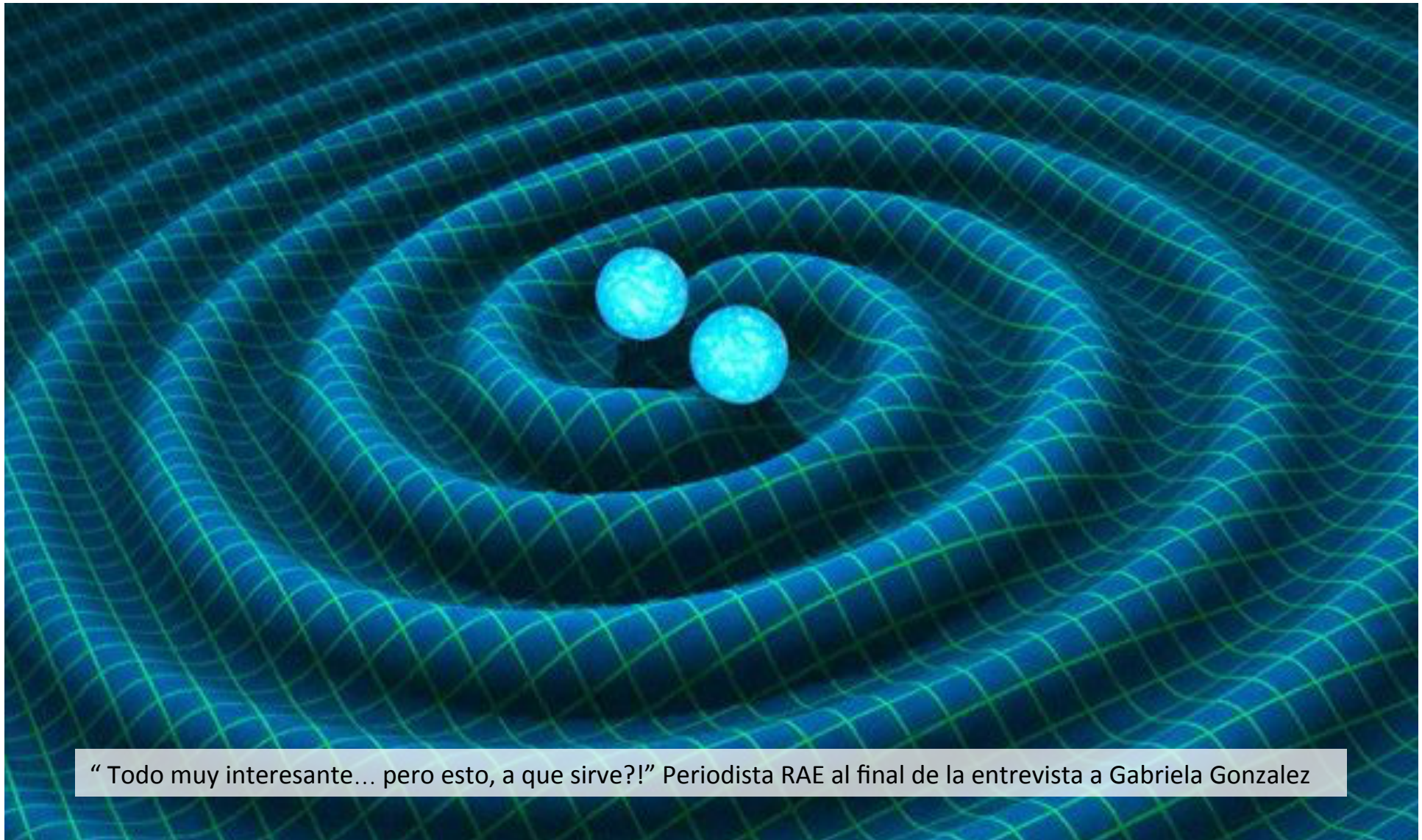


El diseño como instrumento de investigación aplicada

Maximiliano Romero,
Design Department, Politecnico di Milano
HCI team, Fraunhofer Portugal
Bologna – 03/12/16



“ Todo muy interesante... pero esto, a que sirve?!” Periodista RAE al final de la entrevista a Gabriela Gonzalez

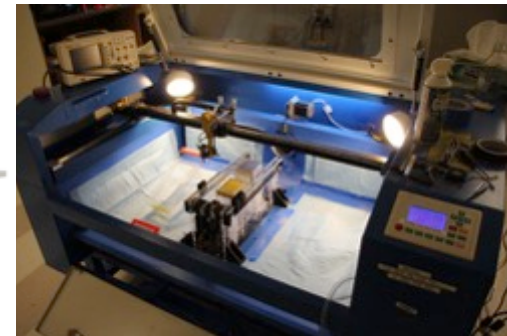
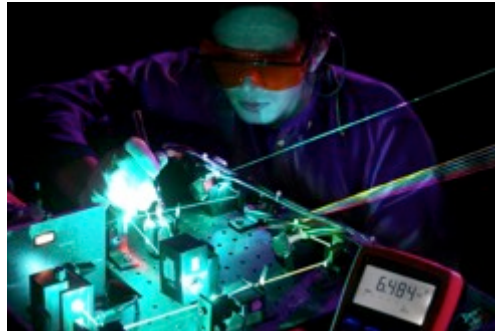
Investigacion Aplicada

Laser theory (A. Einstein, 1917)

Primer laser funzionante (T. H. Maiman, 1960)

Patente del Selective Laser Sintering (C. Deckard, J. Beaman, 1986)

Proyecto OpenSLS 3D printer (Andreas, Ian Kinstlinger, 2016)



Basic Research:

Basic (aka fundamental or pure) research is driven by a scientist's curiosity or interest in a scientific question. The main motivation is to **expand man's knowledge**, not to create or invent something. There is no obvious commercial value to the discoveries that result from basic research.

Applied Research:

Applied research is designed to **solve practical problems** of the modern world, rather than to acquire knowledge for knowledge's sake. One might say that the goal of the applied scientist is to **improve the human condition**.

Aceptación Tecnológica

Ergonomía y Human Factors

“...is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design **in order to optimize human well-being and overall system performance.**”



Source: International Ergonomics Association. What is Ergonomics. Website. Retrieved December 2016.

User Centred Design

G:\OFM\NC10\NC.EXE

G:\OFM\NC10				C:\ARC			
Name	Size	Date	Time	Name	Size	Date	Time
..	UP--DIR	9/16/07	8:22a	..	UP--DIR	9/16/07	8:23a
file-id	diz 129	1/02/99	9:29p	funzip	exe 57344	2/28/05	6:51p
nc	exe 65840	1/21/94	10:57p	funzip	txt 4286	2/28/05	6:45p
nc	ext 158	1/21/94	1:24a	history	txt 851	3/08/05	5:28p
nc	ini 184	3/25/94	6:18p	license	3143	2/10/05	11:15a
nc100	zip 39727	9/16/07	8:22a	license	txt 3088	2/10/05	11:15a
				readme	15091	2/28/05	6:10p
				readme	nt 2292	2/27/05	11:12a
				readme	txt 7442	3/08/05	5:51p
				sfx16	dat 51222	3/09/05	6:55p
				sfx32	dat 114710	3/09/05	6:57p
				sfxwiz32	exe 53248	2/28/05	6:52p

unshrinking: NC.INI

G:\Downloads\OFM\NC10>NC.EXE

G:\OFM\NC10>NC.EXE

The Norton Commander, Copyright (C) 1986 by Peter Norton

G:\OFM\NC10>

1Help 2Menu 3View 4Edit 5Copy 6RenMov 7Mkdir 8Delete 9Setup 10Quit

User Centred Design

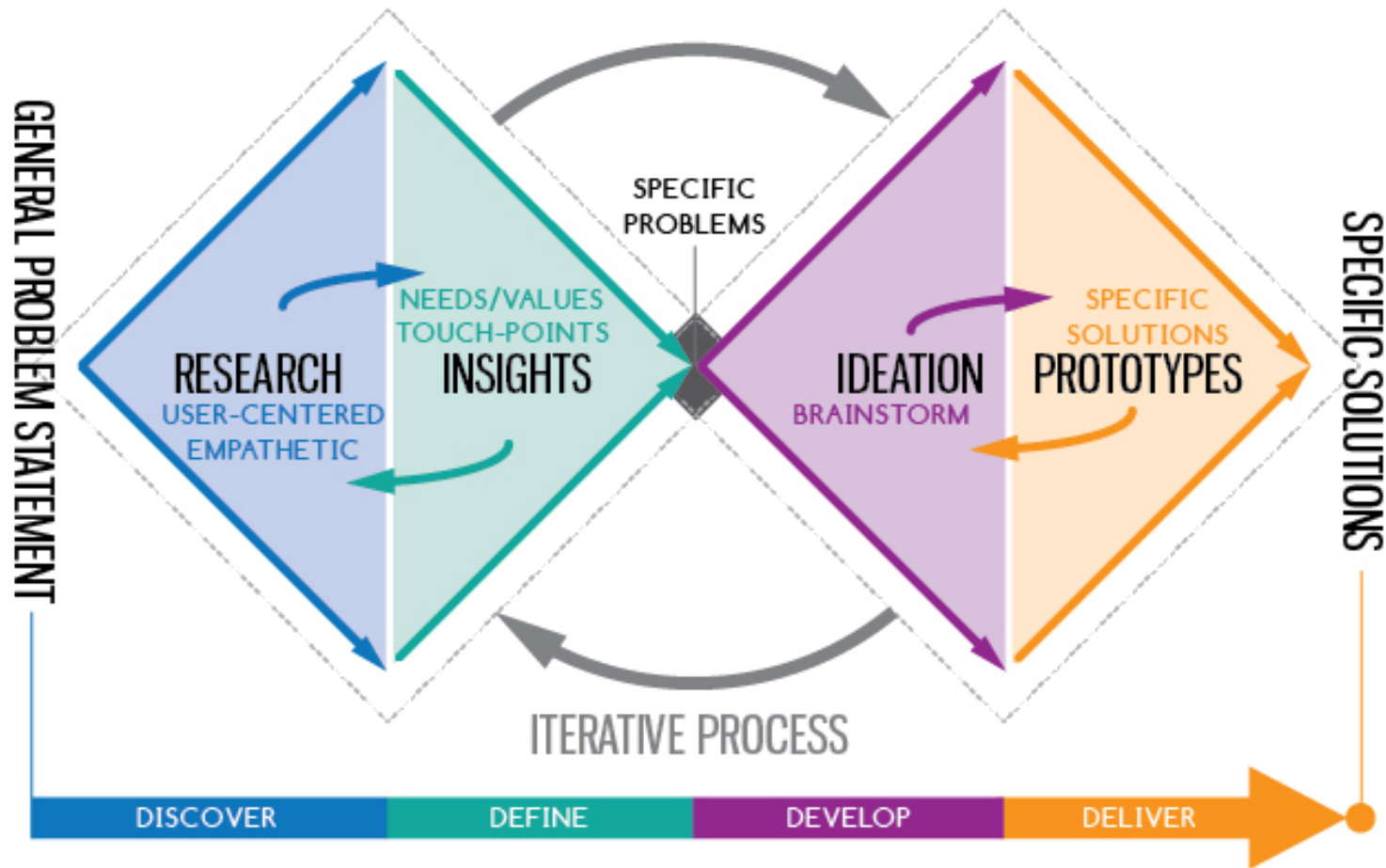
Donald Norman (Electronics Eng., Cognitive Psychologist)
Human Computer Interaction (1986).

Mental models and error theory for software development.

1. User Involvement
2. Multidisciplinarity
3. Iteration

from Design for users to Design with users

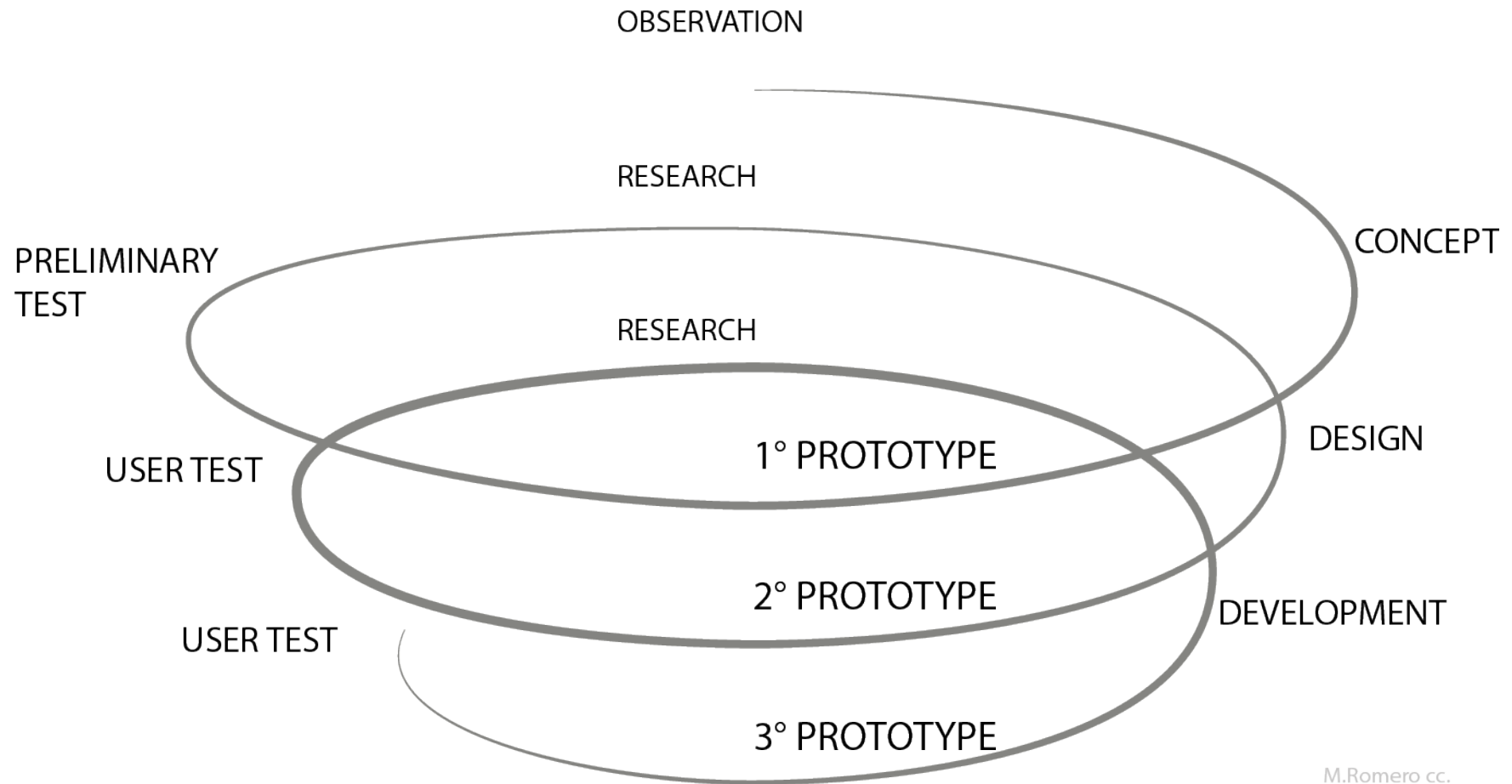
Double Diamond DESIGN PROCESS



Service Design Double Diamond Process by Kaishin Chu is licensed under a Creative Commons Attribution-Non Commercial-No Derivatives 4.0 International License. Based on a work at <http://kaishinchu.com>. Permissions beyond the scope of this license may be available at <http://creativecommons.org>

Service Design Vancouver
building innovation + value for businesses and people

Design Process

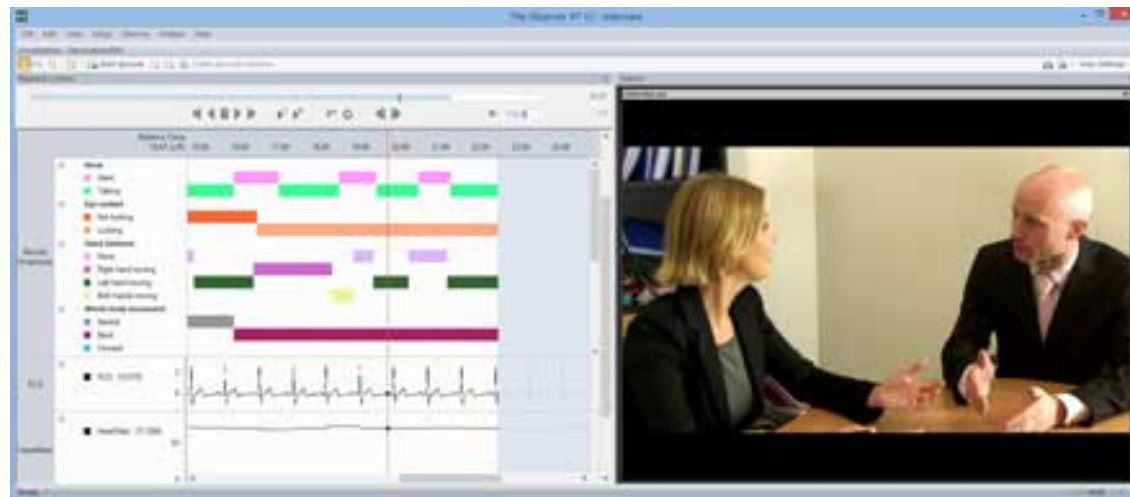
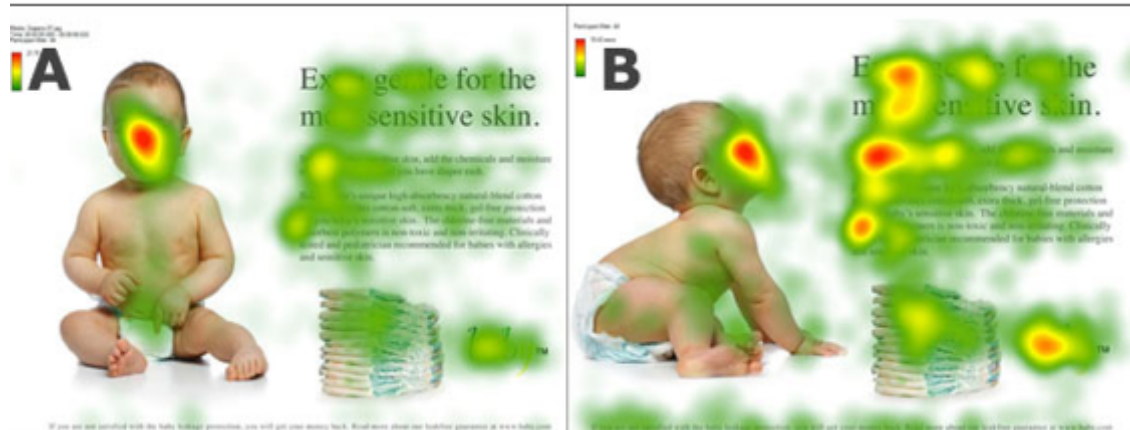


M.Romero cc.

Source: M.Romero

User research

Qualitative/quantitative data



Eye tracking and Video tagging

Financiamiento europeo

Active and Assisted Living programme

The image shows a collage of documents related to the AAL2BUSINESS project. On the left is a screenshot of the website 'AAL2BUSINESS' with a navigation menu (Home, About, Projects, Get Involved, News & Events, Contacts, Documents) and a header 'AAL PROGRAMME ACTIVE AND ASSISTED LIVING PROGRAMME ICT for ageing well.'. Below the website is a document titled 'HELPING YOUR PROJECT GOING TO MARKET' featuring a 'NOW WHAT !?' sign and the text 'The AAL2BUSINESS is an...'. On the right is a report page with the following content:

3.1.5 Little iteration during the project

Perhaps due to the relatively short timeframe and the fixed partner setup of an AAL there seems to be surprisingly little iteration and agility in the projects analysed in the support action. Most projects execute only one "specification-implementation-validation cycle" implementing and validating the product or service concept. Identified reasons in:

1. As the project partners are fixed, even if the validation network would require different partners (see chapter 3.1.2.).
2. Prevailing...

3.2 Common bottlenecks and challenges in service models

This subchapter summarizes issues that were commonly identified by AAL JP projects as challenges into getting the AAL service concept ready for the market. The focus is on the results of the project, i.e. what are the issues projects need to solve for defining a sustainable business model.

3.2.1 Usability of ICT components

In recent years, there has been enormous advancement in user interface technologies. Usability guidelines for older users are available and they are used in many AAL projects. Also, high user involvement emphasized in most projects helps in creating solutions with high usability. However, some common problems with usability were still identified in the projects:

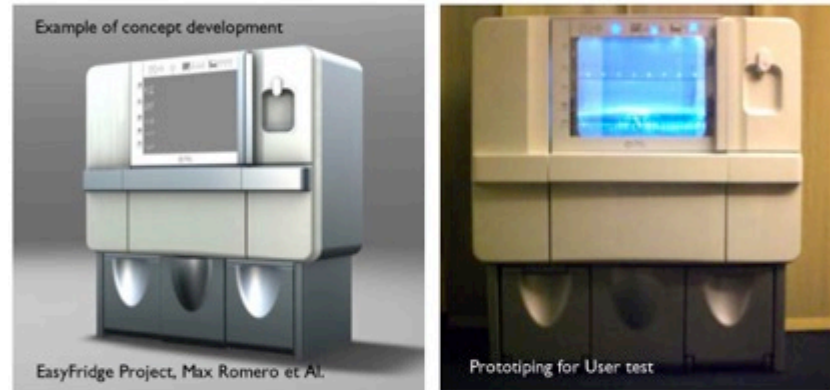
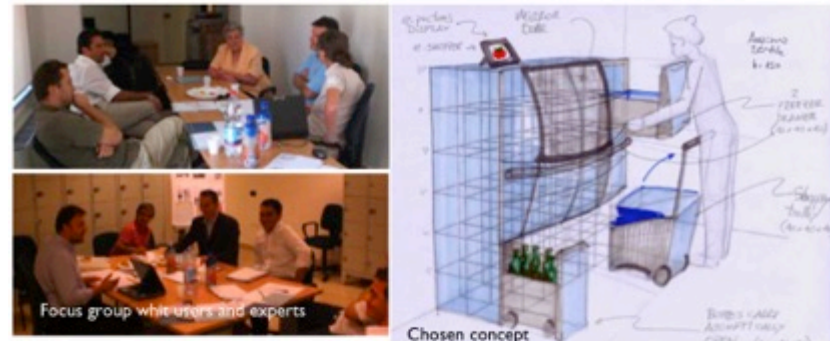
- User authentication. Username and password –based authentication was seen problematic in some cases.
- Error situations caused by arbitrary technical failures, such as problems with internet connections or unplugged power cables.

...ion cycle indicates that the va
...lt to involve them in the proj
...are rather heavy. They requi
...ving various user groups and
...ing users, installing devices,
...providing adequate data
...ly to test and fix technical
...done during the project.
...device or concept
...e room for the
...ology does not mature
...g. to prevent

Source: <http://www.aal-europe.eu/support-to-projects/aal2business/> - Final report

Ejemplo aplicado

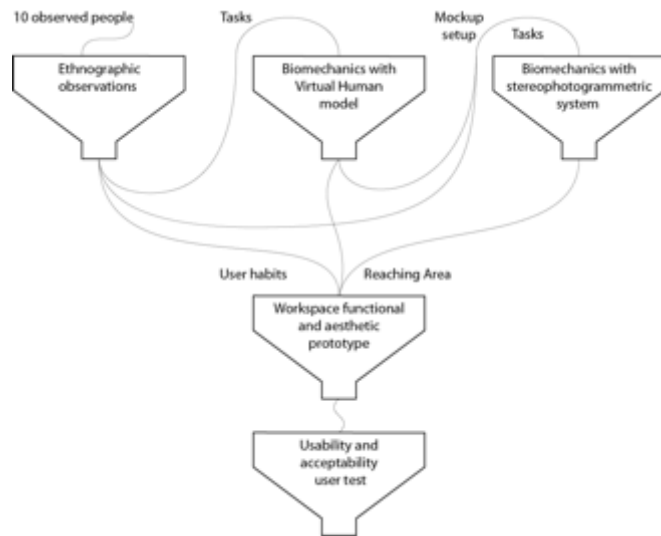
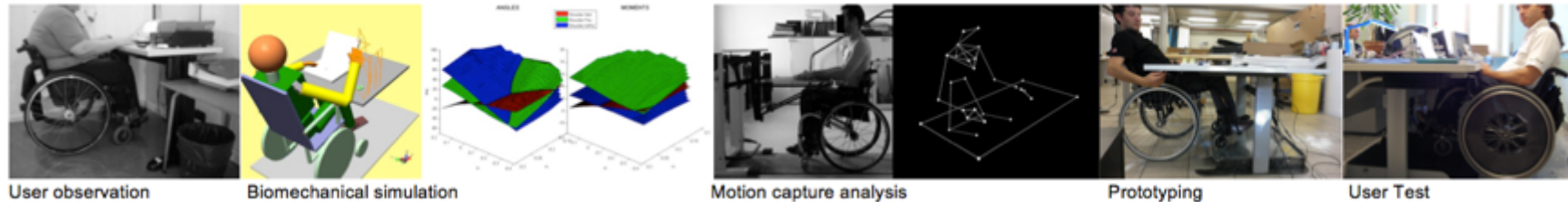
EasyFridge



Source: G. Andreoni, L. Anselmi, F. Costa, M. Mazzola, E. Preatoni, **M. Romero**, B. Simionato, **Human behaviour analysis and modelling: a mixed method approach**, in AHFE 3rd International Applied Human Factors and Ergonomics Conference, 17-20 July 2010, Miami, USA, Pag. 90 - 97, USA, 2010

Ejemplo aplicado

Workable



Source: G. Andreoni, F. Costa, M. Dall'Amico, C. Frigo, E. Gruppioni, S. Muschiato, E. Pavan, M. Piccoli, **M. Romero**, B. G. Saldutto, C. E. Standoli, G. Verni and G. Vignati, **Participatory workplace development for disabled workers reintegration**, in Ergonomics and New Services in Healthcare in 5th International Conference on Applied Human Factors and Ergonomics (AHFE 2014) 19-23 July 2014, Krakow, Poland, 2014

Ejemplo aplicado

Human Robot Interaction



Fig. 1. A first version of Teo, smaller, with cap and velcro-attached eyes, and the final one, with hat and magnetic pad.

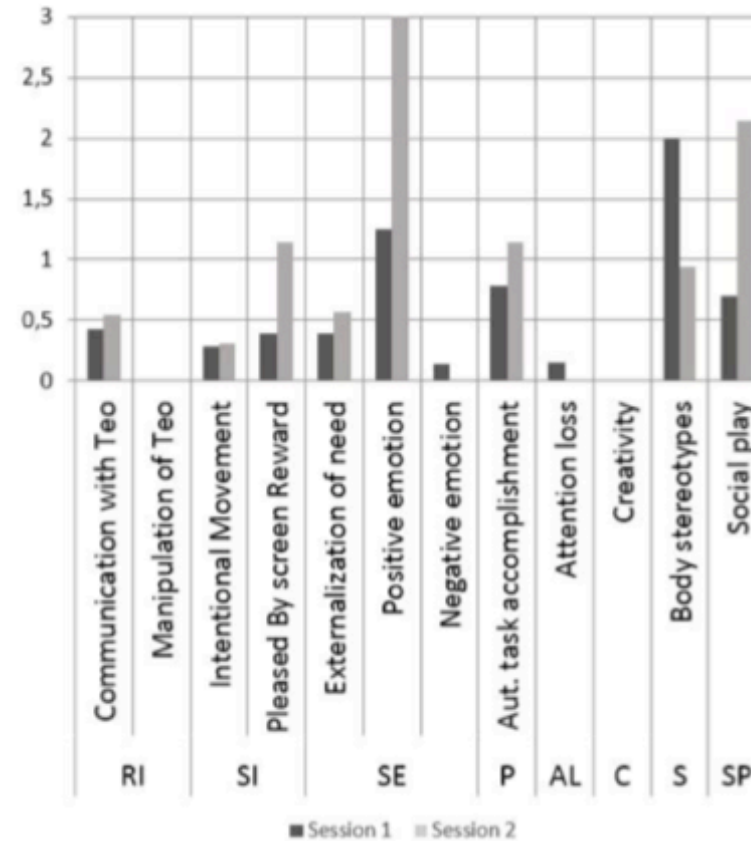
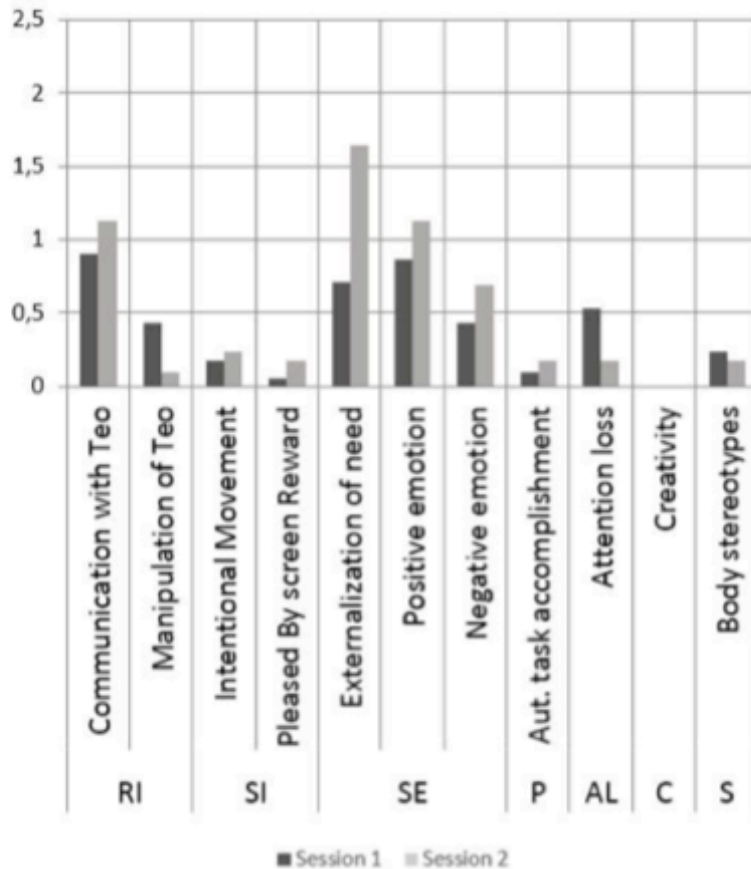


Fig. 2. Children's performance in Color game with Teo; in abscissas the sessions, in ordinates the number of correct answers to 10 questions.

Source: A. Bonarini, A. Celebi, F. Clasadonte, M. Gelsomini, F. Garzotto, **M. Romero, *A huggable, mobile robot for developmental disorder interventions in a multi-modal interaction space.*** IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN), August 26 - 31, 2016, New York City, USA, 2016.

Ejemplo aplicado

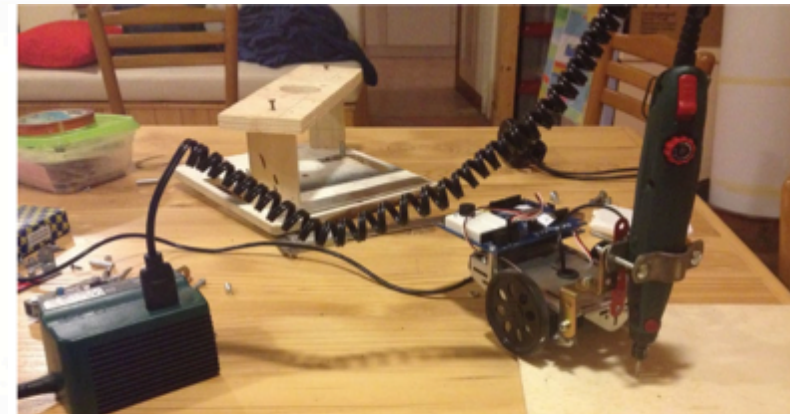
Human Robot Interaction



Source: A. Bonarini, A. Celebi, F. Clasadonte, M. Gelsomini, F. Garzotto, **M. Romero, *A huggable, mobile robot for developmental disorder interventions in a multi-modal interaction space.*** IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN), August 26 - 31, 2016, New York City, USA, 2016.

Ejemplo aplicado

Goliath



Source: Tesis de laurea magistrale en Design & Engineering Master of Science, Politecnico di Milano, 2014
Goliath: Robot autonomous for two-dimensional cuts, Author: Lorenzo Frangi, Supervisor: M. Romero

Ejemplo aplicado

Fraunhofer AICOS

REMPARK



- **European Project:** 11 partners from 8 countries;
- Developed a **Personal Health System for Parkinson's Disease patients;**
- In real time: **identifies ON/OFF/Dyskinesia states**, detects Freezing of Gait and registers falls;
- **Includes a smartphone** to collect information and communicate with the clinical team.



