UNIVERSITY OF TECHNOLOGY OF COMPIÈGNE

Evaluating Collaboration in Table-centric Interactive Spaces

The TATIN-PIC Project

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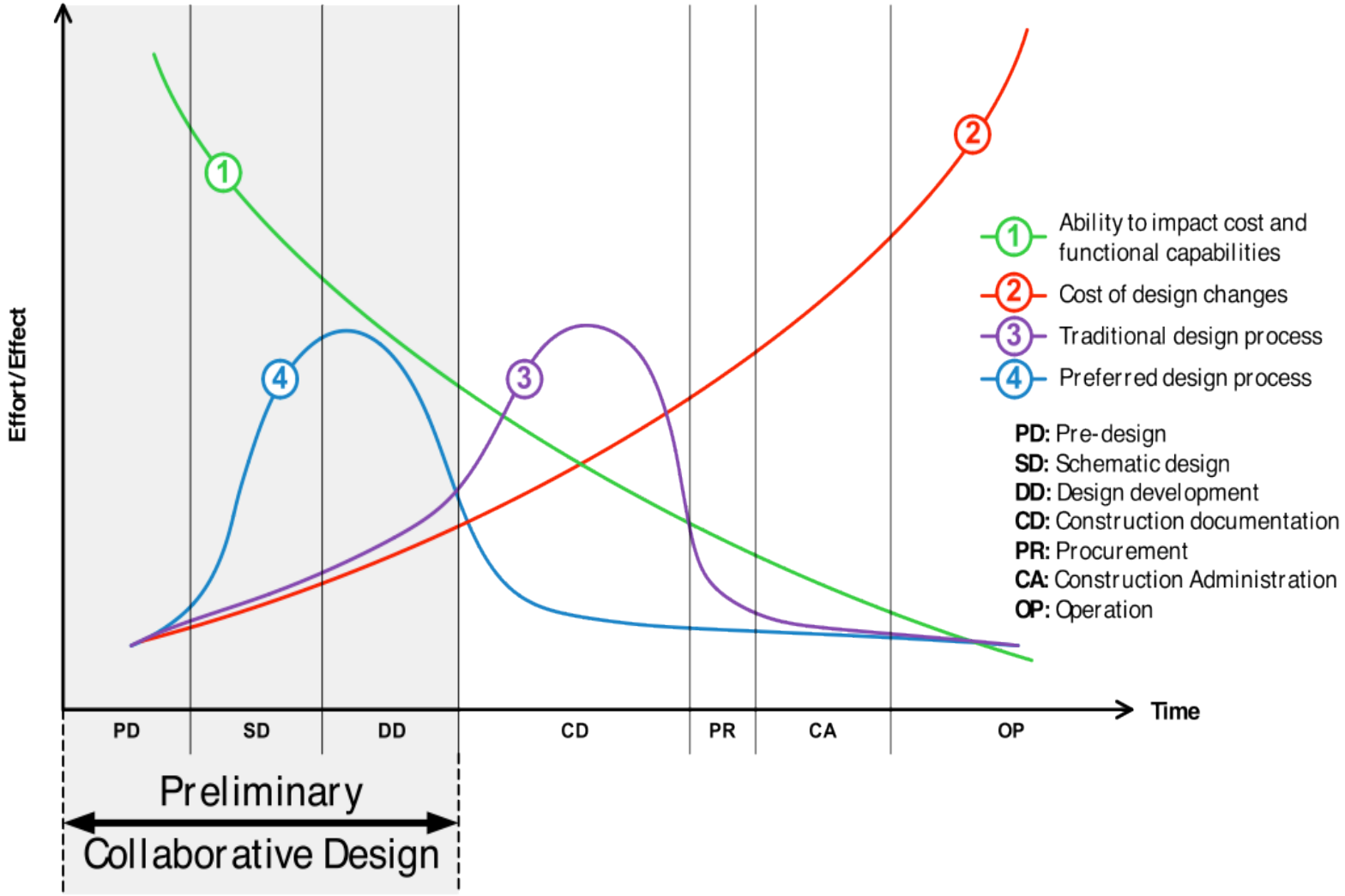
UTC - Heudiasyc

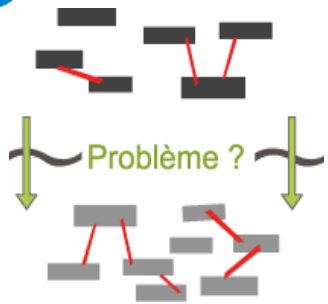
1)
Design of an Interactive Space

The Design Curve [MacLeamy, 2005]



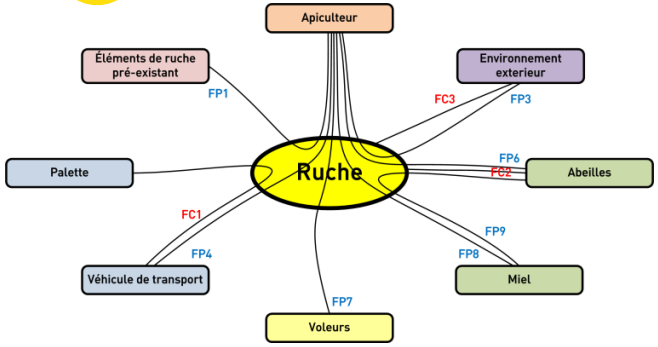
Preliminary Design

3 Causal Analysis



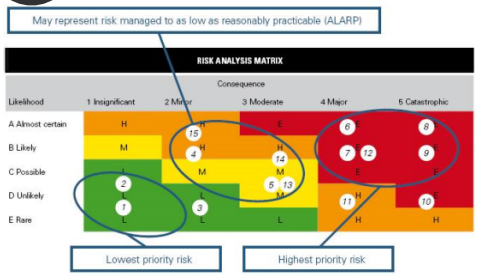
2 Flowchart, Project Planning

4 Functional Analysis



1 Brainstorming

5 Risk Analysis



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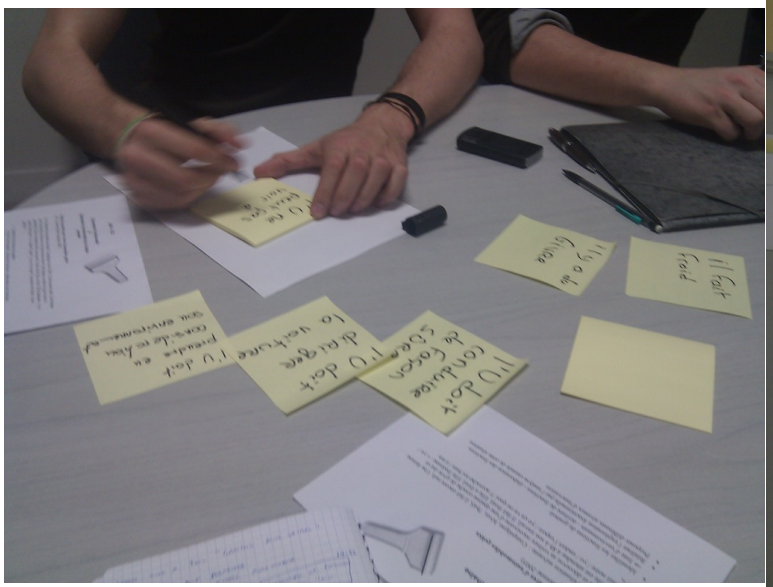
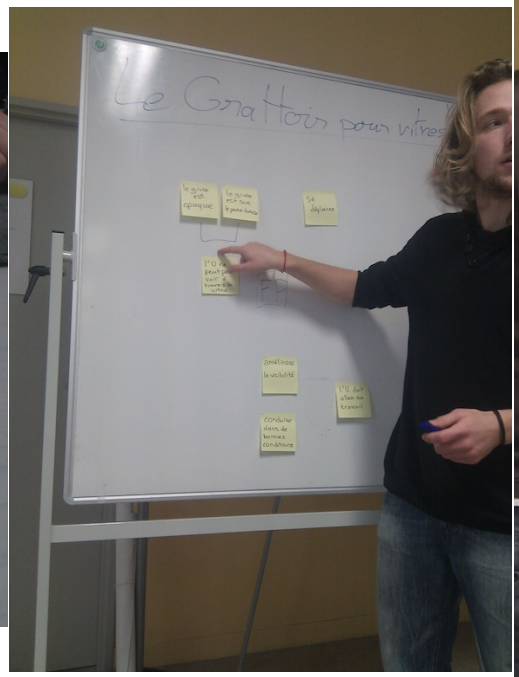
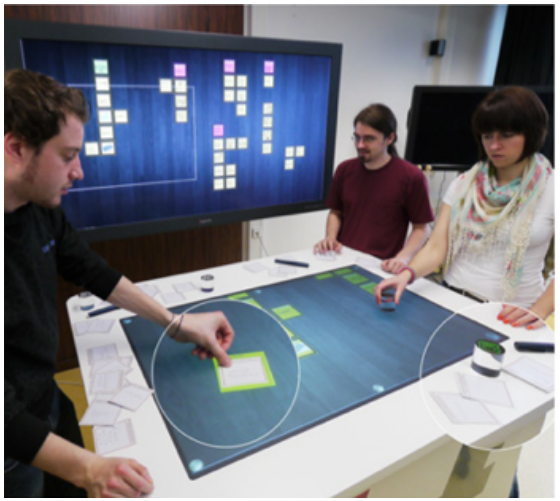
Observations (Project Planning & Causal Analysis)



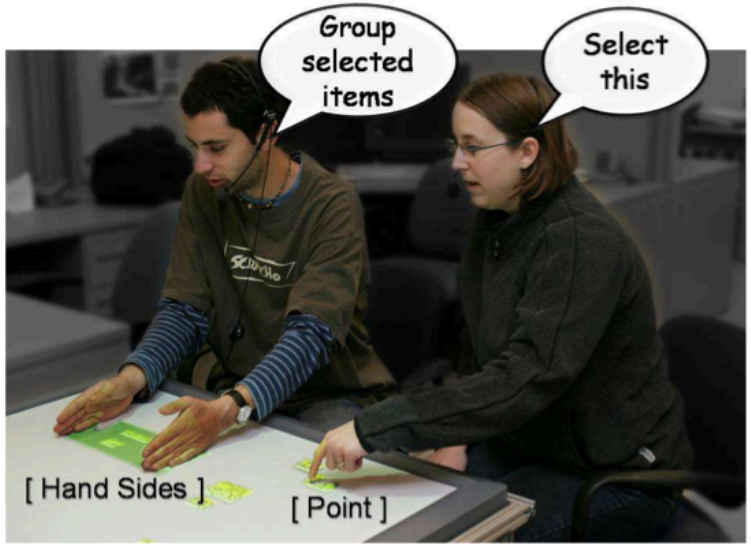


Related Work in Interactive Spaces

[Hilliges 2007]



[Geyer 2011]



[Tse 2008]

✓ Tabletop display: support for divergent thinking

✓ Board display: support for convergent thinking

✓ Tabletop display: shared action space

✓ Board display: shared reflection space

✓ Multimodal, multi-user interactions, promote group awareness

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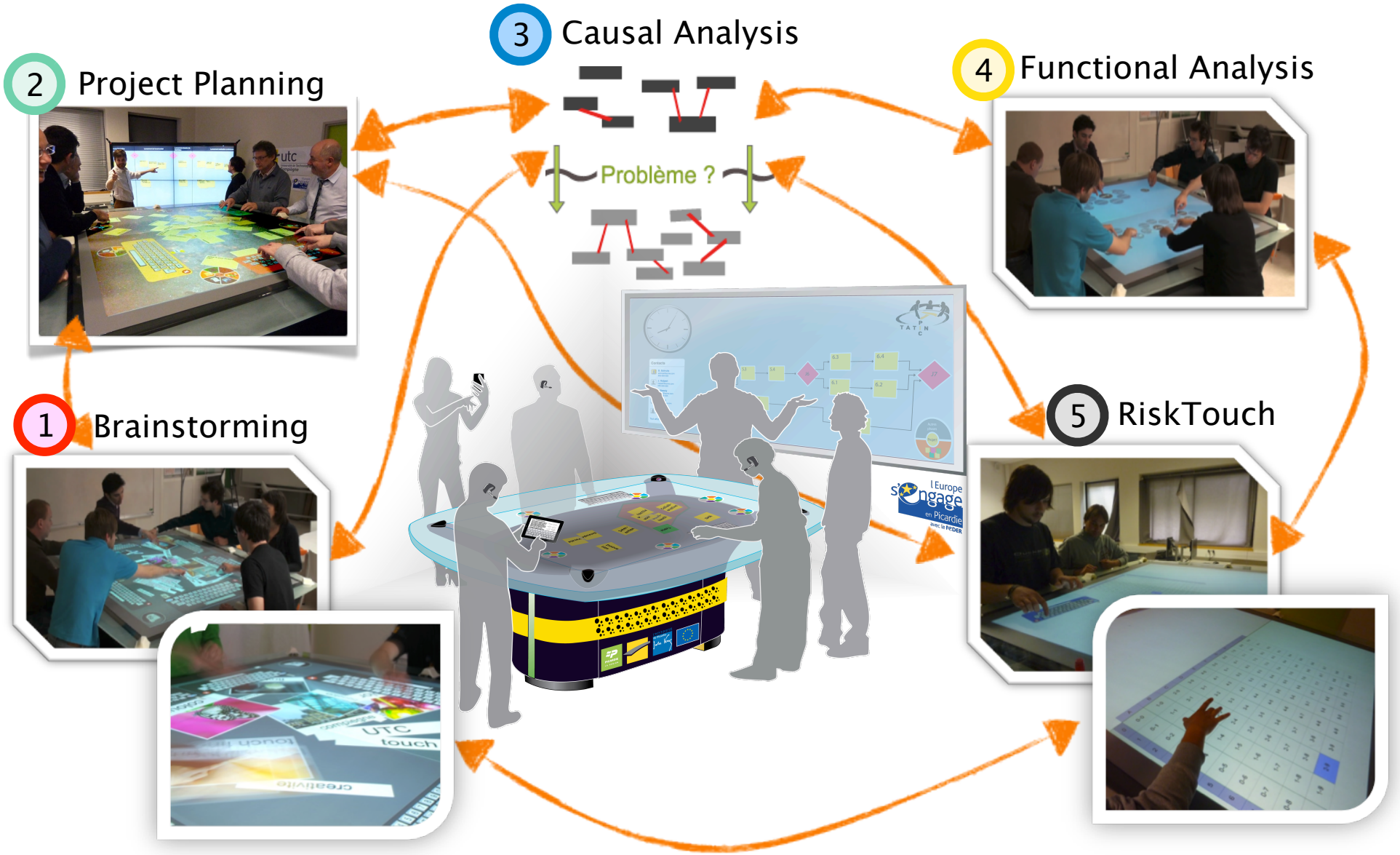
TATIN-PIC and Preliminary Design



TATIN-PIC Prototype

Characteristics

- Multi-touch tabletop (1m60 x 1m40 ; 2180 x 1920 pixels)
- Multi-touch board display (2m05 x 1m15 ; 2732 x 1536 pixels)
- Multimodal interaction with headsets (OMAS tookit)
- Tablet PCs (Android custom software, iOS Dragon Dictation)

2)
Multi-agent Middleware

Multi-agent Middleware

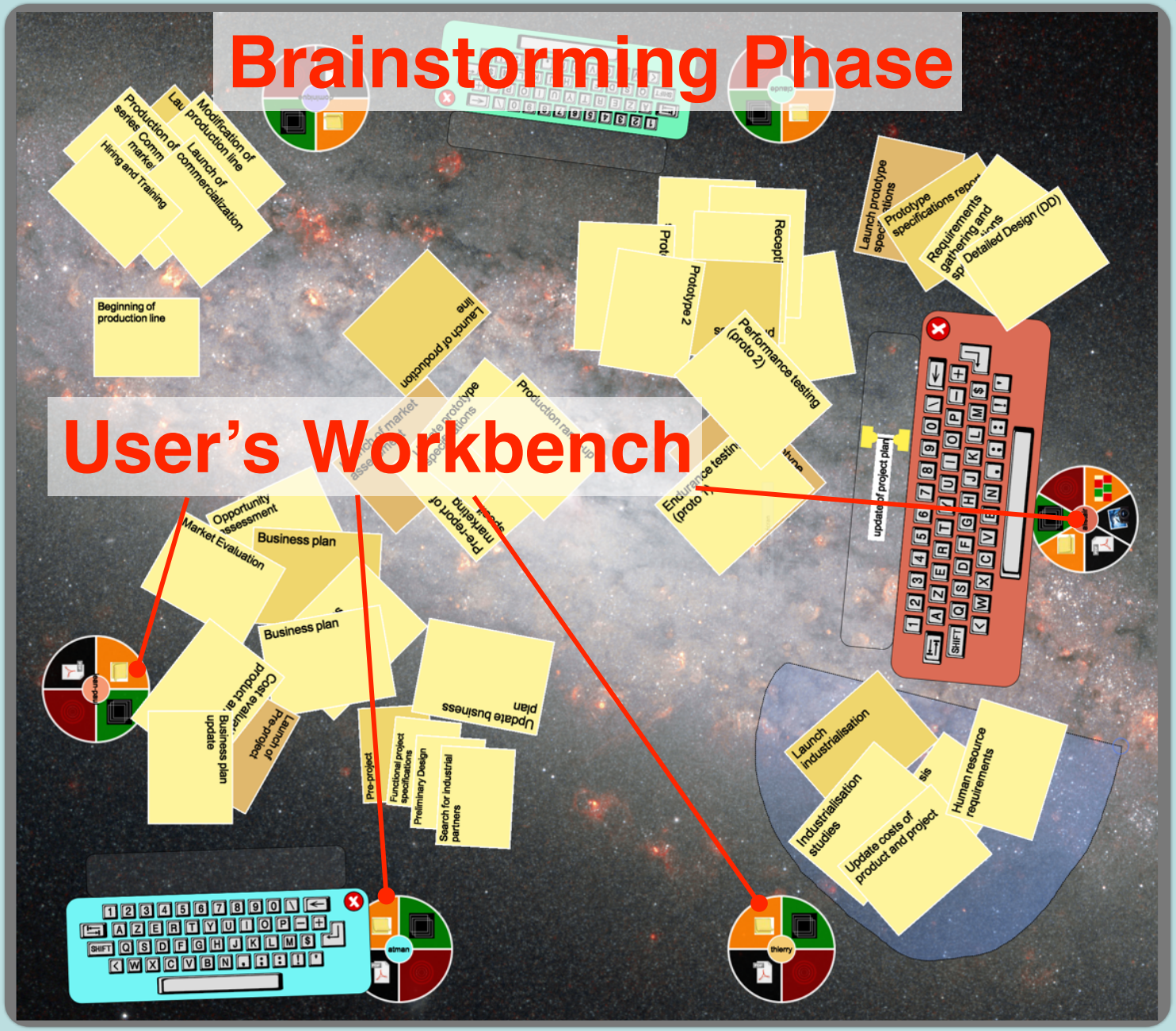
table agent

board agent

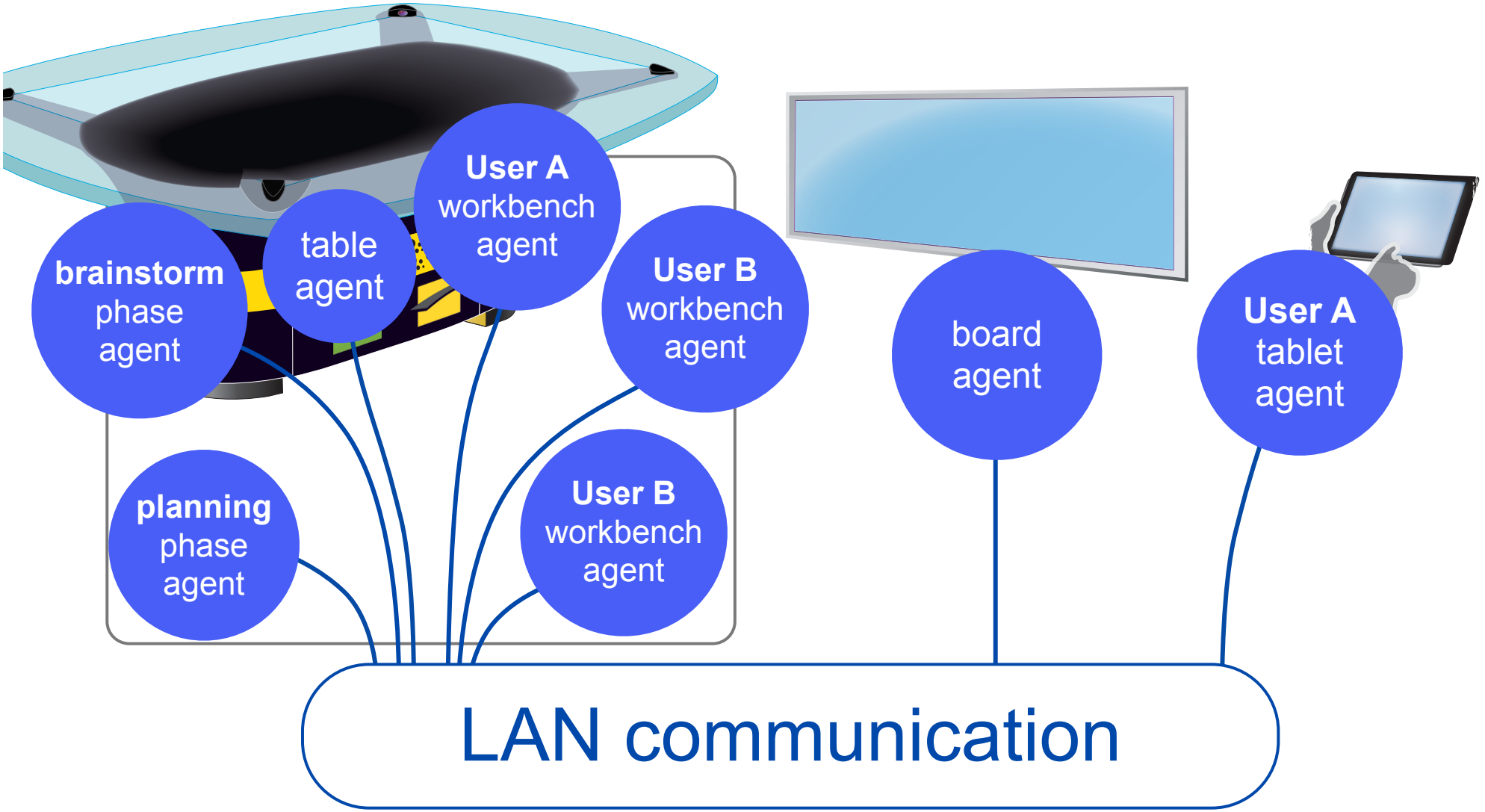
tablet agent

LAN communication

User Interface on the Tabletop



Multi-agent Middleware (JADE)



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3)
Table-centric evaluations

Experiments

Compare brainstorming sessions in a traditional setting (Post-It notes) and our interactive tabletop.

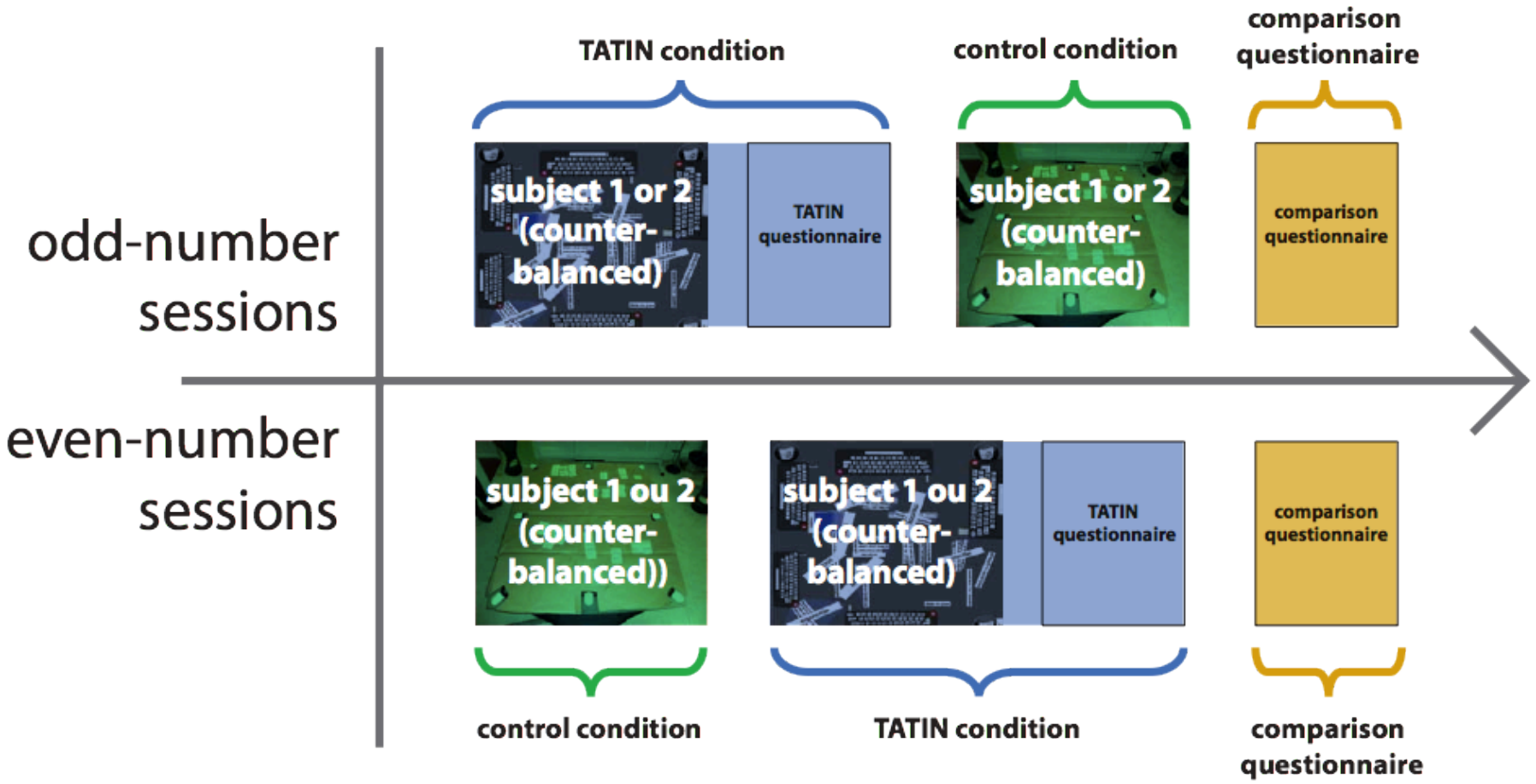
- Subjective analysis (Questionnaires)
- Objective analysis (Video analysis)

Population

8 groups of 6 subjects (48 subjects)

- 34 engineering students (20-25 years old)
- 14 non-students (25-50 years old)

Sequence of experiment



Data records

- 3 synchronous cameras
- Audio capture
- Screenshots (TATIN condition)
- Questionnaires

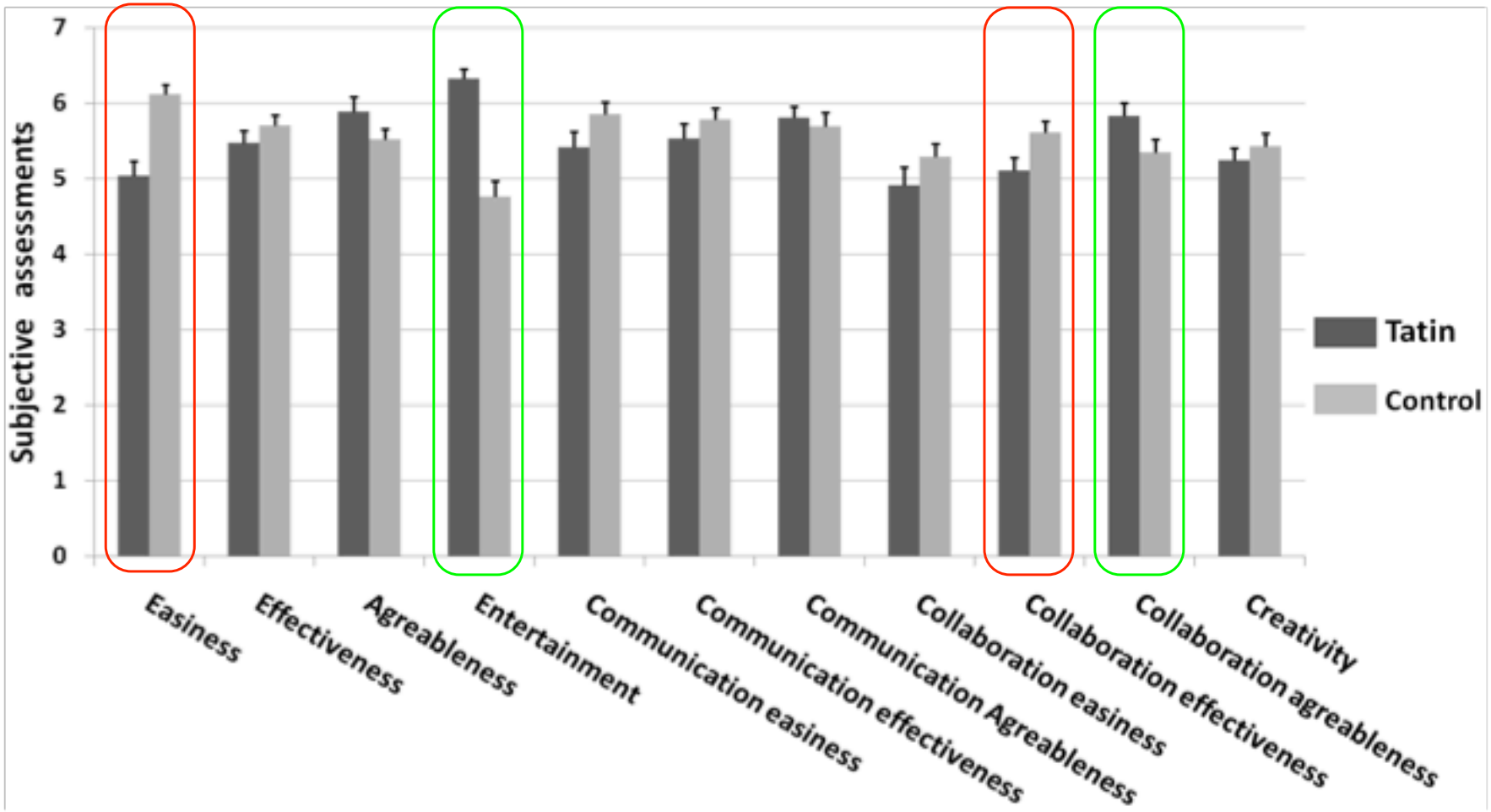
Control condition (30 minutes)

Presentation Categorization Cleaning

Condition TATIN (30 minutes)

Presentation Data Generation Cleaning

Evaluation subjective



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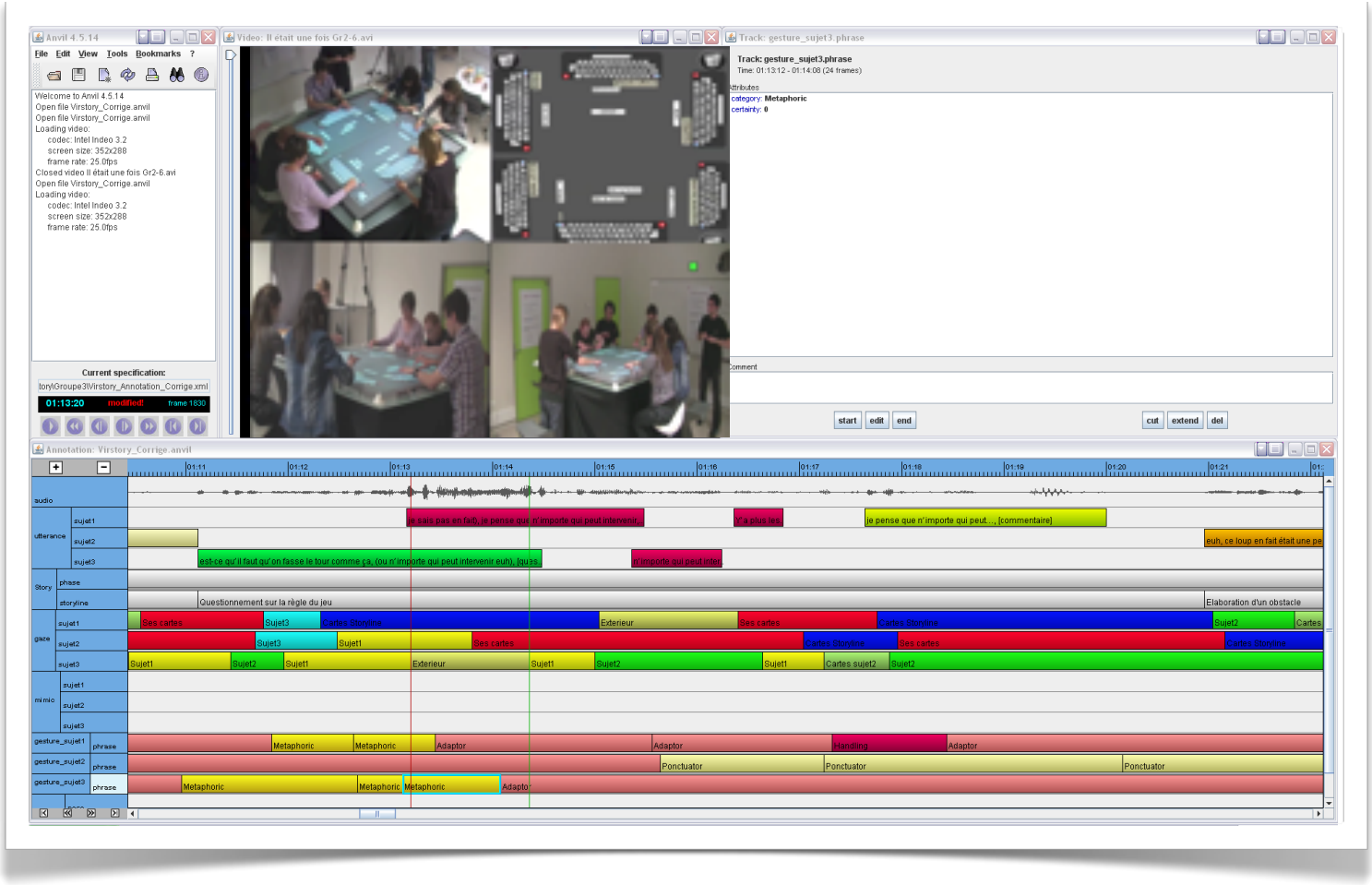
Encoding communication



ANVIL [Kipp, 2004]

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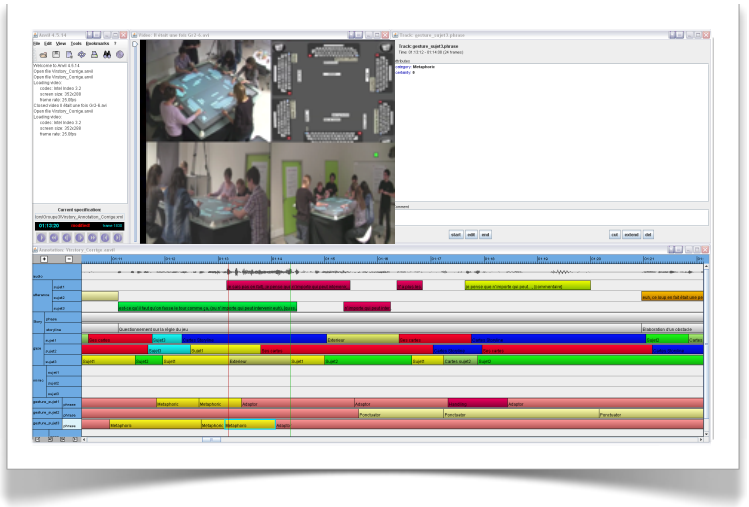
Coding Scheme

Verbal communication

- assertions (e.g. giving an idea)
- information requests (e.g. requesting clarification)
- action requests (e.g. asking a participant to pass a note)
- answers to questions
- opinions

Non-verbal communication

- deictic gestures
- handling gestures
- metaphoric gestures
- regulator gestures
- adaptor gestures



ANVIL [Kipp, 2004]

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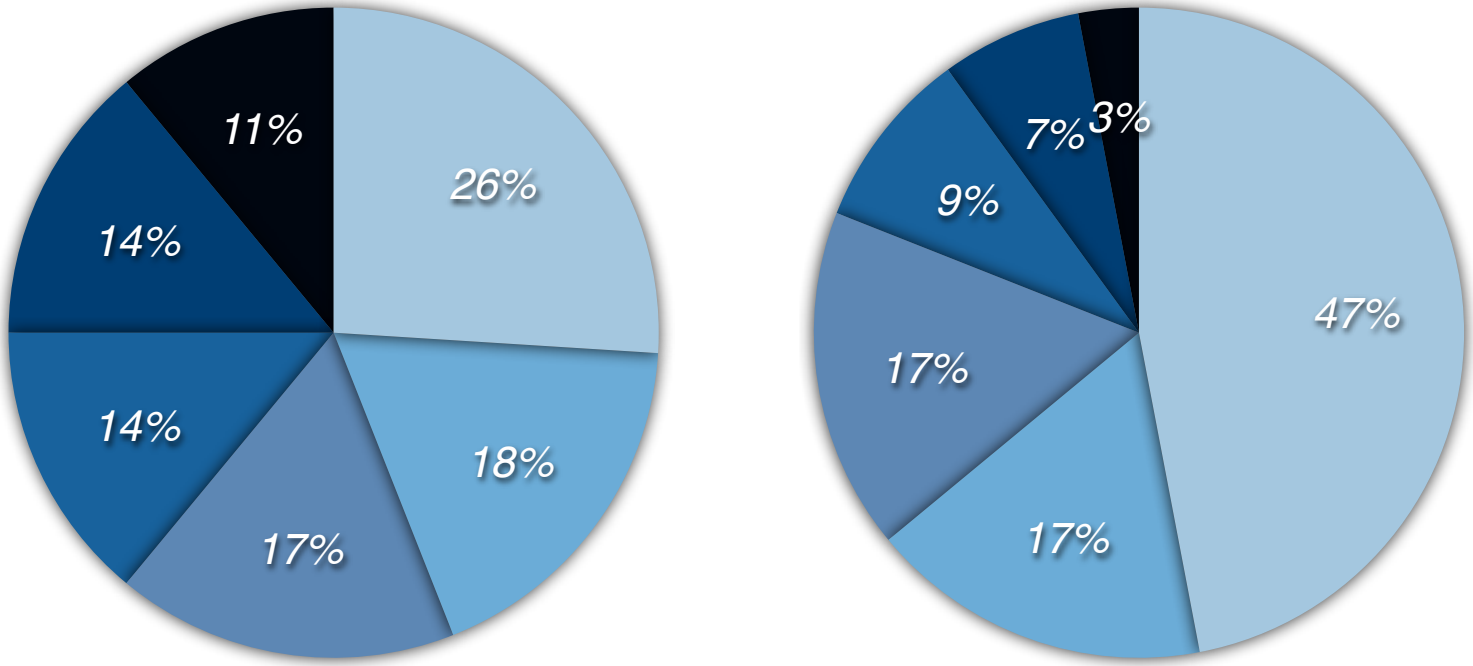
Speech breakdown by participants



- Most talkative participants
- Least talkative participants

Why are the speaking patterns more balanced?

- Greater visibility: Ideas are written clearer, easier to read from far; Multi-touch interactions are more visible, greater group awareness
- Pleasurable interface: Adding pictures, passing notes with inertia solicited positive reactions from the group.
- Novelty of system: All users must learn new interface.
- Improved learnability of brainstorming method: Actions in interface guide users through brainstorming.

Thanks for your attention

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