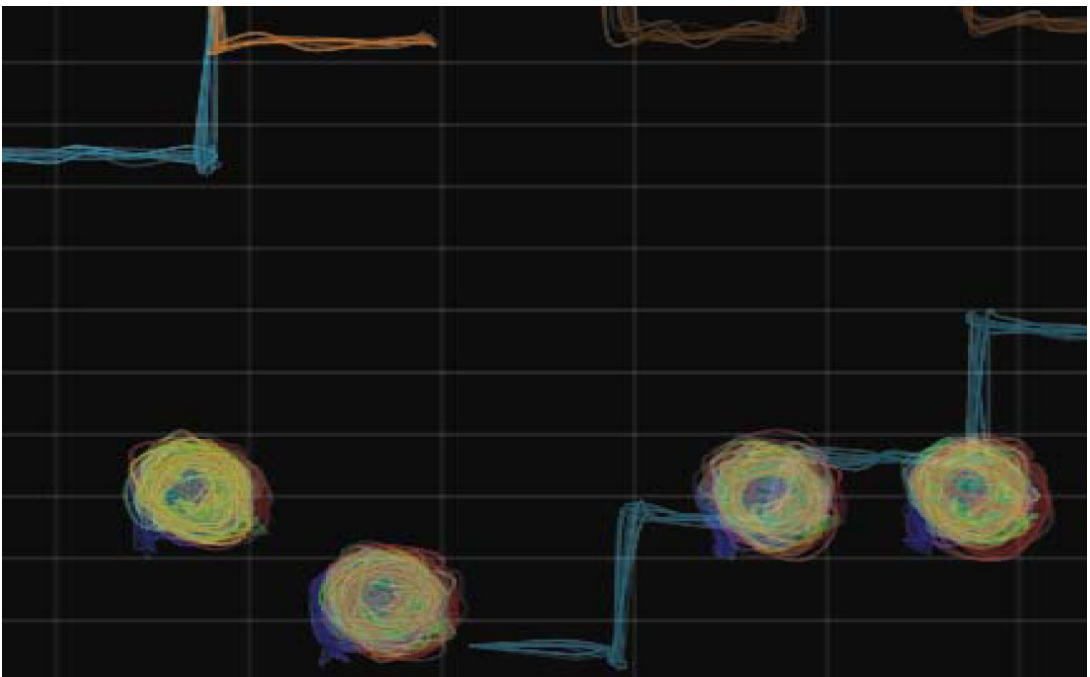
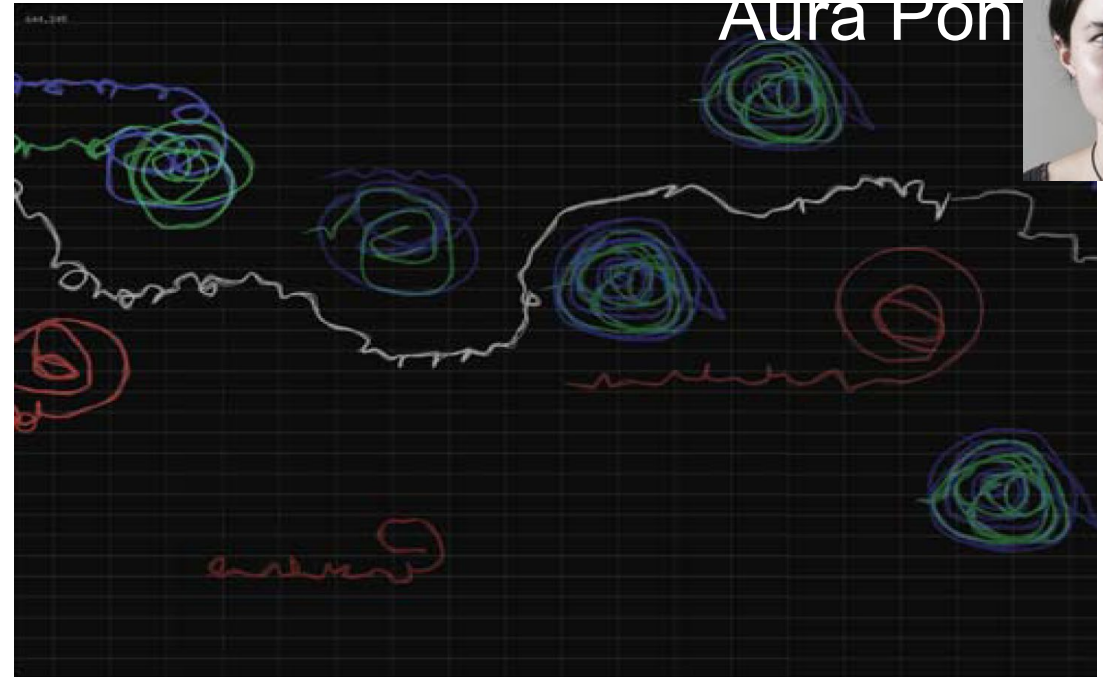
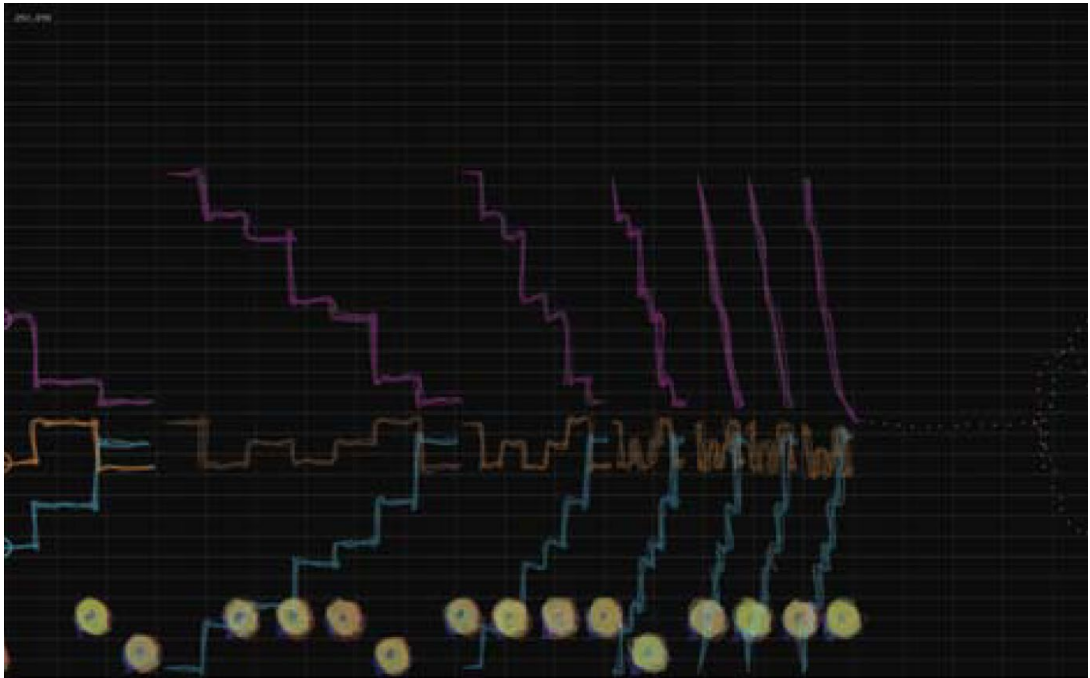
	A. Individual data points	B. Low level summary	C. Low-level comparison	D. Comparisons and Trends in the dataset	E. Including Extrinsic Information	F. Statements with Analytic Potential
1	Refer to specific individual data values	Summarize individual rows or columns.	Compare two rows or columns.	Compare 3 or more rows or columns; note trends.	Classify as named type.	Fledgling hypothesis.
2	Refer to approximate individual data values.			Classify values, rows or columns.	Compare against expectations.	Conjecture about reasons for values.
3				Group items according to value.	Explain in domain context.	
4				Make global comparisons.		

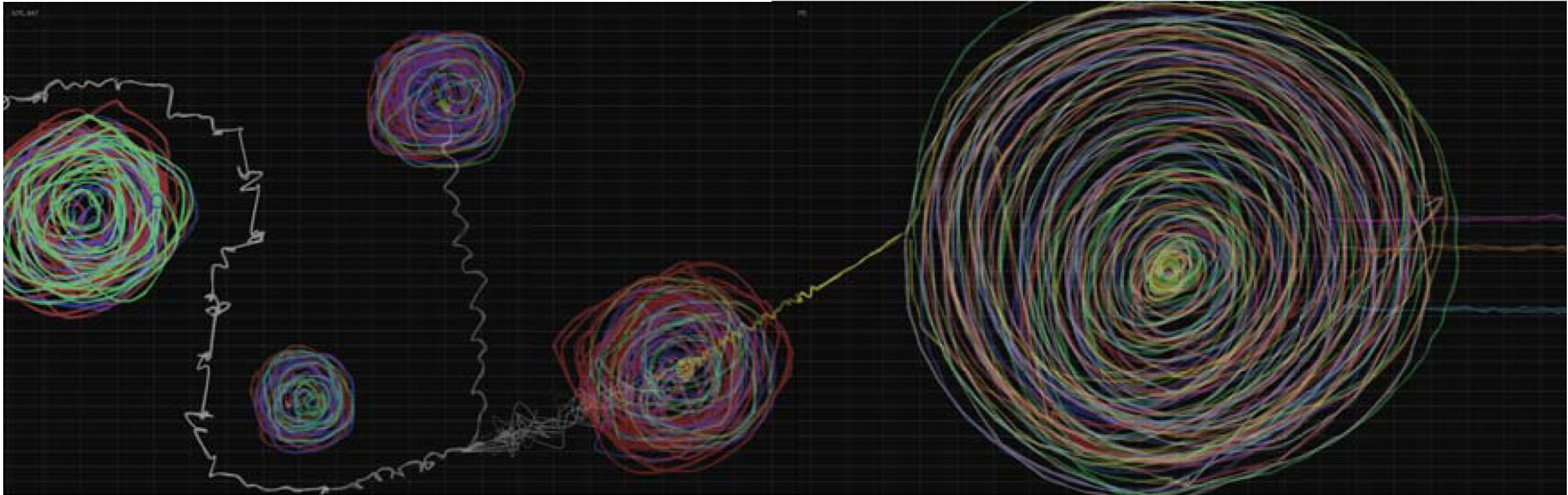
Aura Pon, J. Ichino, E. Sharlin, D. Eagle



Aura Pon



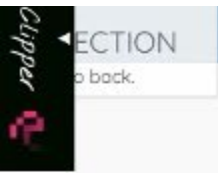
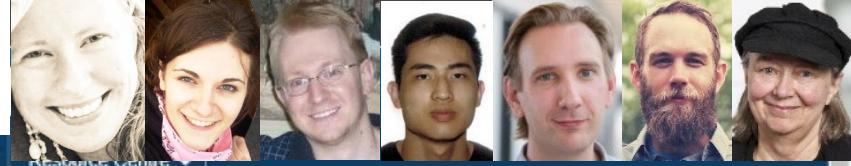




Three performances of *Concordia discors* took place with two different ensembles. The premiere took place at Kino Šiška, Ljubljana, Slovenia, at the International Computer Music Conference on Sept 13, 2012, by Vox Tactum Ensemble.

currently

engagement and expression

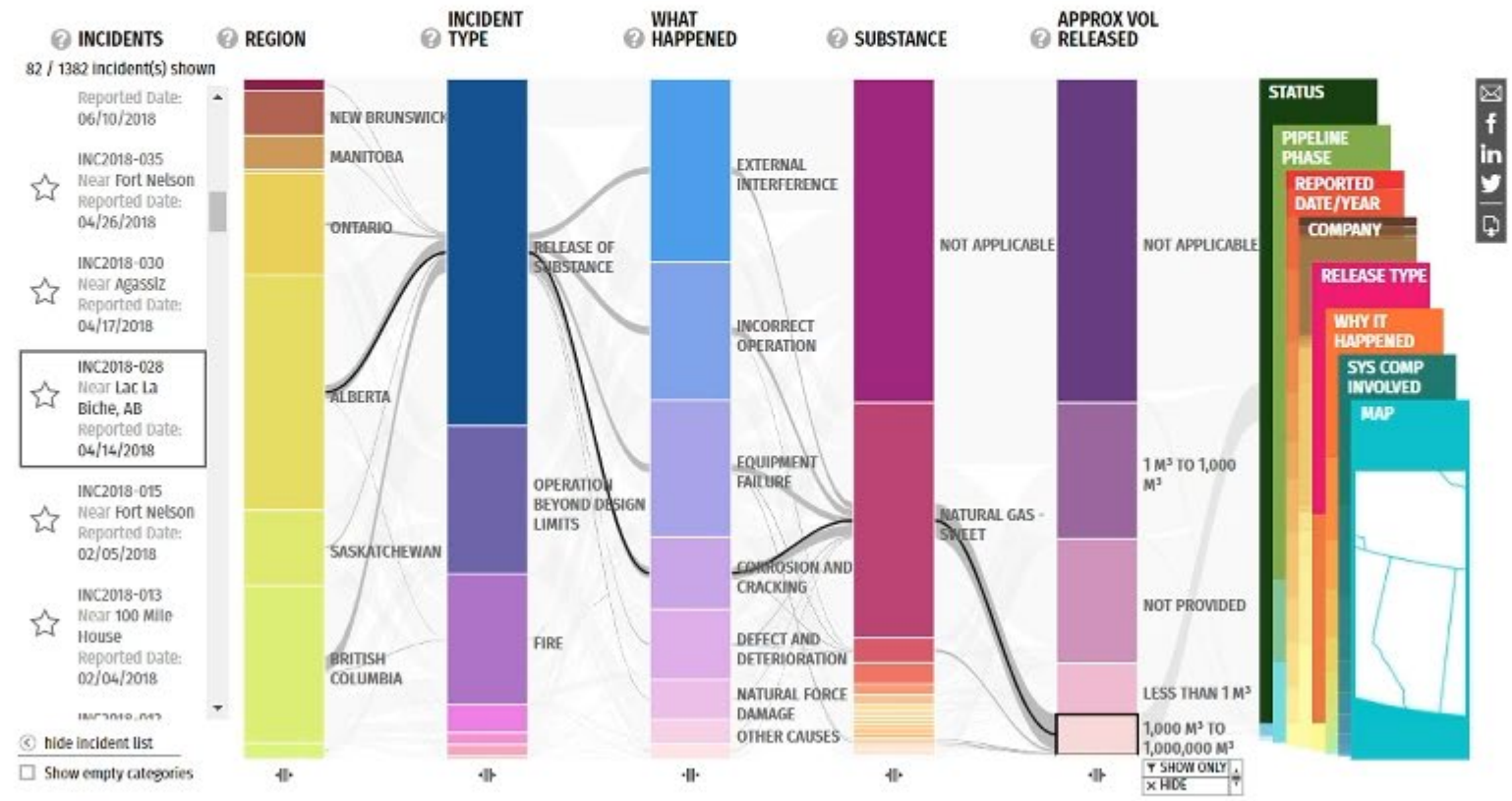


Home → Safety & Environment → Safety → Safety Performance Portal → Pipeline Incidents

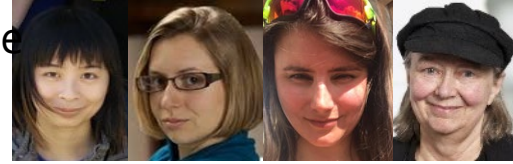
INCIDENTS AT CER-REGULATED PIPELINES AND FACILITIES

The information presented here is based on CER data from 2008 to current for incidents reported under the Onshore Pipeline Regulations and the Processing Plant Regulations. New data is added quarterly. The last update was: 2020-06-30. [Data disclaimer](#)
[Learn more](#) on how data collection has evolved since the NEB (now the CER) was established in 1959.

- TELL ME A STORY
- ABOUT THIS PROJECT
- METHODOLOGY
- RESET ALL



empowerment and expression



Visualization Stamps (with potatoes)





GROUP 1

GROUP 2

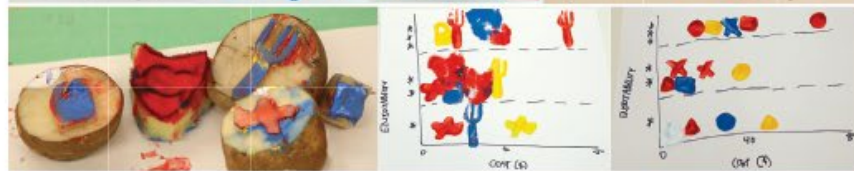
P1



P2



P3



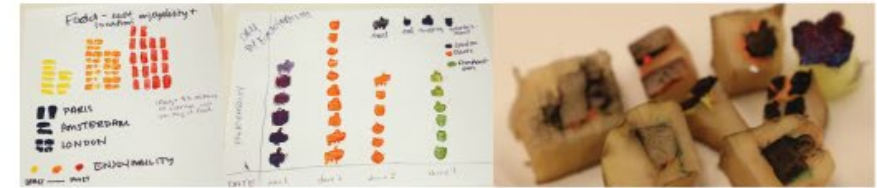
P4



P5



P6



P7



P8



P9



P10

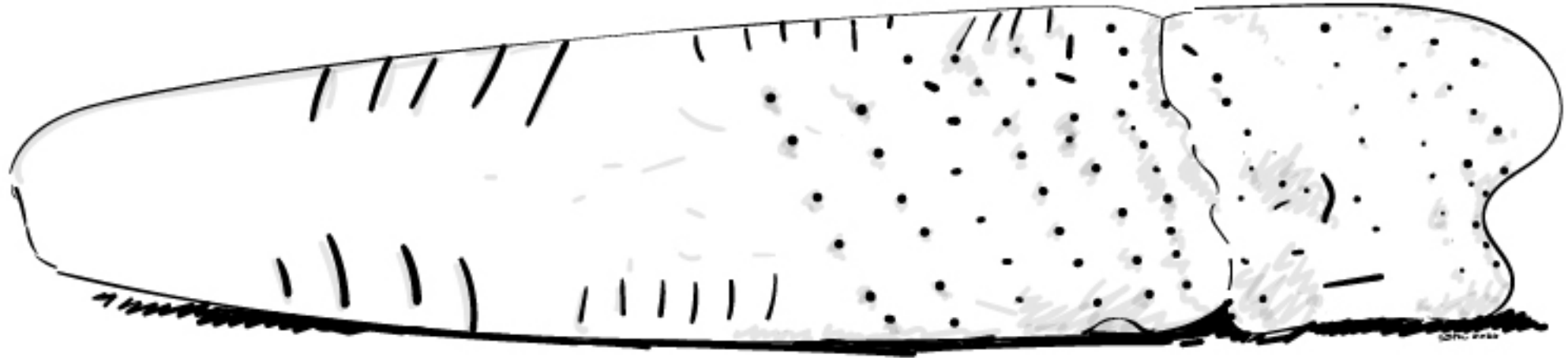


Stamps: 71 created, 65 used for authoring visualizations; Visualizations: 21 created

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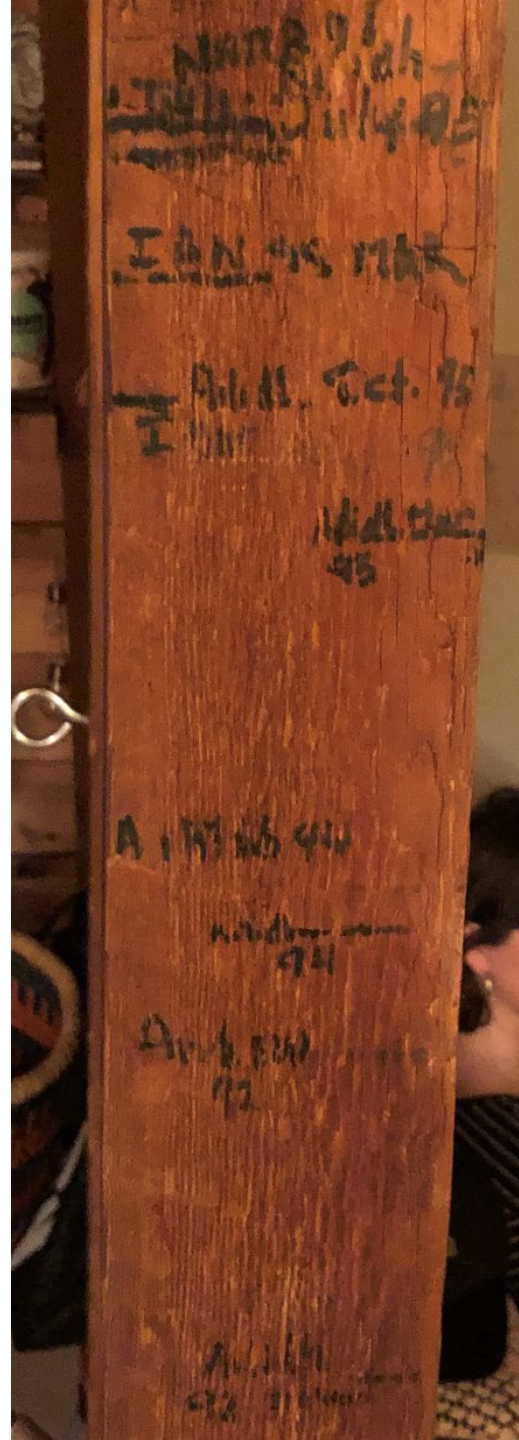
From Ancient Times ...



- earliest known data recording
- Dordogne, France c. 38,000 BC
- 30,000 years before written language
- thought to be a woman tracking her menses







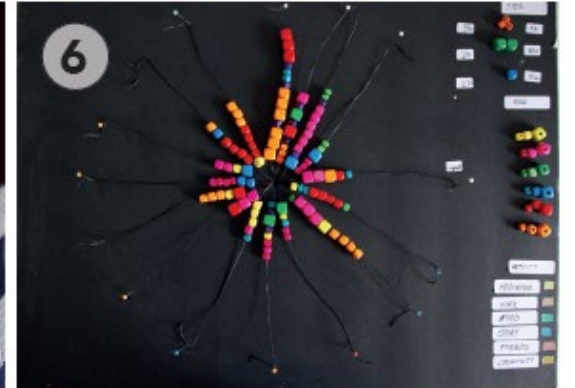
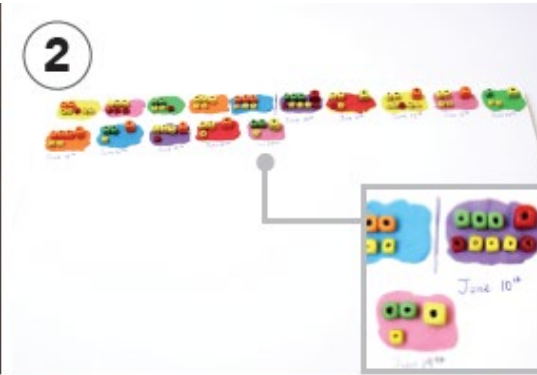
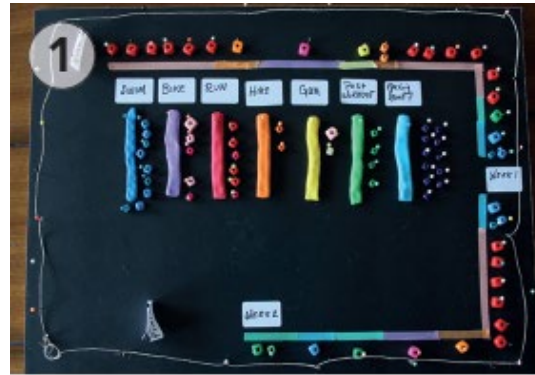
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personal data visualization





Constructive Personal Visualization





Life In Clay
Alice Thudt (2017)

lets not get dis-inherited!!!!

Lessons ...

- **Observation is a skill**
- **Words are not sufficient**
- **Hard work can lead to new insights**
- **This is our data!**
- **Mutual respect is both overt and covert**
- **Externalization: Engagement, Empowerment, Expression**
- **Claiming our data heritage**

Thank You for listening



**Data Vis
for
Empowerment and Inclusion**