

Developing interactive systems considering User-Centred Design

Personas, Motivations and Scenarios

Samuel Silva

Researcher on Human-Centred Technologies

sss@ua.pt

deti departamento de
electrónica, telecomunicações
e informática

 universidade
de aveiro

AMS
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 ieeta instituto de engenharia electrónica e telemática de aveiro



Instituto de Engenharia Eletrónica e Informática de Aveiro

Unidade de investigação com forte propensão para abordar problemas que necessitem de contribuições multidisciplinares

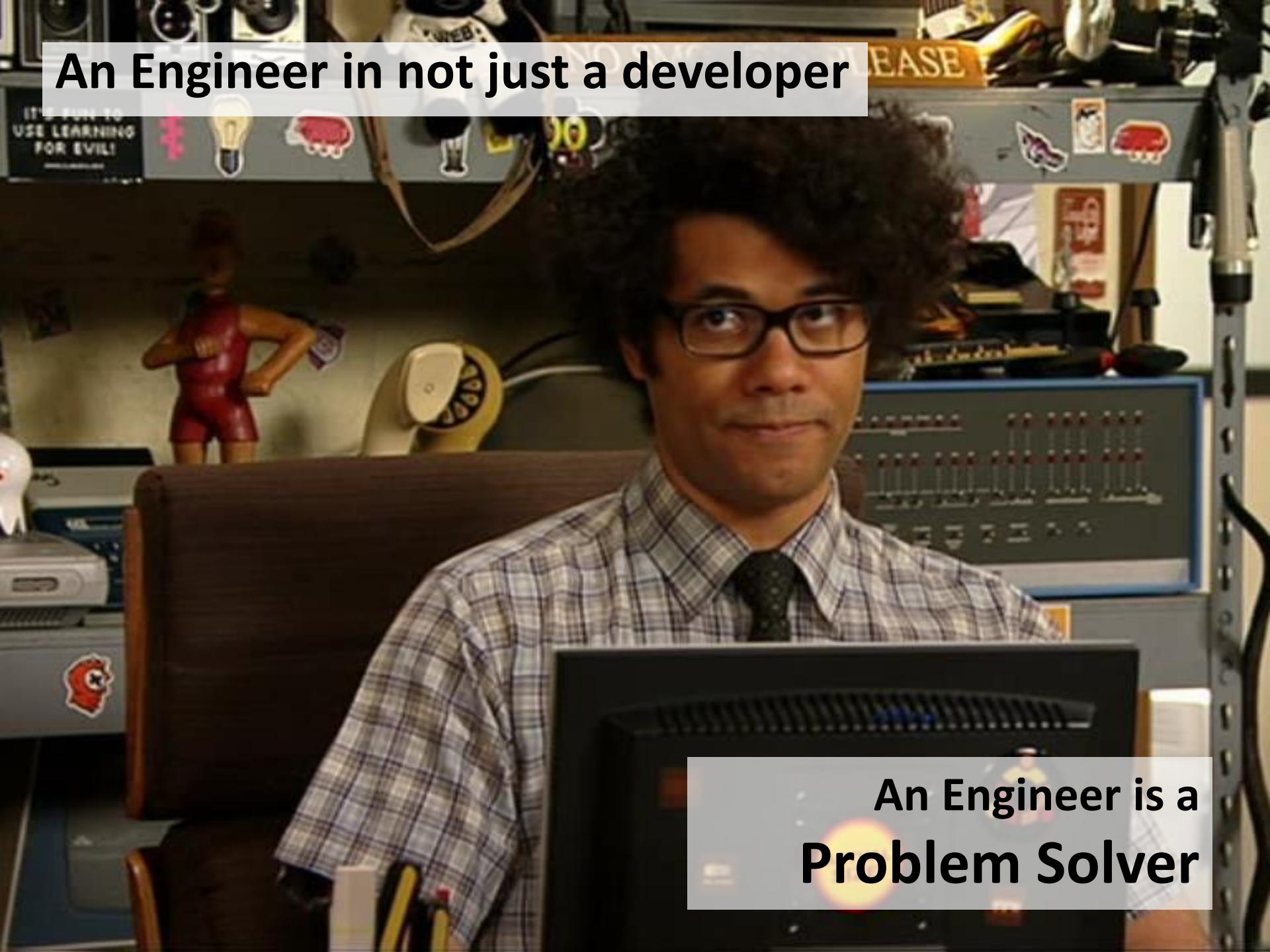
Eletrónica – Informática – Mecânica – Saúde – Matemática – Biologia – Gestão ...



**Technology can play an important role
in our daily lives**

**If we manage to harness its power
to serve our needs and
motivations**

An Engineer is not just a developer



An Engineer is a
Problem Solver

Understand a problem well

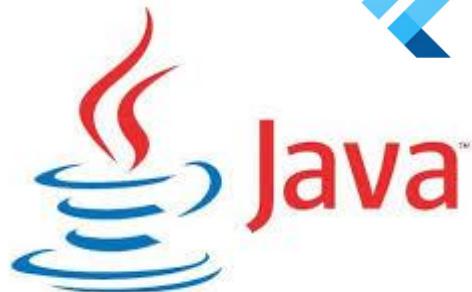
- Discuss with domain experts (not engineers!)



Document decisions and requirements

- Why did I choose to make it this way?

Propose solutions that are
understandable



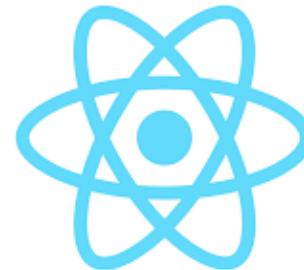
Not like this!



vmware / APACHE
PROJECT



kubernetes



Be able to **discuss how it impacts users**
(not what is used to make it happen)



Human-Centred Technologies... hein?

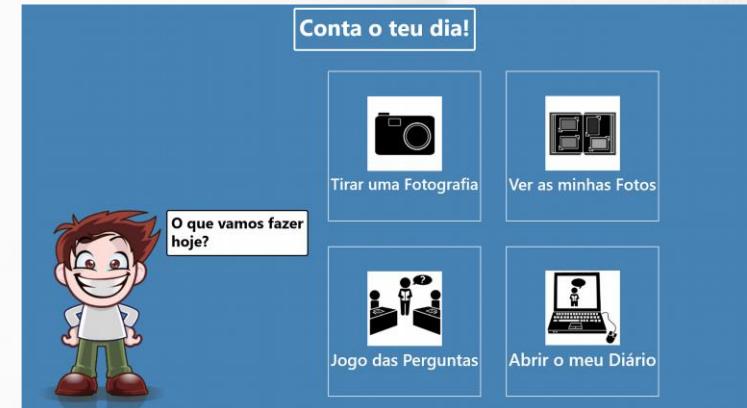


**Designing and developing
for different audiences
is challenging**

**We must understand
users and their needs**



“Tell Your Day”



Application “Medication Assistant”



Beyond just a medication reminder

Application “Geriatric Helper”





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Stop Anxiety



Human-Centered Effort to Support
Anxiety Management in the Academic Context



Multi-camera view

Individual wireless ECG collection



Stanford Behavioural Analysis Toolkit 3.15r1

Experiment Identification

Experiment: Experiência LEGOS
Location: Dep. Educação e Psicologia
Researcher: Profa. Dra. Isabel Dimas
Session: 37

licensed to
Departamento de Educação e
Psicologia
Universidade de Aveiro

Active Sensing

Video 1 Audio
 Video 2 EDA
 Video 3 ECG
 GPS EEG

Read only mode

Participant Identification and Progress

Participant: PARTICIPANTE 1
Progress: Equipamento Questionário Tarefa 1 Avaliar Equipa **Analisar Aval** Tarefa 2 Questionário Final

Custom Assessment Module: REPORT INDIMMAL E DO GRUPO

Participant: PARTICIPANTE 1

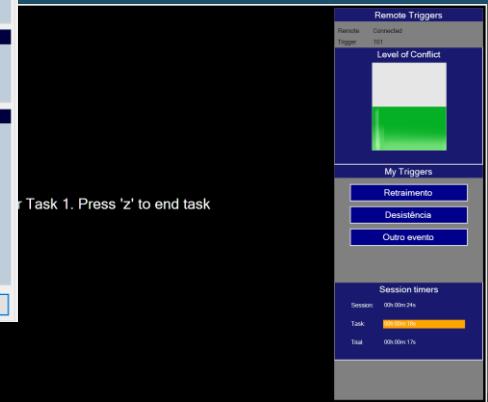
Collected Variables:

Desempenho:	4.0	similar à média do grupo
Comunicação:	4.0	similar à média do grupo
Colaboração:	2.7	abaixo da média do grupo
Personalidade:	2.7	abaixo da média do grupo
Altitude:	2.7	abaixo da média do grupo
Simpatia:	3.0	abaixo da média do grupo
Gostou de Trabalhar:	3.0	abaixo da média do grupo

Desempenho

Close Report Screen

Custom software to manage experiment, collect data and make runtime annotations



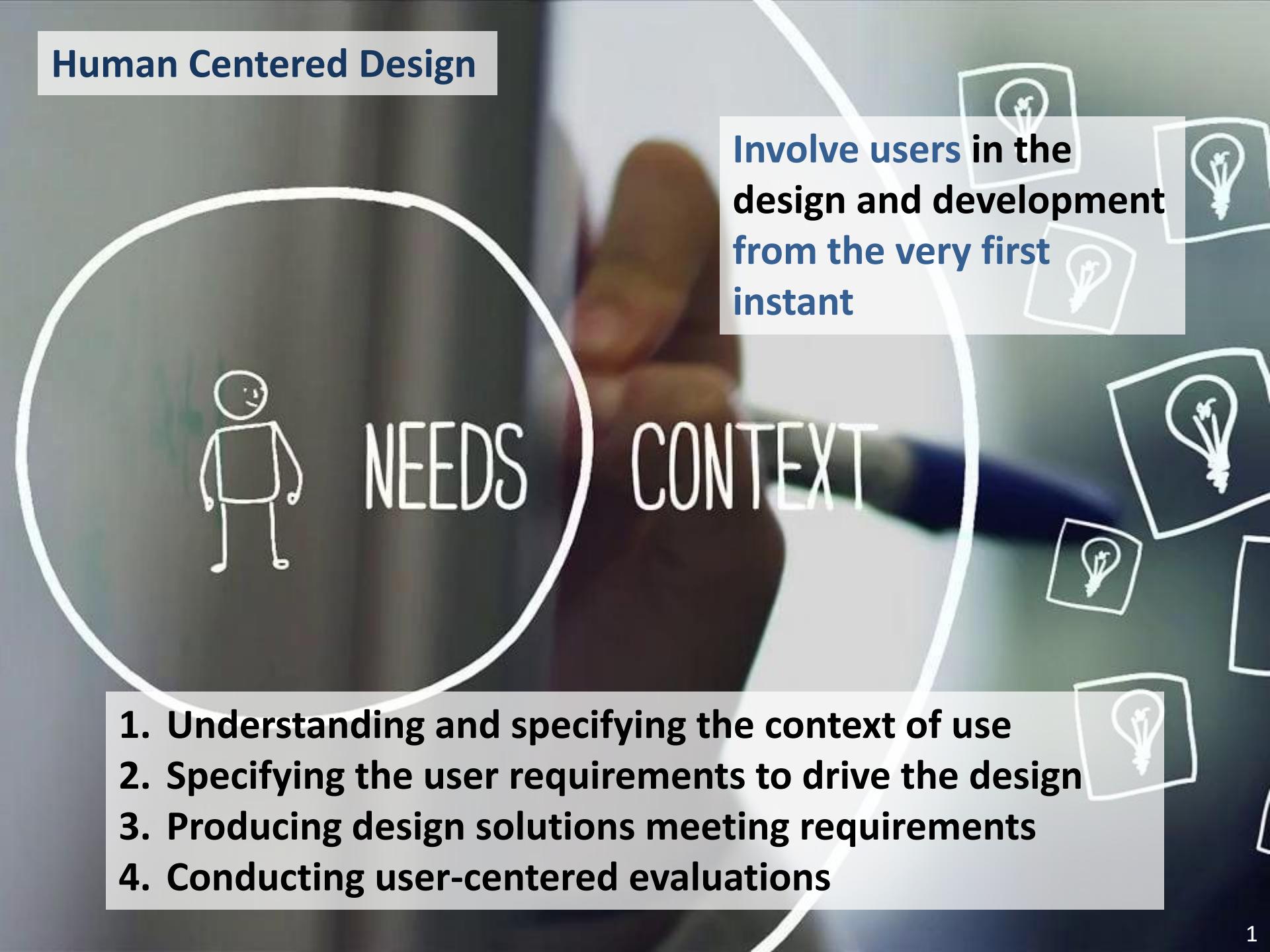
Individual wireless headset microphone



Experimenters with audio feedback of participants' speech and software triggers

And not just for others. Also for scientists and other engineers.

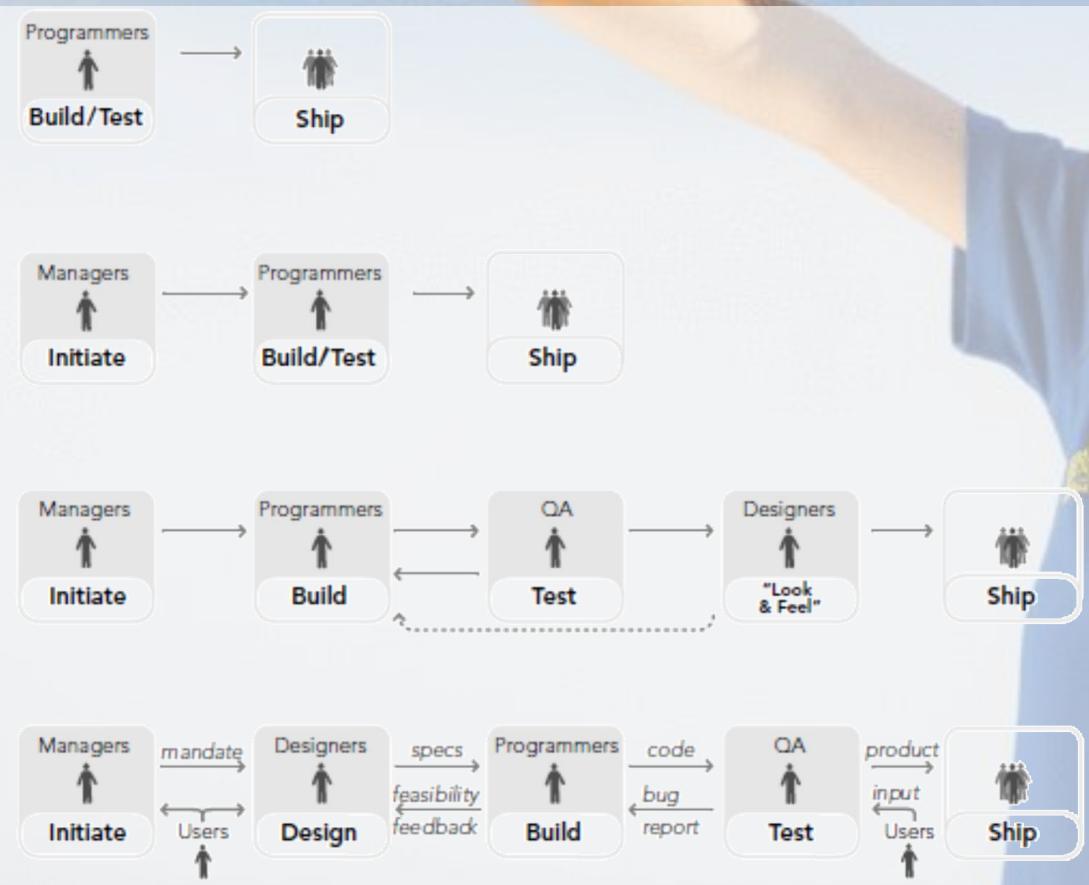
Human Centered Design



Involve users in the design and development from the very first instant

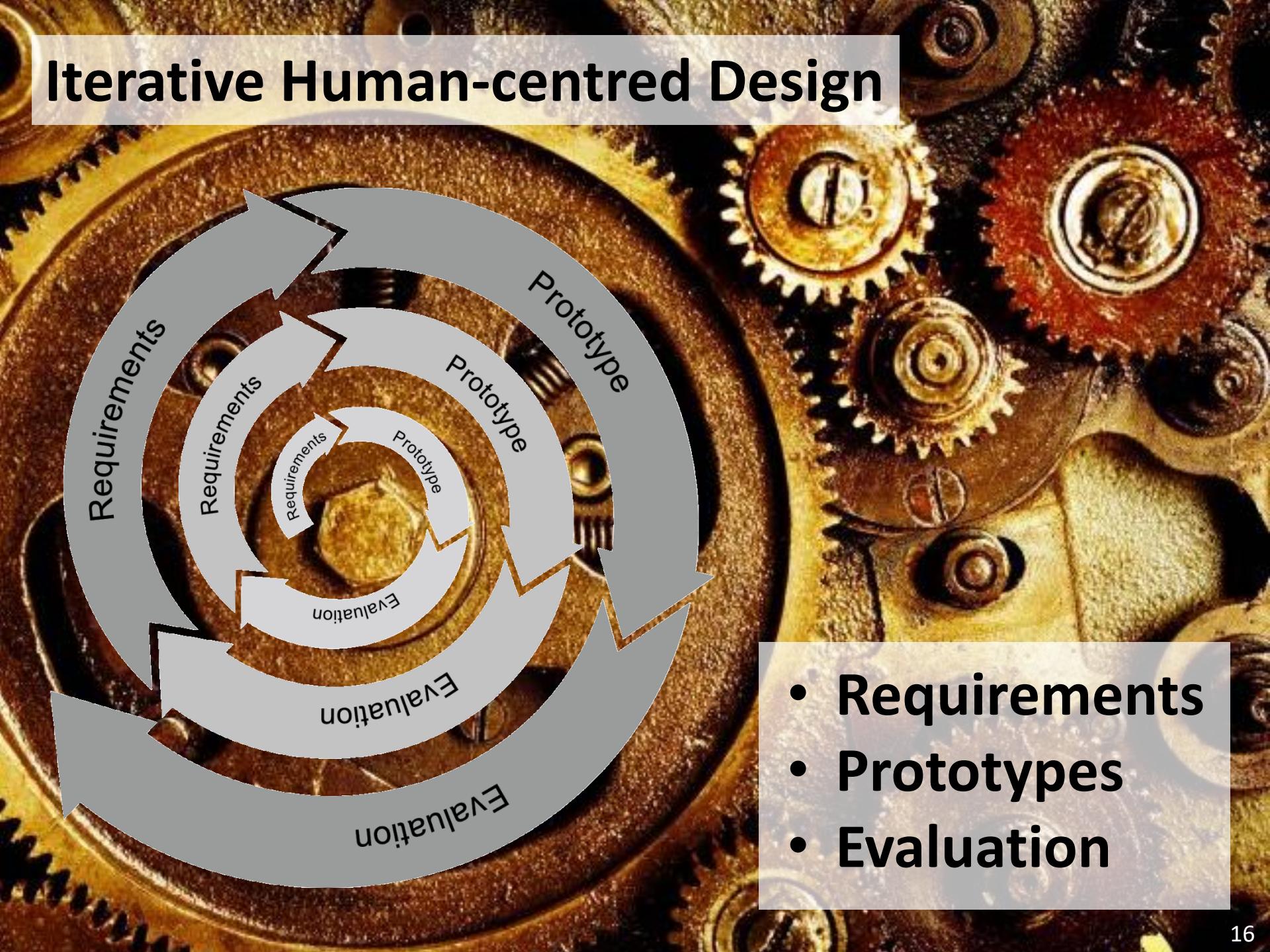
1. Understanding and specifying the context of use
2. Specifying the user requirements to drive the design
3. Producing design solutions meeting requirements
4. Conducting user-centered evaluations

Goal-Directed design



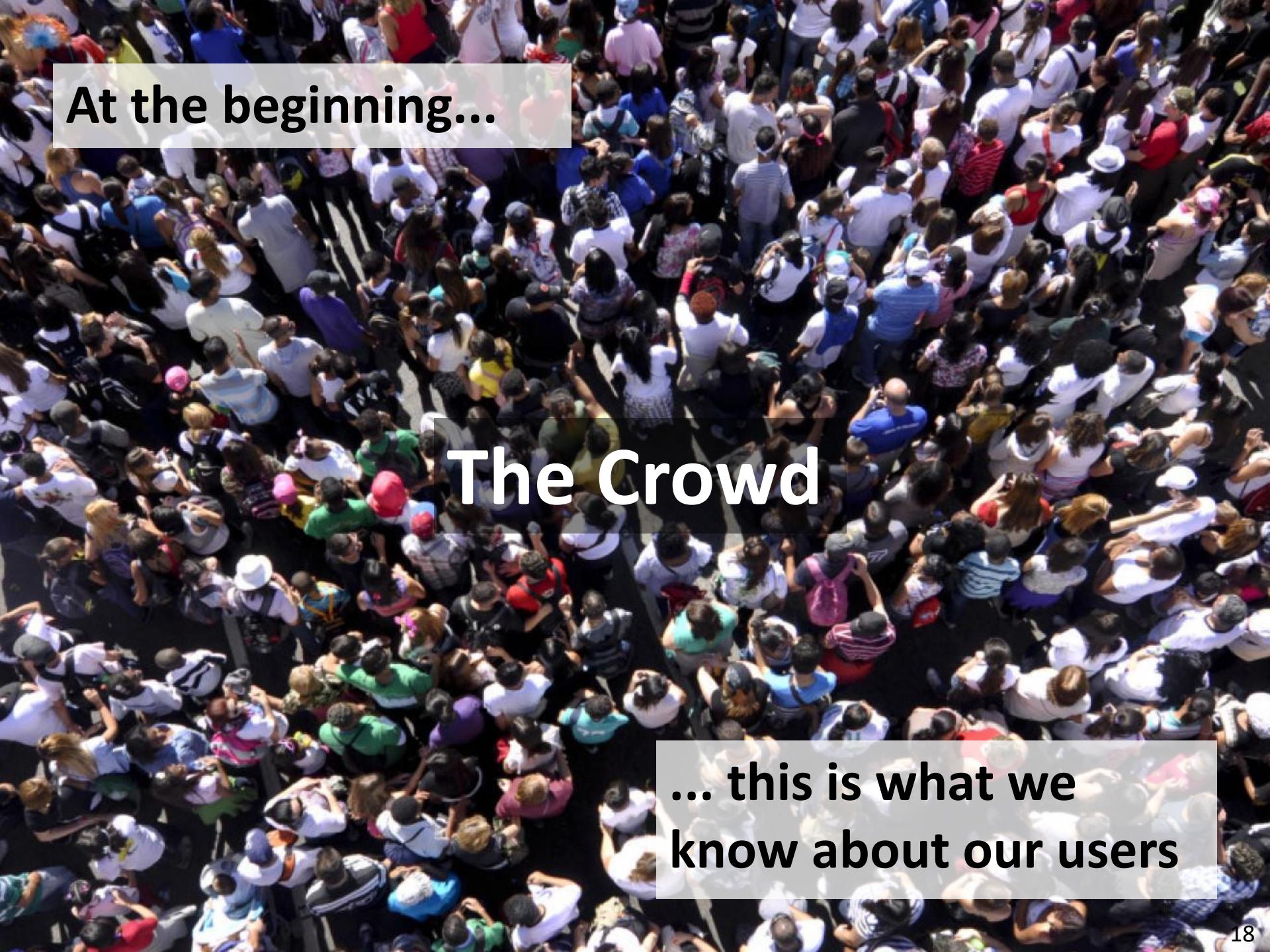
Design to meet
goals in context

Iterative Human-centred Design



- Requirements
- Prototypes
- Evaluation

REQUIREMENTS



At the beginning...

The Crowd

**... this is what we
know about our users**

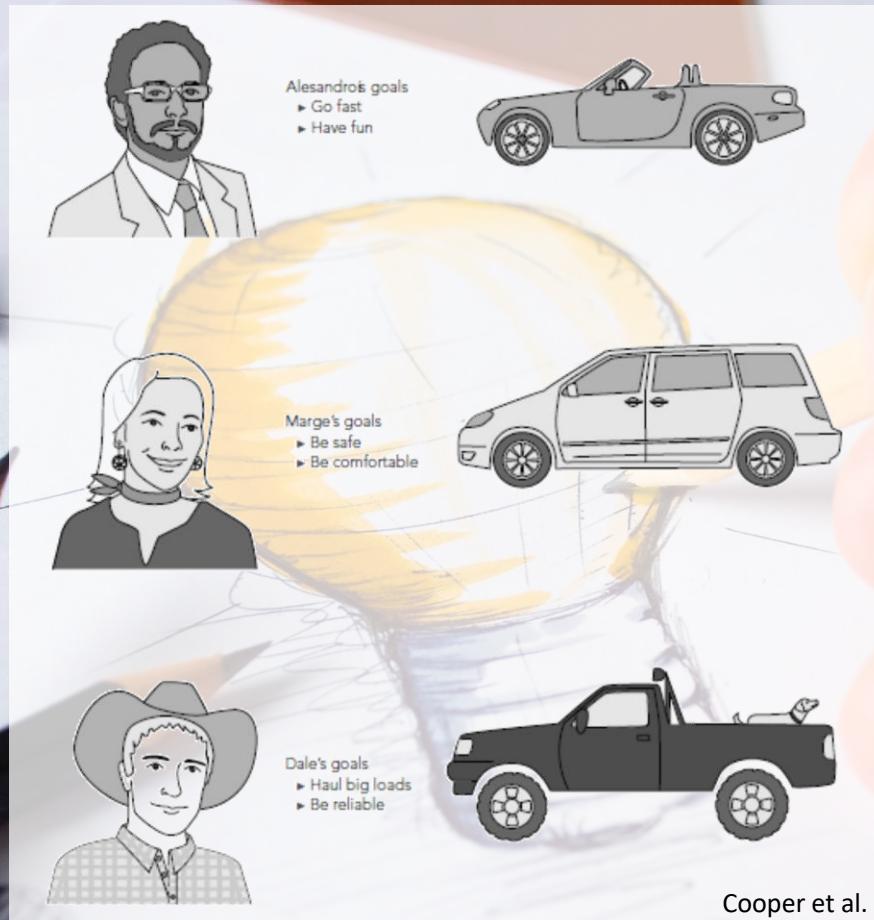
Designing to please every possible user...



Cooper et al.

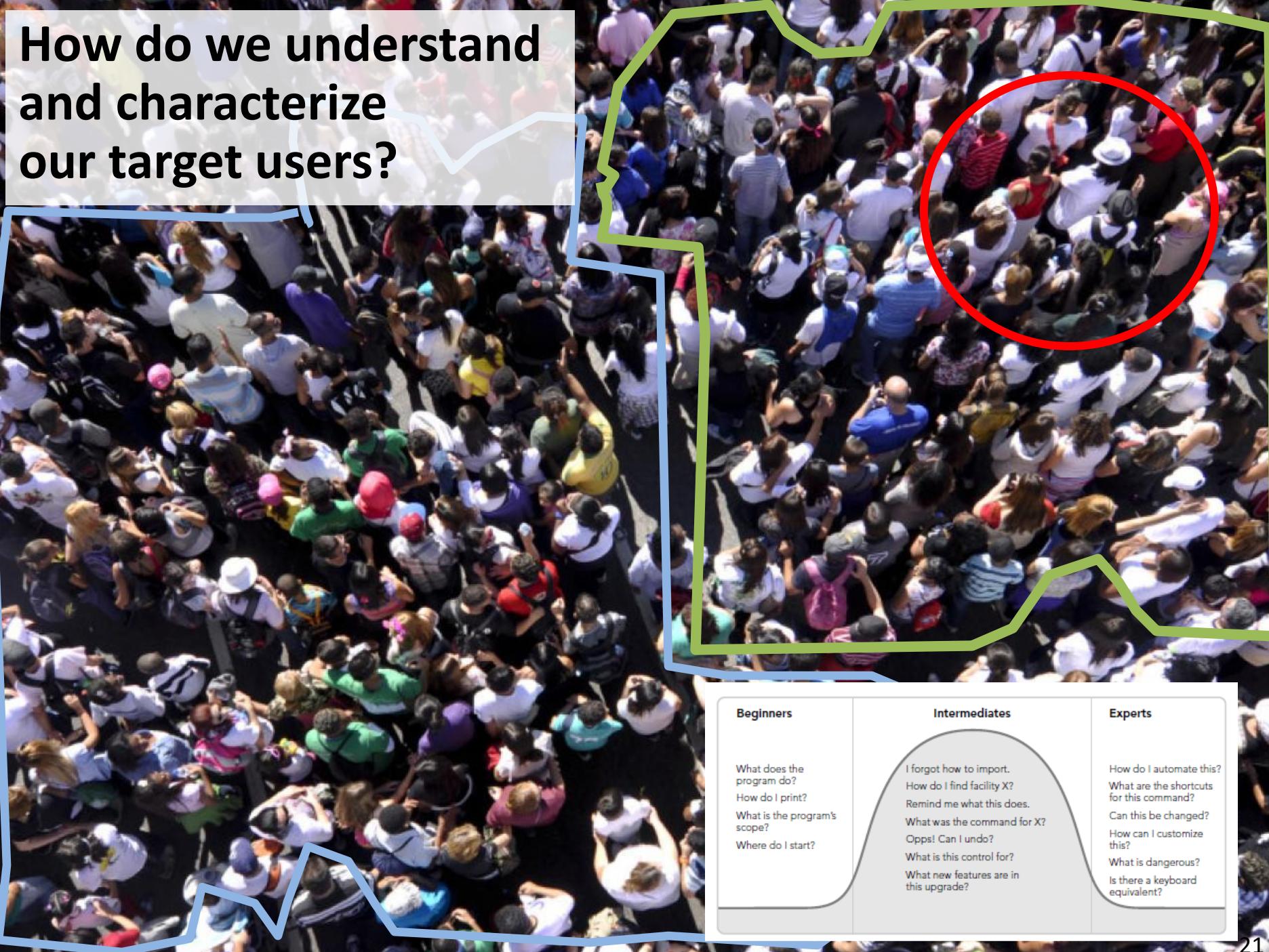
... often results in low user satisfaction, overall

We need to understand which types of users matter...



... and target their specific goals

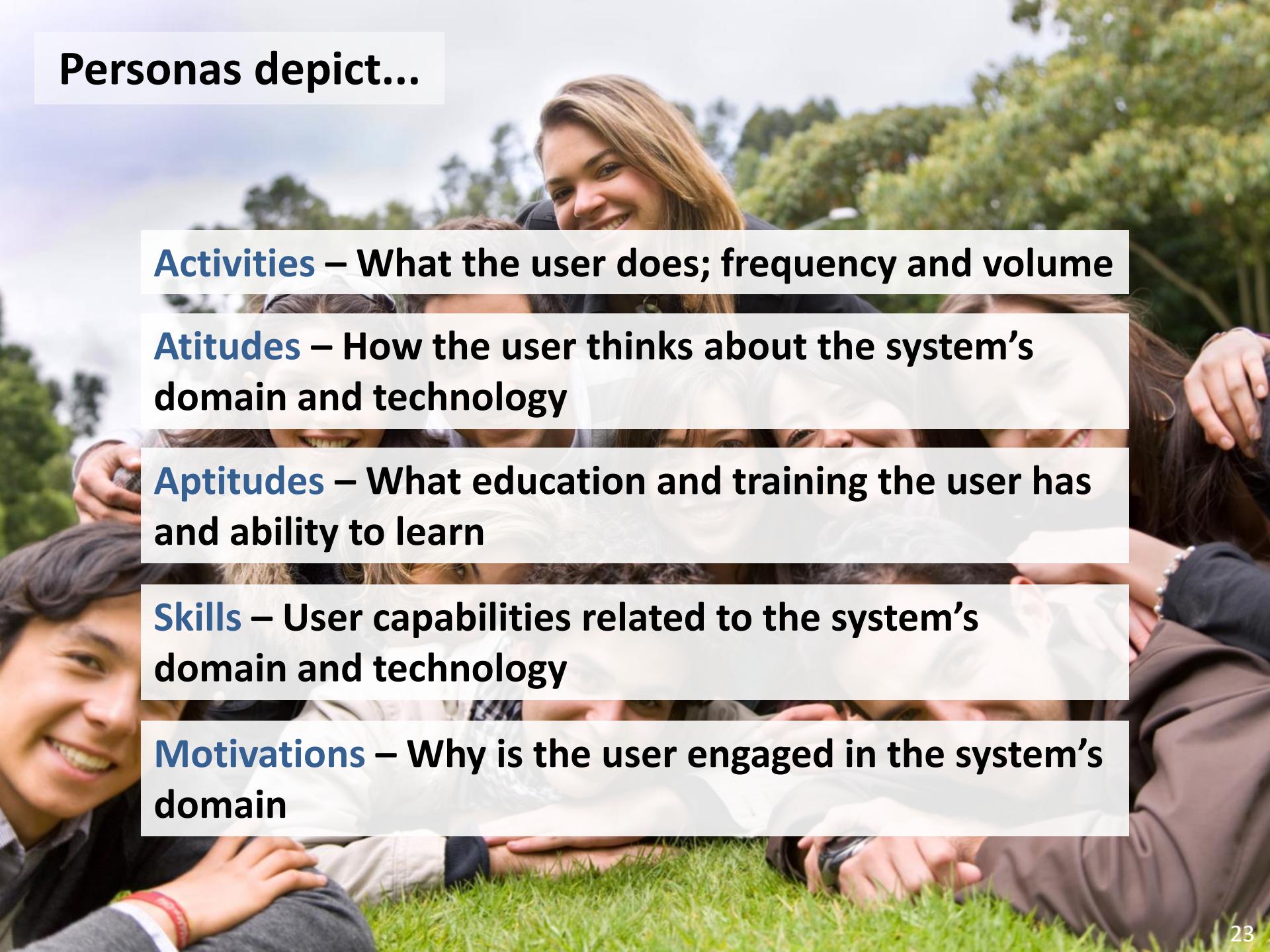
How do we understand and characterize our target users?



Personas

- Based on research
- Represented as individual people
- But, represent groups of users
- Explore ranges of behaviour
- **Must have motivations**

Personas depict...



Activities – What the user does; frequency and volume

Attitudes – How the user thinks about the system's domain and technology

Aptitudes – What education and training the user has and ability to learn

Skills – User capabilities related to the system's domain and technology

Motivations – Why is the user engaged in the system's domain

Personas articulate this information and...



- Include biographical data
- Are presented in narrative form
- Have a photo

How do I get to know all that?



- Relevant literature
- Focus groups and interviews
- Learn by proxy

Personas as tools to understand and empathize with users

Persona for Nuno Rocha, a kid diagnosed with ASD.



Nuno Rocha, born on February 20th, 2005, in Aveiro, Portugal, lives with his parents and a 13 year old sister. At the age of two he went to a Child Development appointment, at the district hospital, because his parents suspected that something was wrong, after which he was sent to an autism exam at the Paediatric Hospital of Coimbra. At the age of three, he was diagnosed with an Autism Spectrum Disorder (level 2 in the scale of severity), with associated cognitive deficits.

He is attending the 4th grade at Anadia's Primary School, benefiting from a Structured Teaching Unit (STU) delivering him a structured learning model (TEACCH) and the application of interdisciplinary intervention methodologies. He also benefits from Speech Therapy sessions.

Nuno follows an individual curriculum (consisting of changes to the normal curriculum, by introducing, replacing or eliminating goals and contents). On a daily basis, for 2 hours, he attends the regular class to work sociability, whereas functional classes (like functional Portuguese, world knowledge, functional math and every day activities) are learned at the STU.

At home, he prefers to watch TV and play computer games. When asked about professional preferences, he mentions he would like to stay at home with his mother and watch TV or play computer games.

He appears to dominate the basic functions of a computer; however, he only uses his ability to play computer games. He is not able to research information on any search engine, nor does he use social networks for communication.

He appears to understand simple oral material, specifically words or sentences related with his social and familiar day-to-day. On the other hand, difficulties are observed on the comprehension of longer sentences that lack visual support or that are out of the context.

General characterization of the child

School and curricula

Technology adherence and proficiency

Receptive-expressive language

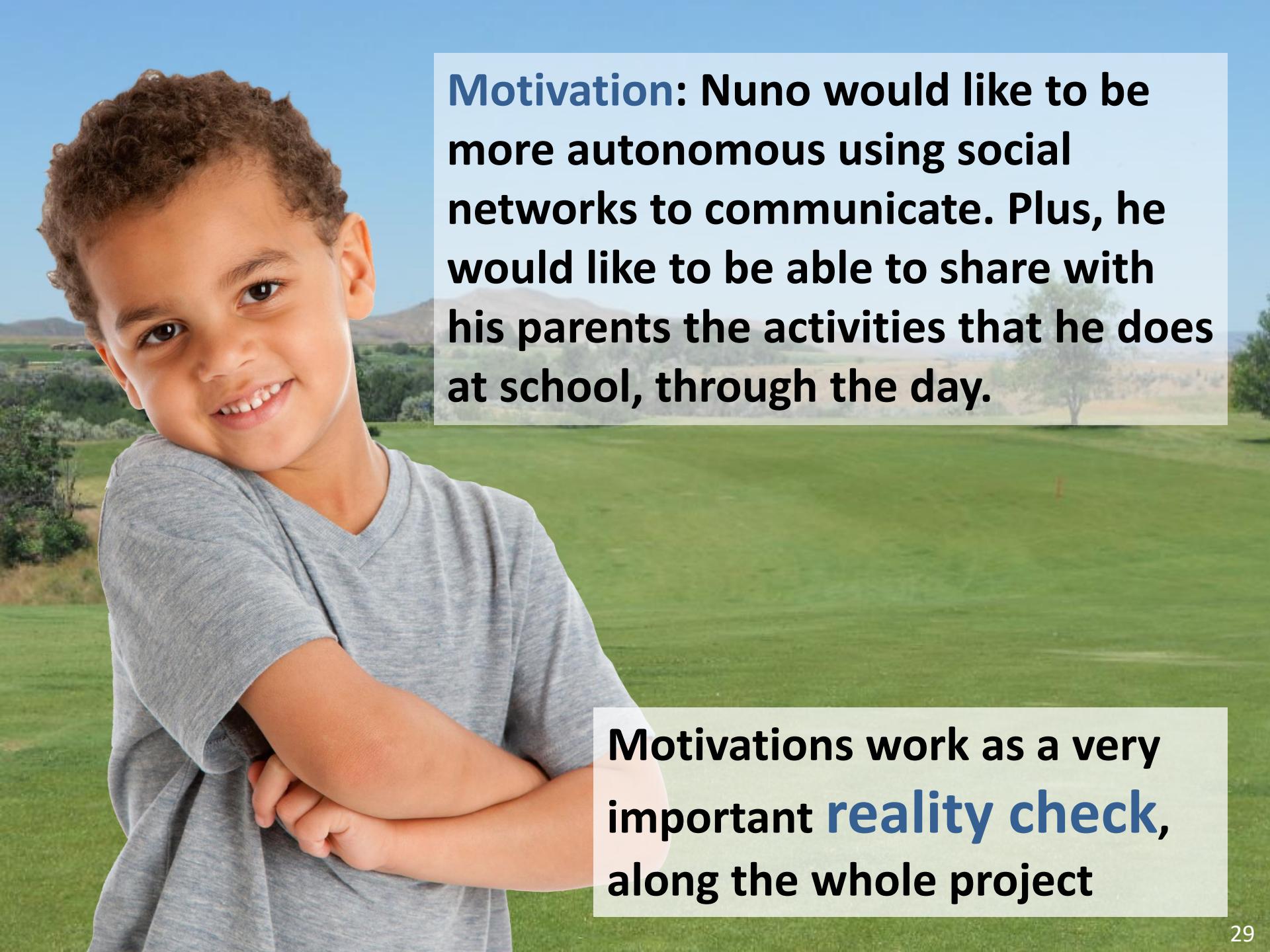
**They are not about technical aspects,
but about behaviours and abilities**

Francisco is a 50 years old Internal Medicine Physician who obtained his degree one and a half years ago. During the courses he took he never had specific education about geriatric patients and how to diagnose them regarding the CGA. The first contact he had with it happened about one year ago, when he started his work in Aveiro's Hospital. Besides his studies, he enjoys jogging at least twice a week and going to the movies [...]

Motivation: Francisco would like to improve the way he applies CGA during his daily practice to enable its more extensive use.



Motivations, motivations, motivations...



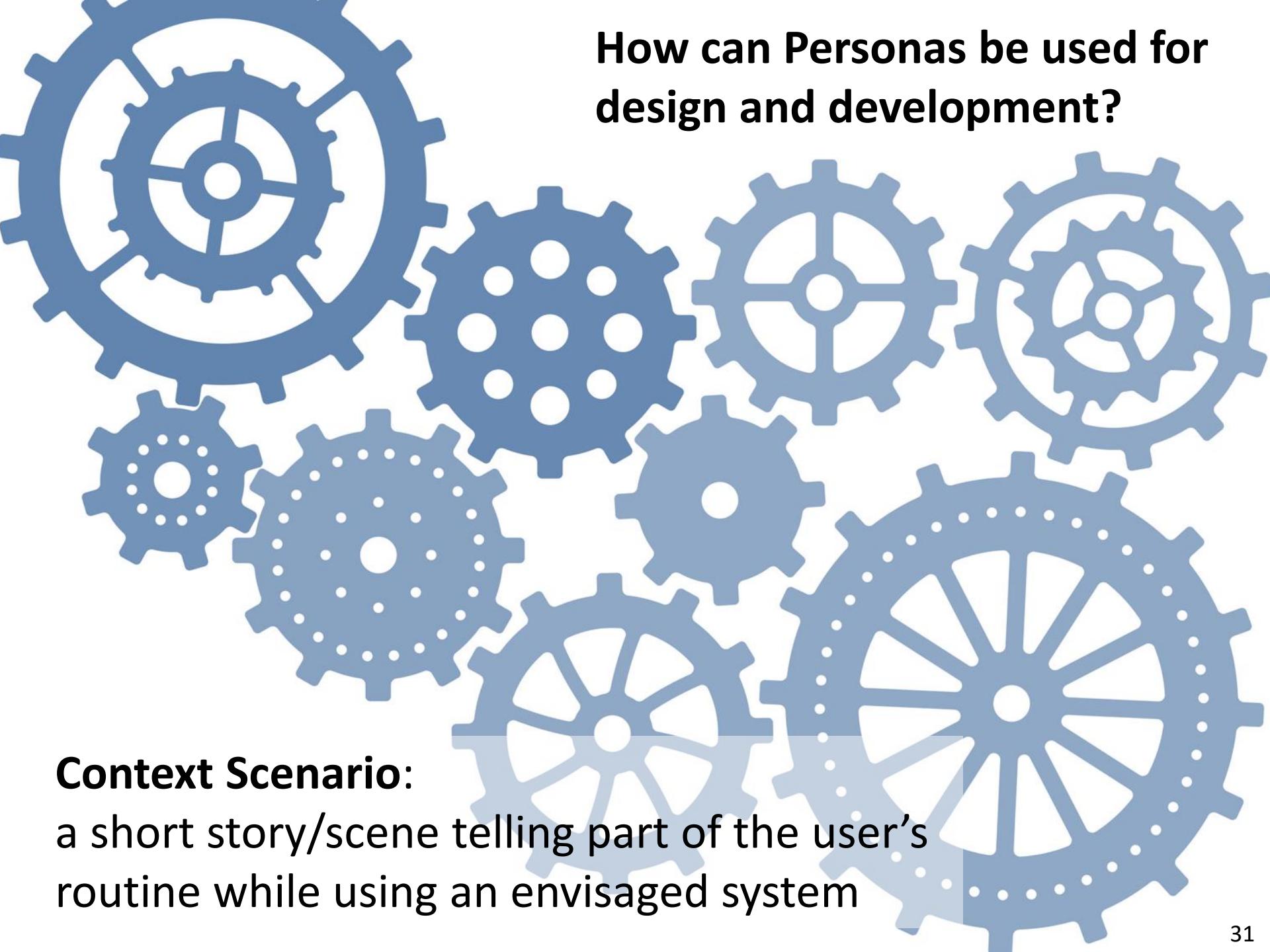
Motivation: Nuno would like to be more autonomous using social networks to communicate. Plus, he would like to be able to share with his parents the activities that he does at school, through the day.

Motivations work as a very important **reality check**, along the whole project



**OK, I know all about my users!
Can I start coding, now?**

**“PATIENCE YOU MUST HAVE my young
padawan”**



How can Personas be used for design and development?

Context Scenario:

a short story/scene telling part of the user's routine while using an envisaged system

Scenarios

- Short scenes illustrating, for example:
 - Where will the system be used?
 - For how much time?
 - What activities does the Persona need to perform?
 - Expected end results of using the system
 - How much complexity is permitted based on the Persona skills and frequency of use?

Personas as actors in movie scenes



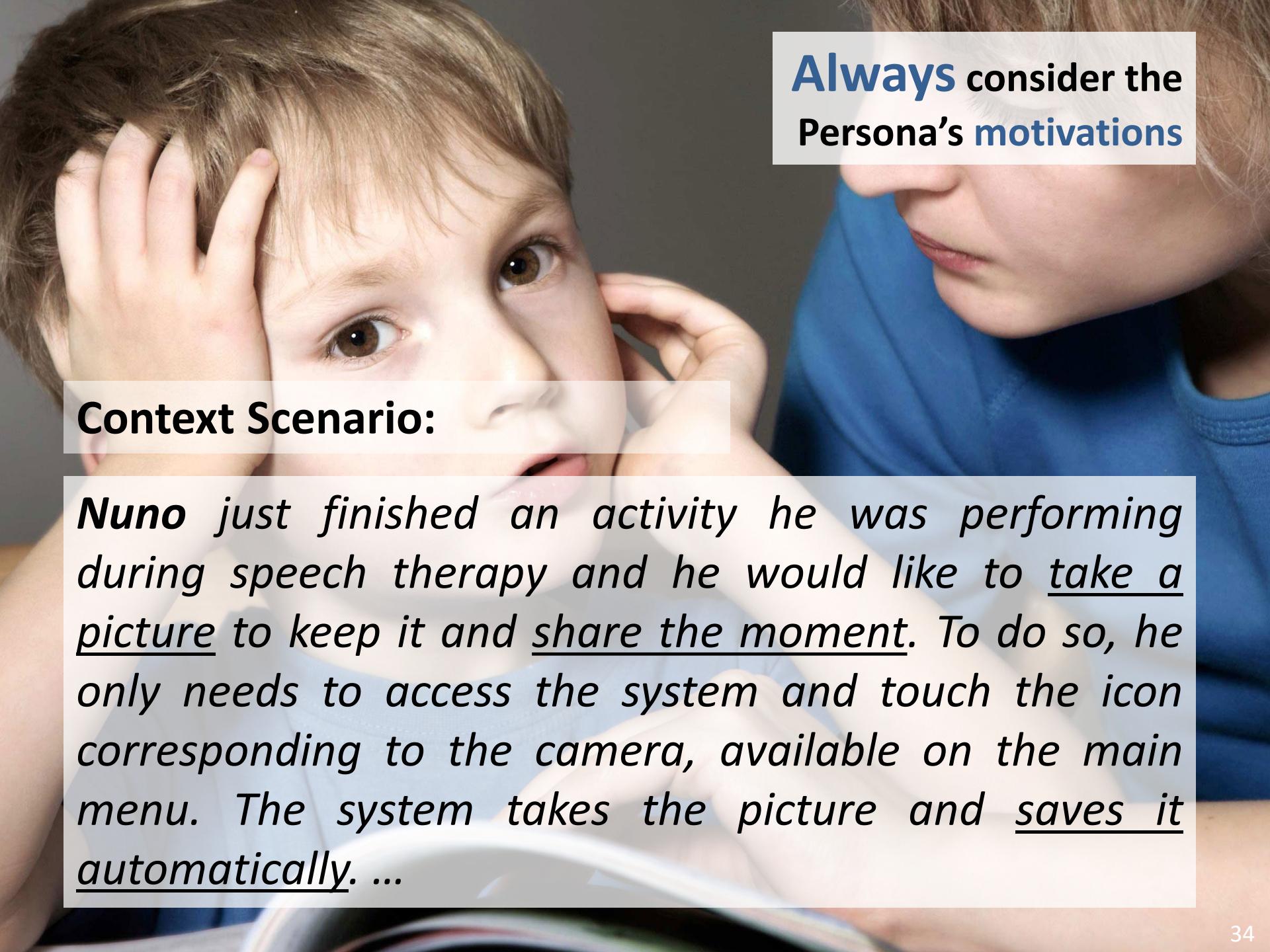
Francisco is a 30 years old Internal Medicine Physician who obtained his degree one and a half years ago. Besides his studies, he enjoys jogging, at least twice a week, and going to the movies with his girlfriend.

During his studies he never had specific training about geriatric patients and how to diagnose them considering CGA. The first contact he had with CGA happened about one year ago, when he started his work in Aveiro's Hospital.

His patients usually present several pathologies, tend to display multiple geriatric syndromes, and have autonomy problems in daily life activities, such as cleaning up their homes, doing



Francisco performs a CGA assessment— Francisco opens the application and sees a welcome message which informs him about the key features of the application. He is informed that only the standard features are activated, and additional functionalities are available for activation from the menu. He explores the information regarding the application of CGA and reviews some of the scales that he usually applies, during his practice. He experiments with filling a few and checks the computed results.



**Always consider the
Persona's motivations**

Context Scenario:

Nuno just finished an activity he was performing during speech therapy and he would like to take a picture to keep it and share the moment. To do so, he only needs to access the system and touch the icon corresponding to the camera, available on the main menu. The system takes the picture and saves it automatically. ...



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General characterization of the child

School and

**Be open-minded
and creative**

**Do not think about
technology, yet**

Context Scenario:



Scene 2: Comment picture taken

Next, the application displays the edit menu so that Nuno can choose an option: attach an emotion to the photo; add a comment to the photo; or share it in his diary so that Nuno's family and friends can be aware of what he is doing at school. Choosing the first option, six different emotions are presented, and Nuno picks the one associated with laughing. Going back, he wants to add a small text explaining what he was doing, and, after that, he chooses to share it in his diary.

A photograph of a film crew on a movie set at night. In the foreground, a man in a blue jacket and red sneakers is operating a professional video camera mounted on a dolly. Behind him, several other crew members are visible, some wearing headsets and others in dark jackets. The scene is lit by artificial lights, creating strong shadows and highlights against the dark night sky.

Scenarios express WHAT the system will do NOT HOW it is done

Remember, not all people in a design and development team have technical skills

Requirements

- Extracted from actions and features depicted in the scenarios
- Can also be complemented with Use Cases
- Can be the first stage for other systematic methods such as Hierarchical Task Analysis



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Context Scenario:

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e.g., HTA

Scenarios depict the tasks and features that need to be addressed



The image shows a smartphone displaying the GeriatricHelper mobile application. The app's interface includes a welcome screen with a doctor icon and text in Portuguese. Below this are sections for 'AGG' (Assessment Global) and 'Patient 1'. The AGG section lists categories like 'Estado afetivo', 'Estado cognitivo', 'Estado funcional', 'Estado nutricional', and 'Situacao social'. The Patient 1 section shows details for a patient named '1920-12-01 Aveiro', with an 'AVALIAOES' tab active, showing 'Levemente incapacitado socialmente'. The app also includes a 'Guia do AGG' (AGG Guide) and a 'Prescrição' (Prescription) module. A blue arrow points upwards from the bottom of the phone screen towards the elderly woman's face, which is partially visible on the right side of the image. The woman has white hair and is wearing a red shirt.

Prescribing medication to Lurdes — The physician needs to be careful since Lourdes already takes medication for other health issues and the drug he is going to prescribe must not interfere, causing new health complications. Since he needs to consult medication-related criteria, which is not visible by default, he heads to the settings menu. He browses a list of the modules that can be activated and deactivated and proceeds to activate the Clinical Criteria module. Francisco consults the app and searches for the name of the medicine he has in mind. The app tells him that medicine should be avoided for a health issue Lourdes already has. Francisco then proceeds by using the Start criteria that inform which drugs are best for certain conditions.



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Personal Life Assistant “AALFred”



Multinational distributed R&D team developing multiple modules:

- Portugal (Univ Aveiro, Microsoft, INESC)
- France (Genitech)
- Poland (ssw)
- Hungary (BME, BMZ)

All serving the same users and scenarios...



Multimodal Interactive Assistant to Enhance the Social Life of the Elderly



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Mental Health

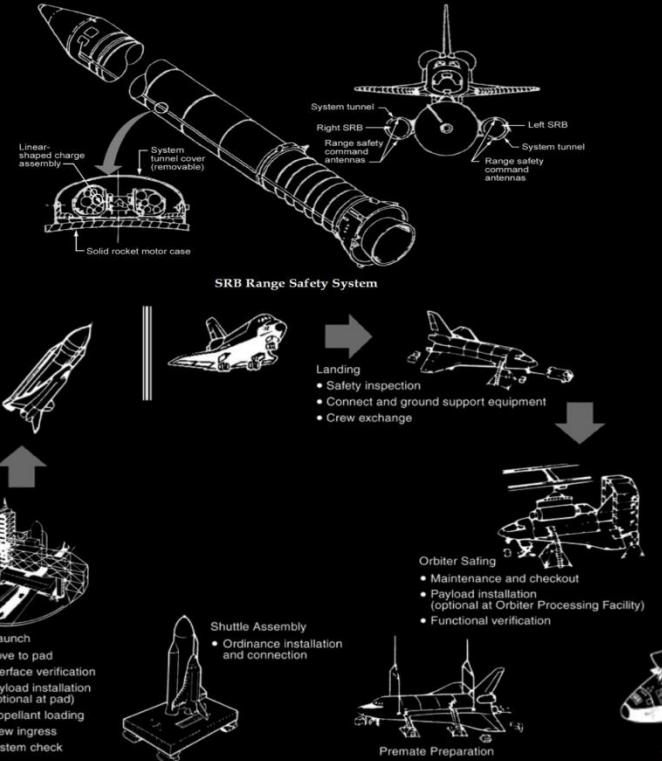
From the Lab into People's Lives



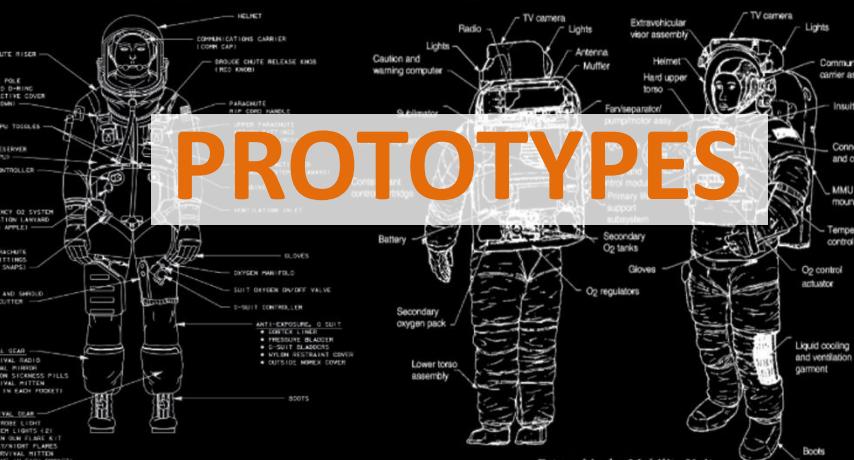
Psychologists
Psychiatrists
Software Engineers
Interaction Engineers
Designers
Physics Engineers
Chemistry Engineers
Electronics Engineers
Patients
MSc Students

Translational Human-Centered Multidisciplinary Effort
towards Improved Support for Mental Health Management

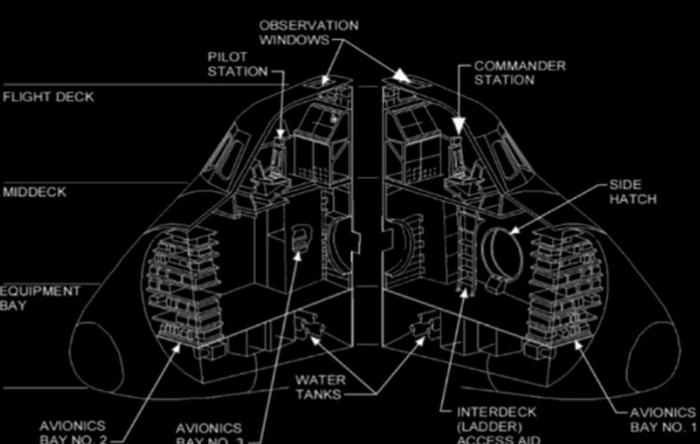
The space shuttle



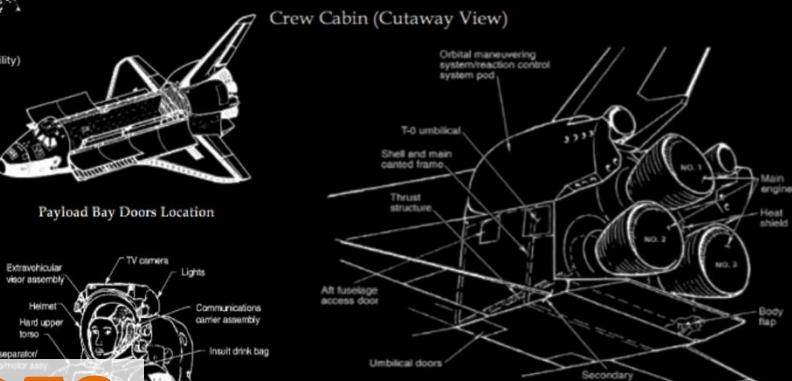
Kennedy Space Center Ground Turnaround Sequence



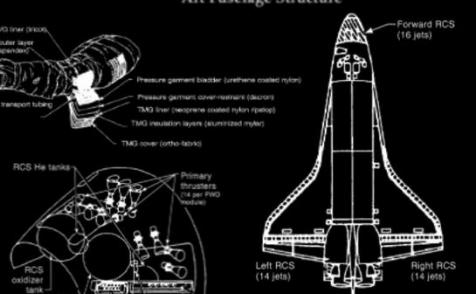
PROTOTYPES



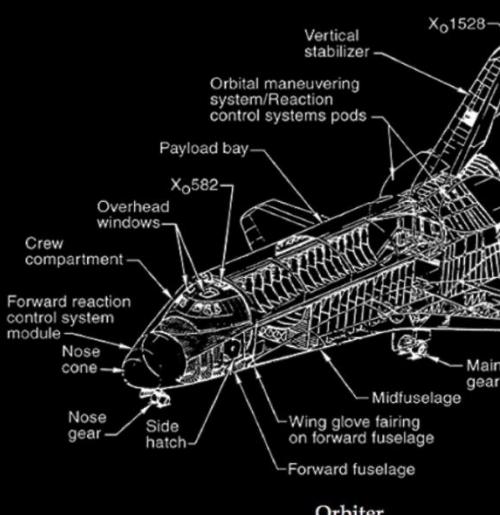
Crew Cabin (Cutaway View)



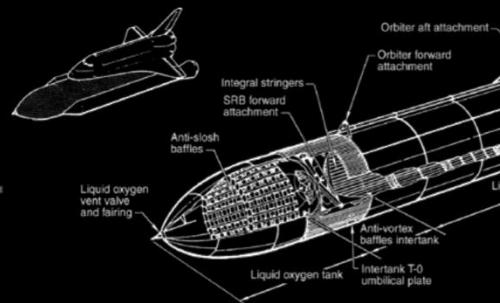
Aft Fuselage Structure



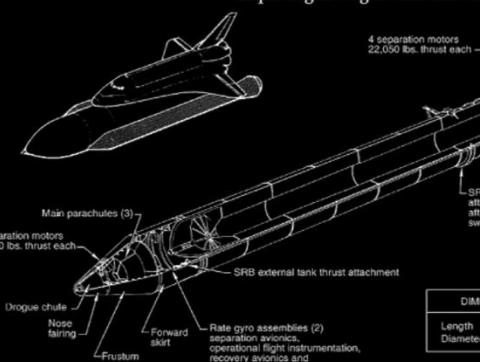
Forward, Left, and Right BCS Modules



Orbiter



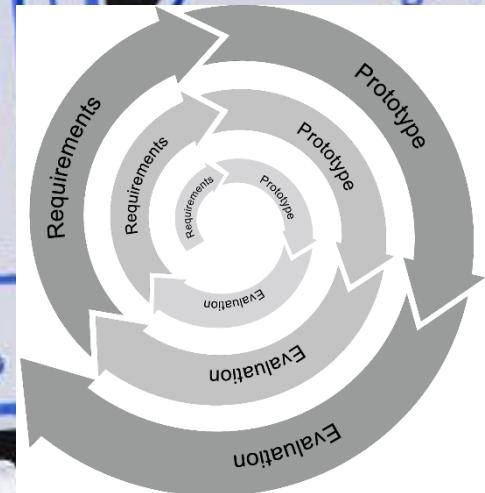
Super Lightweight External Ta



Solid Rocket Booster

The role of prototyping

Rapid development cycles for a subset of requirements

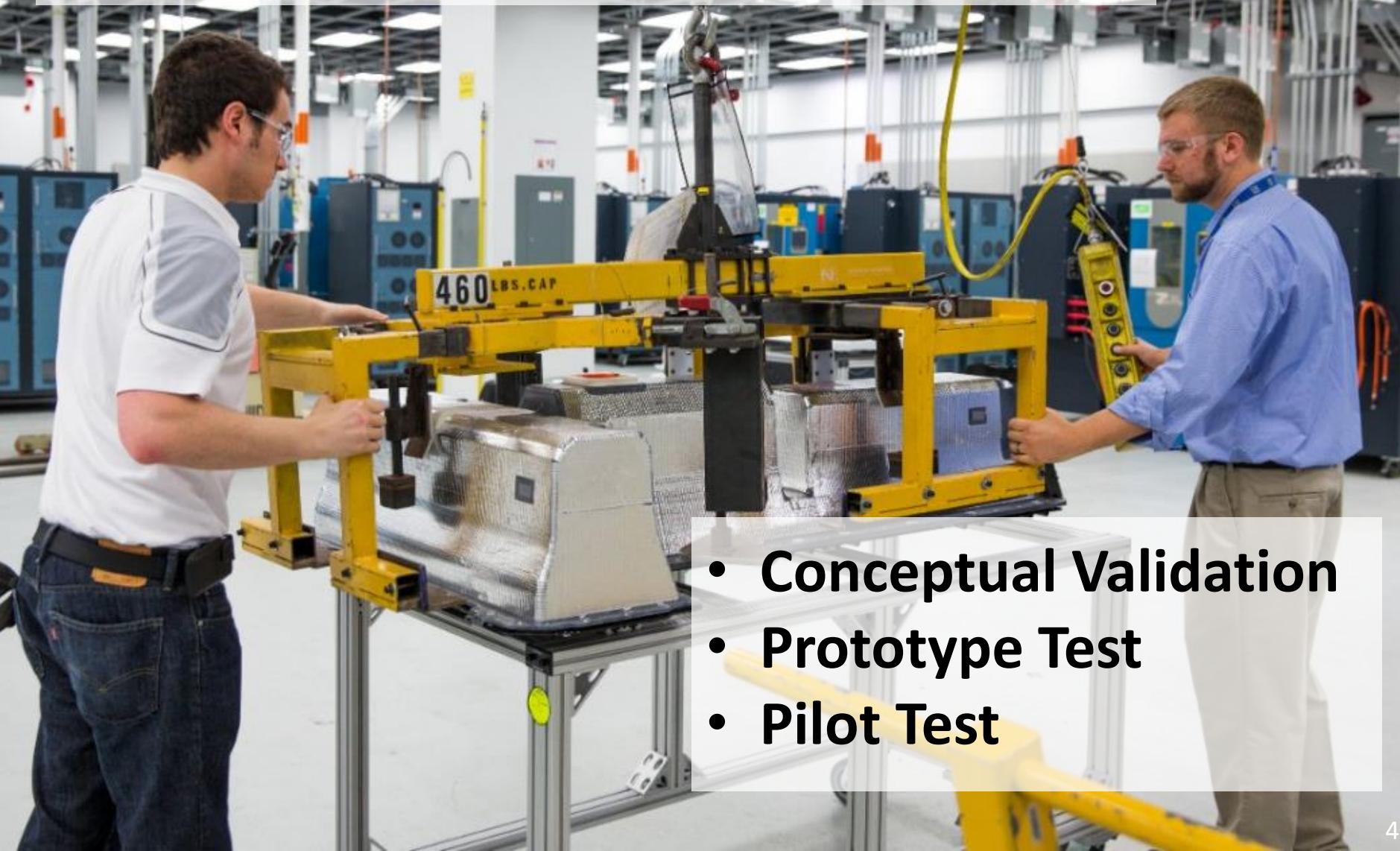


- Discover issues at an earlier stage
- Refine/expand requirements
- Support dialogue with stakeholders

A photograph of two hands, one dark-skinned and one light-skinned, both giving a thumbs-up gesture. The background is a soft-focus indoor setting.

EVALUATION

Prototyping and evaluation methods adapted to the project's stage



- Conceptual Validation
- Prototype Test
- Pilot Test

The scenarios keep
being very useful...



... providing the tasks that
can be used for evaluation.



“Lack of knowledge about users, their motivations and contexts of use is the path to the dark side.”

Master Yoda, Episode 4 (more or less)