OIPEC

OPEN INNOVATION PLATFORM FOR

ENTERPRISE-UNIVERSITY COLLABORATION

Funded by the
Erasmus+ Programme
of the European Union

OIPEC: The partners

POLITECNICO
MILANO 1863

LUT
Lappeenranta
University of Technology

Grenoble INP

LOMONOSOV MOSCOW STATE UNIVERSITY
MSU

HEBEI UNIVERSITY OF TECHNOLOGY

ВЛАДИМИРСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ

TIANJIN UNIVERSITY (PEIYANG UNIVERSITY)

OIPEC

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OIPEC: Objectives

- To create for partner universities new type of **collaboration** with enterprises.

- The platform serves as a sustainable set of value added collaborative activities with enterprises in invention and improvement of product/services.

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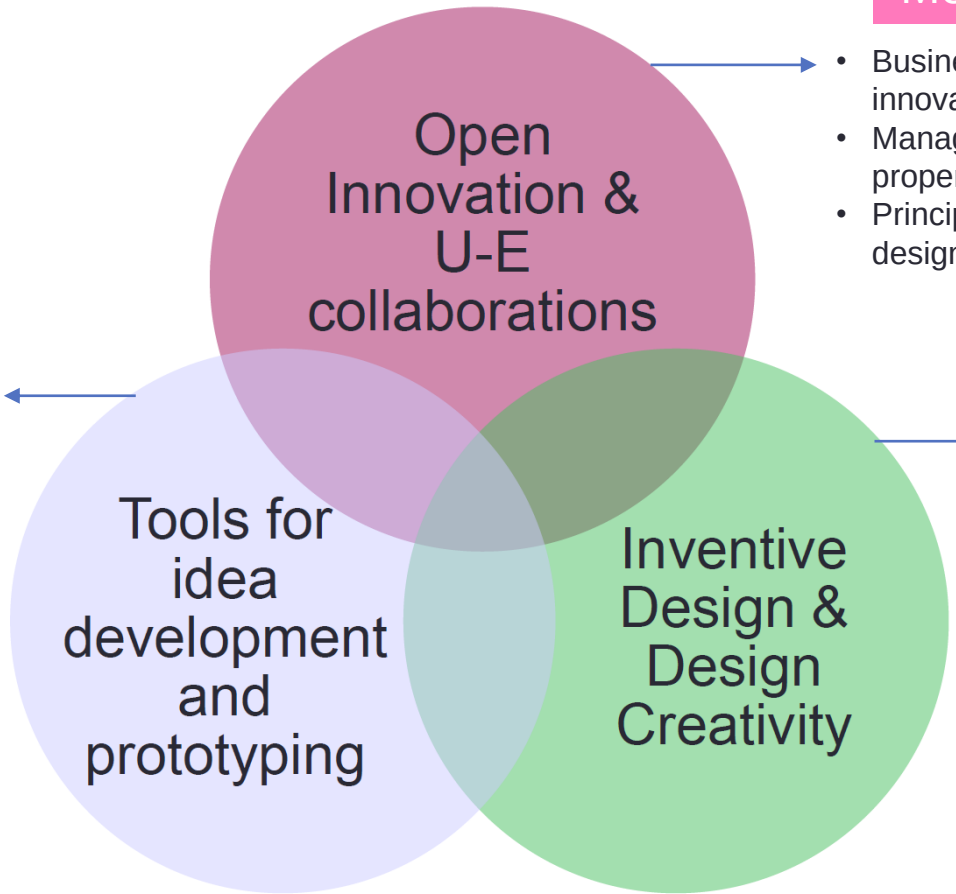
Areas covered by OIPEC curriculum



Module A

- Virtual prototyping
- Rapid prototyping
- Agile development and lean entrepreneurship

Module B

- Business plans for open innovations
- Management of intellectual properties
- Principles of collaborative design

Module C

- Creativity dimensions and assessments
- Inventive design methodologies
- Technology forecasting

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OIPEC: Output

1. **Training course and executive program to improve competences of enterprises' staff in innovation management and new product/service development:**

- Training course titled “New Product/Service Development”
- Executive program titled "Innovation Management”

2. Partner universities’ “Collaborative Open Innovation laboratories,” an integrated set of university facilities with the following functional areas:

- Area for collaborative concepts development, brainstorming, raw prototyping, and coordination meetings;
- Area for training in design and operations of rapid prototyping;
- Area for collaborative development and validation of entrepreneurial business concepts for new products/services.

3. Management procedures and services specific to multi-country collaborative activities aiming at developing and validating concepts of new products/services;

4. Dissemination of experience gained along the project among Chinese and Russian universities.

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Exemplary Open innovation project carried out within the OIPEC prototype initiatives

- Company: Rold Group
- OIPEC partners: POLIMI, MSU
- Project: Reducing human involvement in dangerous and annoying interactions with household appliances: formulation of innovation concepts and preliminary feasibility check
- Period: October-December 2017

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Exemplary Open innovation project carried out within the OIPEC prototype initiatives

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Time for active participation to OIPEC

- Are you interested in any of the OIPEC training modules?
- Are there any innovation projects you would like to develop with an «Open» approach?

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POLITECNICO MILANO 1863

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Spatial Augmented Reality as enabling technology for collaborative design

Gaetano Cascini **gaetano.cascini@polimi.it**

POLITECNICO
MILANO 1863

Raffaello’s fresco *The School of Athens*, whose cartoon (Ambrosiana Picture Gallery, Milano) originates the logo of Politecnico di Milano

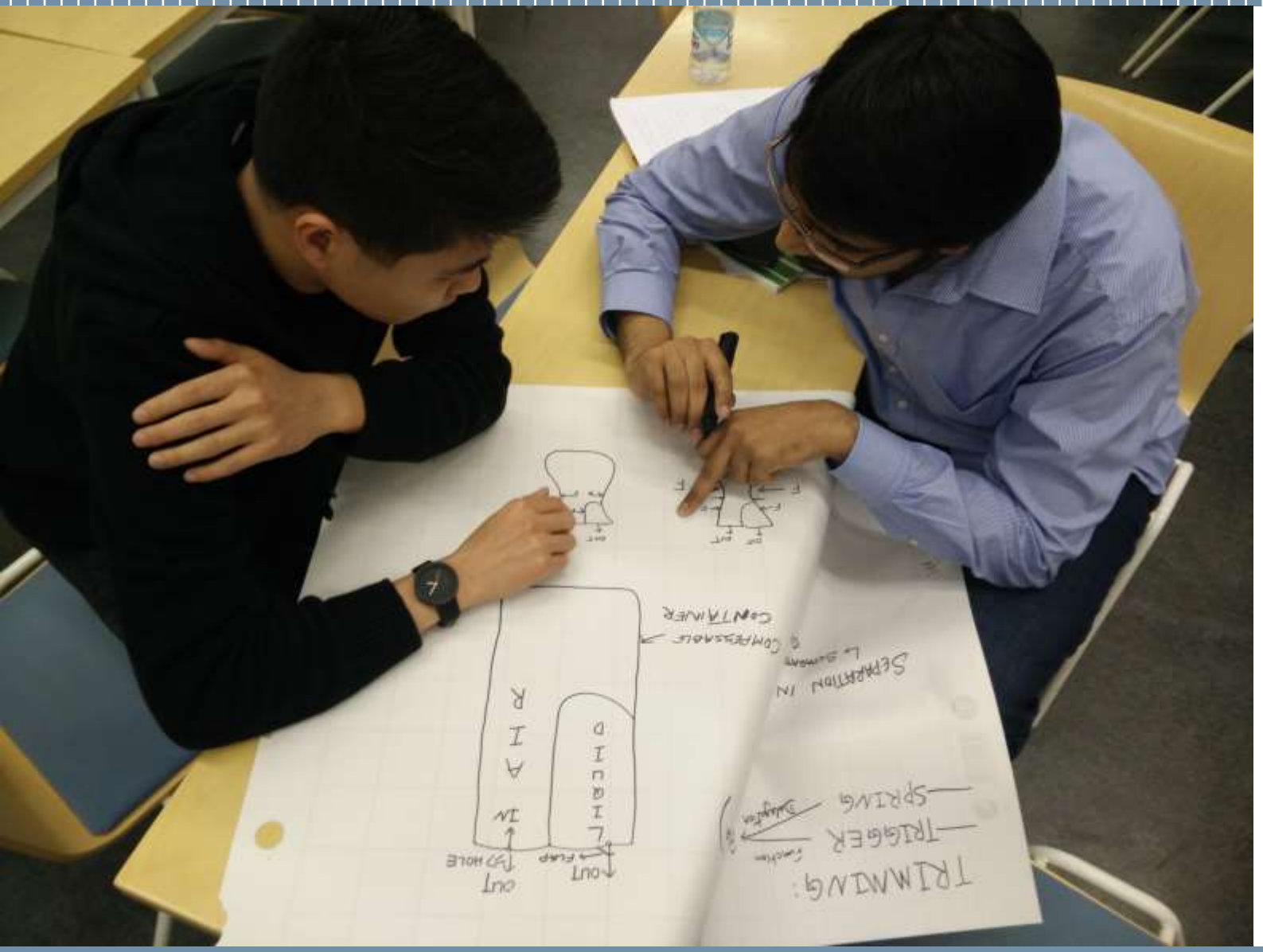
Outline

- **Intro to Co-design**
- **SPARK Project**
  SPatial Augmented Reality as a Key for co-creativity
  - Project ambition and objectives
  - SPARK Technology
- **SPARK (ongoing) Validation**
  - Co-creative session performance
  - Protocol analysis of gesture interactions
  - Protocol analysis of spoken interactions
- **Conclusions**

Intro to Co-design

- Active involvement of **clients** (customers, end-users), **designers** and other **stakeholders** in a **collaborative design** session

Intro to Co-design



- The natural **exchange of information and ideas** among participants is essential for the successful exploitation of design collaboration

Intro to Co-design

- Different **background**, **motivation** and **expertise** affect the interaction among participants and can limit the co-design performance

SPARK PROJECT

Spatial Augmented Reality as a Key for Co-Creativity

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.688417.
H2020_ICT2015_SPARK_688417

SOME DATA ABOUT SPARK

Spatial Augmented Reality as a Key for co-creativity

- H2020 – ICT – 2015 – CREATIVITY
- RESEARCH AND INNOVATION ACTION
- GRANT AGREEMENT NO. 688417
- START DATE: 01-01-2016
- DURATION: 36 MONTHS
- 7 PARTNERS FROM 5 EU COUNTRIES
- TOTAL BUDGET: € 3,180,242
- ESTIMATED EFFORT: 374 PMs

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VISEO #viseospirit

stimulo INNOVATION THROUGH DESIGN

Grenoble INP

antwerp management school
The autonomous management school of the University of Antwerp

UNIVERSITY OF BATH

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The Ambition of SPARK

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The Ambition of SPARK

PEOPLE WORKING TOGETHER AROUND THE PRODUCT

SIMPLE INTERACTION CHANGING THE GRAPHICAL LAYOUT

- To realize a responsive ICT platform that exploits the potential of Spatial Augmented Reality for supporting and fostering **collaborative creative thinking** in the design process
- Spatial Augmented Reality enhances the innovation capabilities of creative industries through the **facilitation of brainstorming** and the **early assessment of design solutions** in a Co-Design environment

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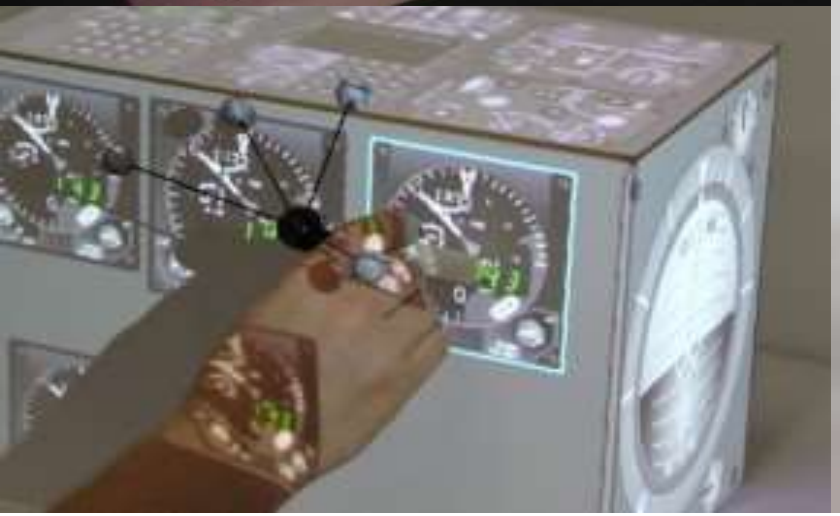
The SAR technology



From a technology just supporting the design review…

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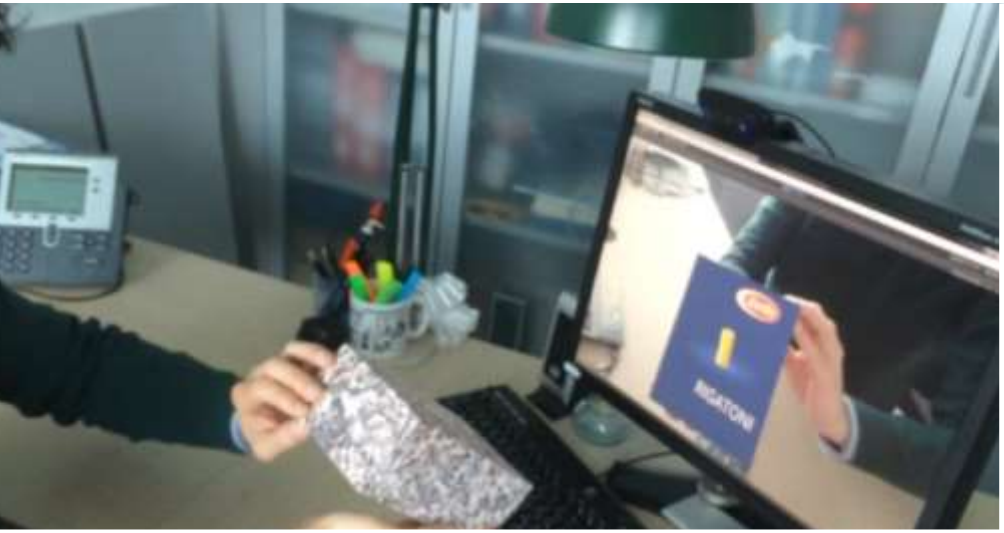
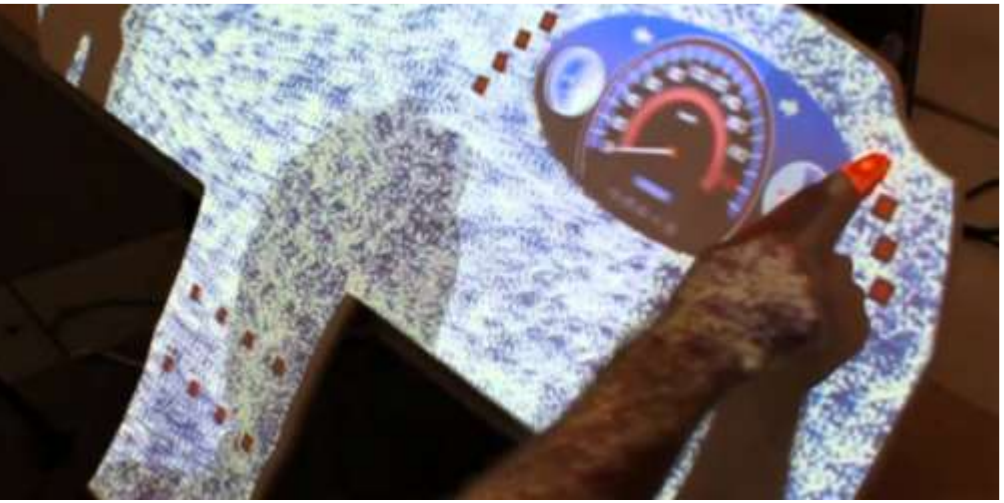
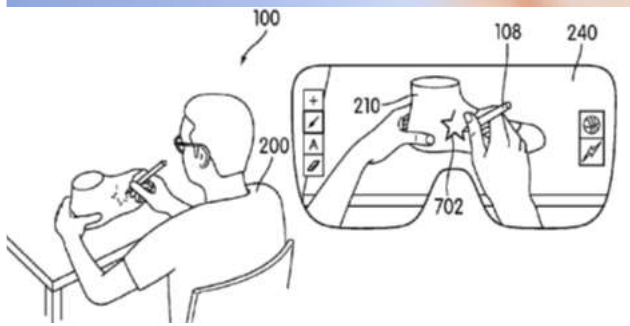
The Ambition of SPARK (continued)





…to a technology supporting the design process since the ideation phase



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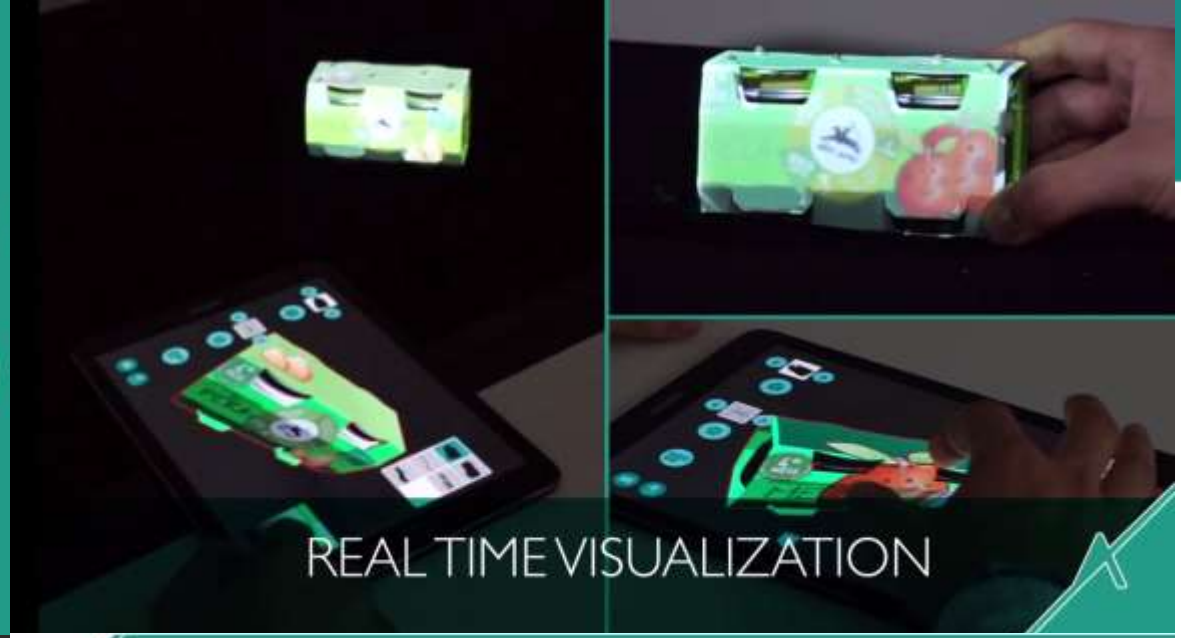

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THE AIM OF SPARK:

a SAR-platform to support *packaging/communication design*

The above pictures just depict the kind of products that should be more easily designed in collaborating sessions using the SPARK platform.

THE AIM OF SPARK:

a SAR-platform to support *product design*

The above pictures just depict the kind of products that should be more easily designed in collaborating sessions using the SPARK platform.

THE AIM OF SPARK:

a SAR-platform to support *shelf tests*

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SPARK (ongoing) Validation

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INNOVATION THROUGH DESIGN

- Co-creative session performance
- Protocol analysis of gesture interactions
- Protocol analysis of spoken interactions

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SPARK (ongoing) Validation

- Condition 1: with standard design representations
- Condition 2: with state of the art ICT technology
- Condition 3: with SAR technology (the SPARK technology)

Condition 1

Condition 2

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SPARK (ongoing) Validation

- Condition 1: with standard design representations
- Condition 2: with state of the art ICT technology
- Condition 3: with SAR technology (the SPARK technology)

	Artefice	**Stimulo**
Condition 1 – CG1 (Standard)	Team A1 / Project A	Team S / Project S1
Condition 2 – CG 2 (AR)	Team A2 / Project A	Team S / Project S2
Condition 3 – TG (SAR)	Team A3 / Project A	Team S / Project S3

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SPARK (ongoing) Validation: Co-creative session performance

- **Co-creative performance metrics**
  - Quantity of ideas
  - Variety of ideas
  - Quality of ideas
  - Novelty of ideas
  - Task Progress
  - Filtering Effectiveness
- **Usability**
  - Creativity Support Index (CSI), variant of NASA Task Load Index (NASA-TLX)
- **Follow-up survey**

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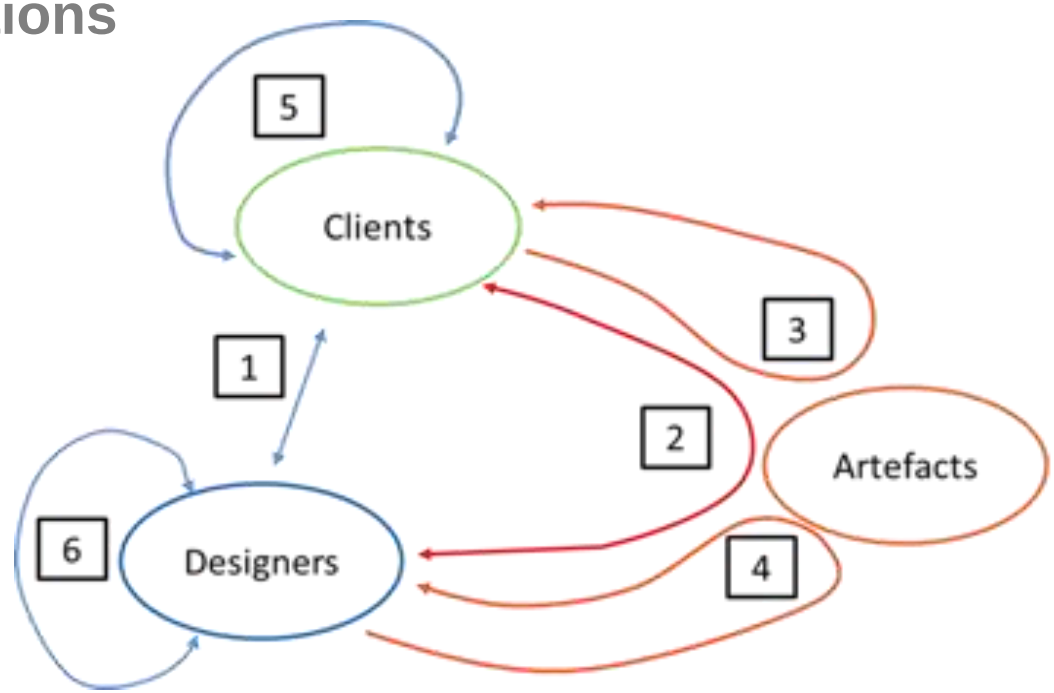
SPARK (ongoing) Validation: Protocol analysis of gesture interactions

- **Gesture classification:**
  - Tangible
  - Digital
  - Mixed
  - Ephemeral
- **Interactions**



1a	*Client to designer without artefact*
1b	*Designer to client without artefact*
2ad	Client to designer with digital artefact
2at	Client to designer with tangible artefact
2av	client to designer with virtual artefact
2bd	Designer to Client with digital artefact
2bt	Designer to Client with tangible artefact
2bv	Designer to Client with virtual artefact
3d	Client (to client or with himself) with digital artefact
3t	Client (to client or with himself) with tangible artefact
3v	Client to client with virtual artefact
4d	Designer (to designer or with himself) with digital artefact
4t	Designer (to designer or with himself) with tangible artefact
4v	Designer (to designer or with himself) with virtual artefact
5	*Client to client without artefact*
6	*Designer to designer without artefact*
7	Other

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SPARK (ongoing) Validation: Protocol analysis of spoken interactions

- **Actor:**
  - Designer
  - Client
- **Intention:**
  - Analysis
  - Synthesis
  - Choice
- **Design object:**
  - Text, Image, Photograph, Logo, Icon, Background motif, System parts, Whole
- **Design parameter:**
  - Position, Orientation, Size, Number, Presence, Colour, Reflectivity, Material, Content, Shape, Sharpness

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SPARK (ongoing) Validation:

Partial results published on http://spark-project.net/wp-deliverables (5 March 2018)

- **Co-creative session performance**
  - **SAR** and **AR** performed best or joint best against the **idea generation**, **task progress** and **filtering effectiveness** metrics, with particular improvements in terms of the **novelty** and **quality** of idea
  - Designers perceive SPARK **more freedom to try out many different ideas**, and **quickly filter out poor ideas**, but highlight **limited sense of immersion** in the tool
- **Protocol analysis of gesture interactions**
  - Percentage of **end-users' interactions is lower** in the SAR conditions
- **Protocol analysis of spoken interactions**
  - AR and SAR provide counterintuitive effects on communication: spoken interactions and shifts among categories of participants (End-users and Designers) occur less frequently (**reduced need of sharing thoughts in order to align the viewpoints** among co-creative sessions' participants)

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Thanks for your time!!

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