# Research Project Proposal:
## Interactive Storytelling for Children with Neurodevelopmental Disorders

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# Research Plan

- Advanced Users Interface course by Professor Franca Garzotto
- Team of three people
- Functional Prototype to present in the winter session
- Thesis work will extend it

# Research Plan

- From the COMUTTI project we developed our own idea
- Ongoing meetings with the course tutors and the professor
- Ongoing meetings with local centers that are relevant for the project

# Introduction

Storytelling is the ancient art of creating and communicating narrative structures of words, images, sounds, or actions, as a means to entertain, preserve a culture, or educate.

# Goal

My goal is to study how interactive systems and advanced user interfaces may allow us to tackle important issues that children with neurodevelopmental disorders face each and every day.

- Experiment with different kinds of interfaces and approaches
- Study the involved disorders
- Try AI improvements
- Create a useful solution

# Areas of study

- Neuropsychology: is concerned with how cognitive functions and behavior are related to the brain and the rest of the nervous system

- Developmental psychology: studies physical development, cognitive development, and social emotional development with a particular focus on infants and children

- Interaction Design : study how we may create a dialogue between a person and a product, system, or service, in particular, with the use of advanced interfaces that may enrich specific interactions given a precise goal or focus

# Multidisciplinarity

- The difficulty in assessing the tools that are designed and tested, given how qualitative the gathered data may be and the need of an expert to interpret such data
- The time-span for which the data needs to be collected in order to make meaningful observations (during the children therapy that may last years)
- The small batch of candidates and the poor generalization that a few case studies may cause;
- The early adoption of new technologies that may not be fully tested or understood.

# Multidisciplinarity

- The availability of computers, and more in general of advanced interfaces, grants us the ability to record and store data in an easier and more effective way compared to traditional therapy.
- Some areas tend to progress at a slower pace but the on-going collaboration between the fields needs to be explored more, especially when innovative technological approaches are proposed.
- At the same time, new found techniques for therapy must be taken into consideration as well as their possible implementations with advanced interfaces.

# Classification

- The main dimensions in which we may evaluate and classify the related works are closely tied to the effectiveness of the therapy

- The difference between results obtained by classic means of therapy and the ones obtained with interactive approaches, especially with storytelling, reveal the importance of these works.

# Classification

- Another issue is the poor ability to generalize these kind of results to children with slightly different conditions.

- These starting conditions are fundamental for the evaluation of these works of research and span from a different language to different kinds of disorders or again different ages and cognitive abilities

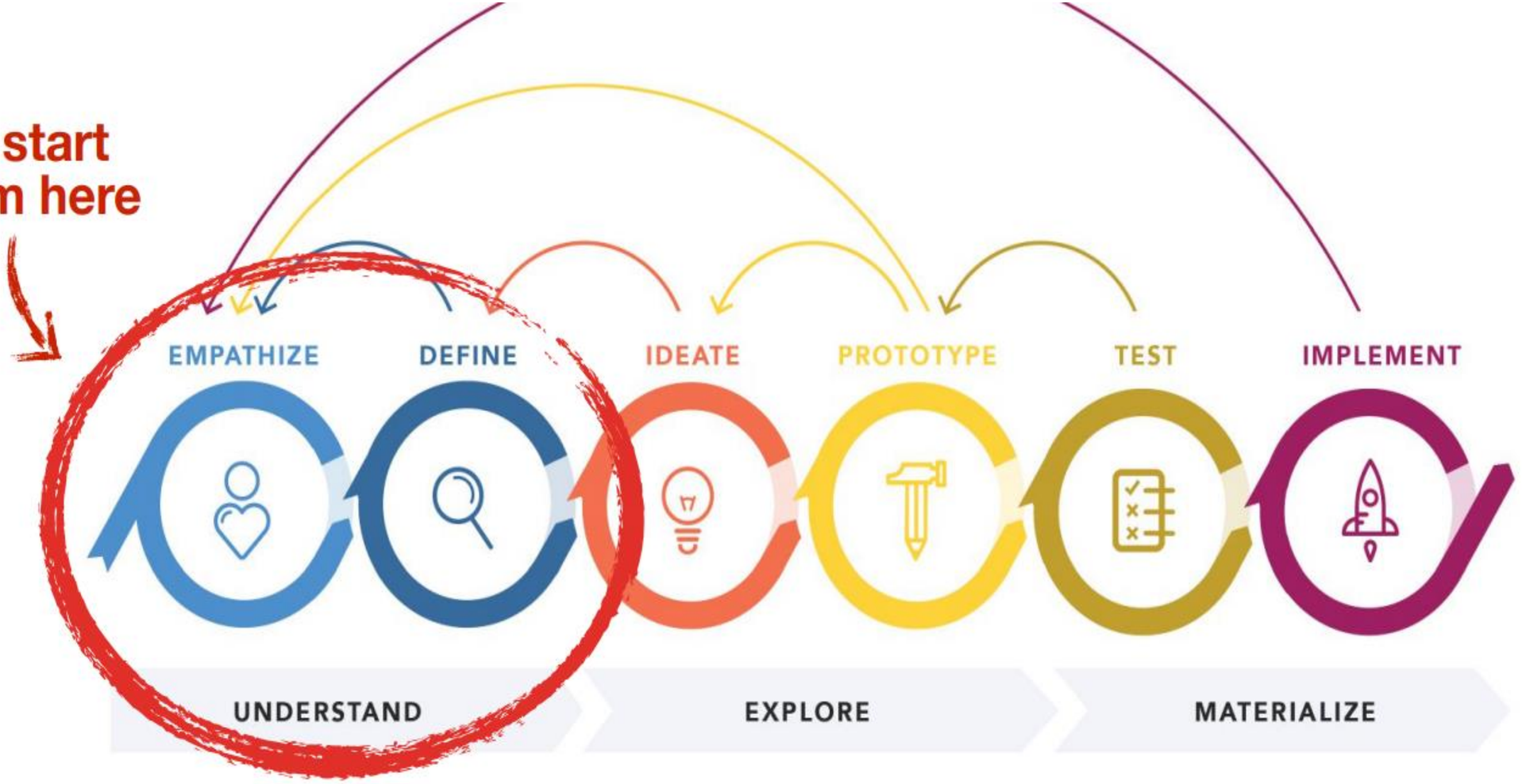
# Concerns

- Use of hypermedia applications
- Interactive tools effectiveness
- Storytelling use and complexity

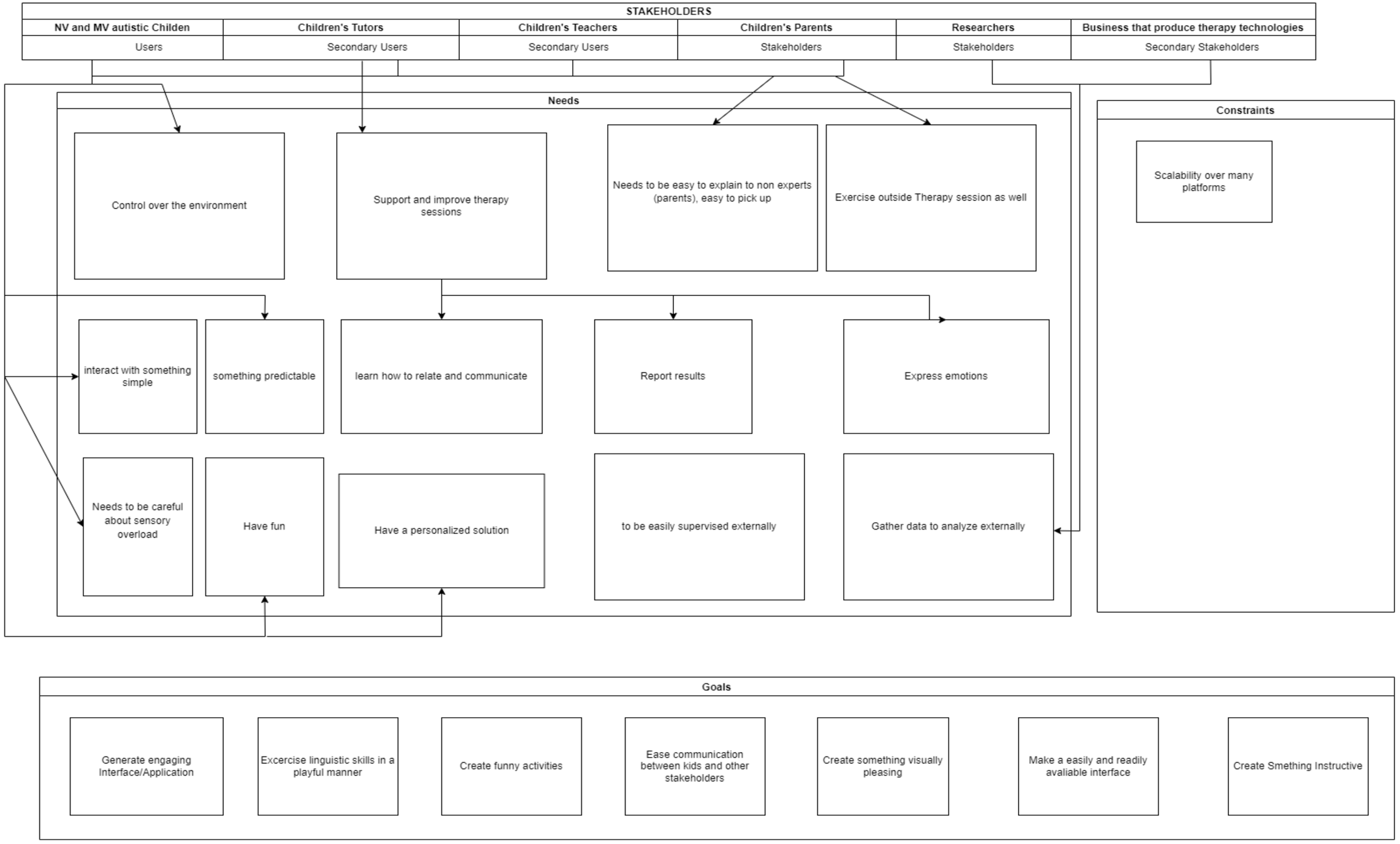
# Expertise

- Evolutiva-mente: Psychological Center based in Monza
- IRCCS Medea: Center based in Bosisio Parini
- Besta: Neurological Institute in Milan

We start from here



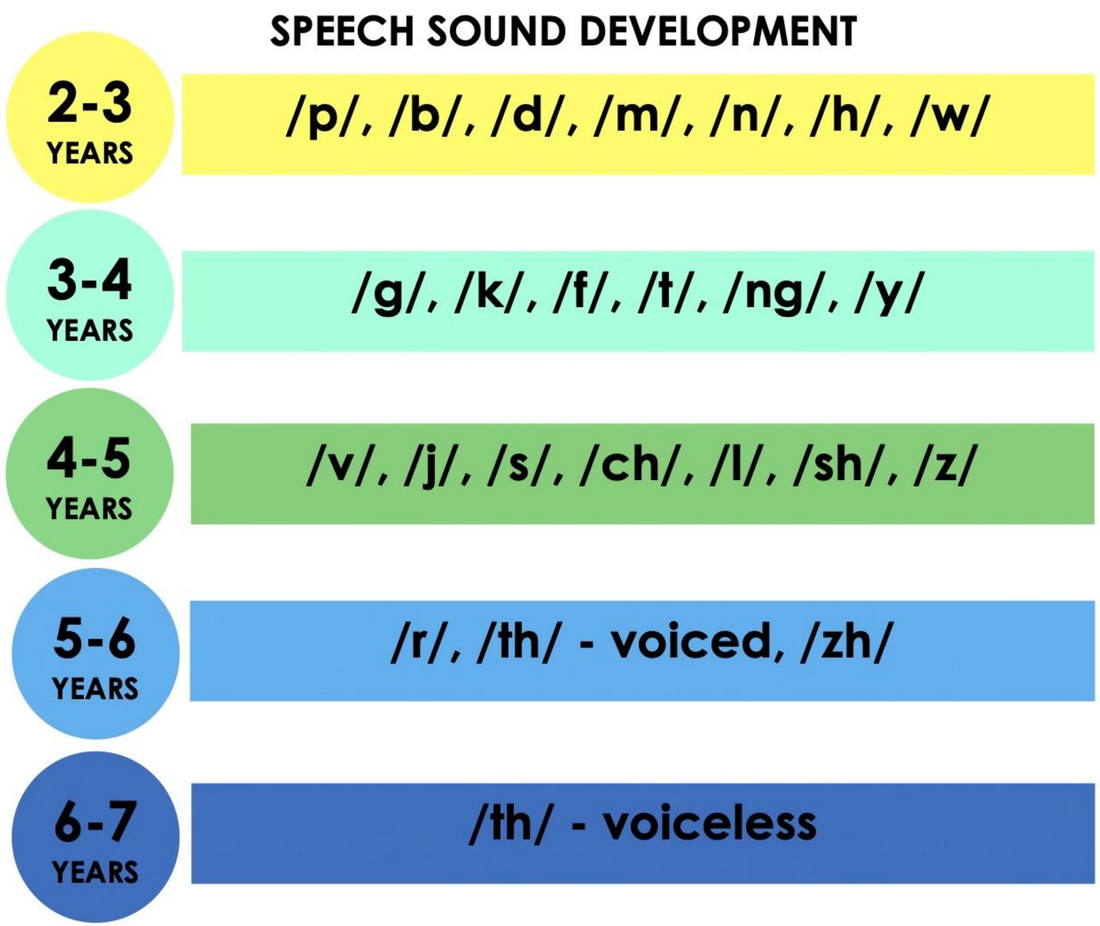

DESIGN THINKING 101 NNGROUP.COM


STAKEHOLDERS
NV and MV autistic Childen
Users
Children's Tutors
Secondary Users
Children's Teachers
Secondary Users
Children's Parents
Stakeholders
Researchers
Stakeholders
Business that produce therapy technologies
Secondary Stakeholders
Needs
Control over the environment
Support and improve therapy sessions
Needs to be easy to explain to non experts (parents), easy to pick up
Exercise outside Therapy session as well
interact with something simple
something predictable
learn how to relate and communicate
Report results
Express emotions
Needs to be careful about sensory overload
Have fun
Have a personalized solution
to be easily supervised externally
Gather data to analyze externally
Constraints
Scalability over many platforms
Goals
Generate engaging Interface/Application
Excercise linguistic skills in a playful manner
Create funny activities
Ease communication between kids and other stakeholders
Create something visually pleasing
Make a easily and readily avaliable interface
Create Smething Instructive

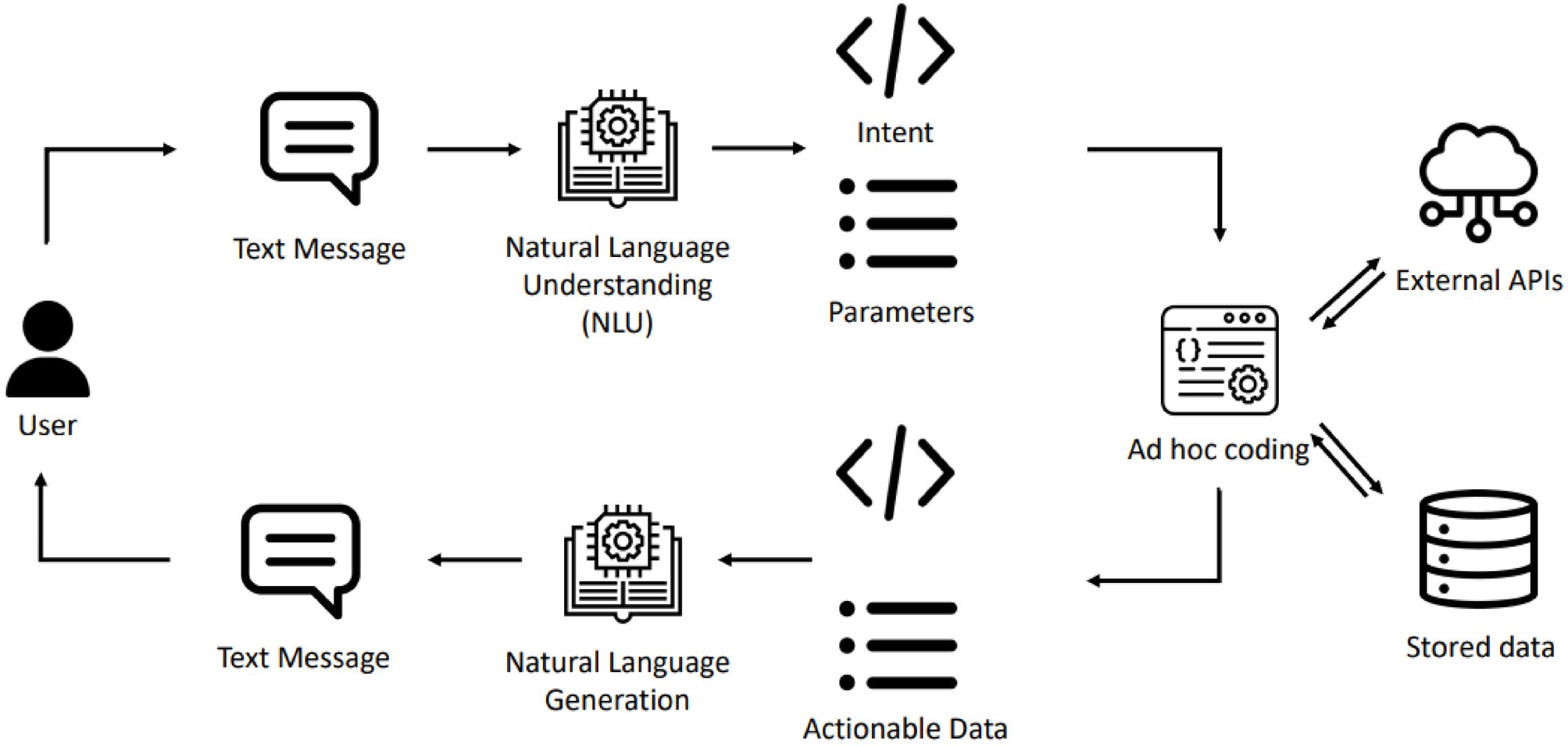
# Direction

- Each neurodevelopmental disorder poses particular challenges
- This project focus is on Language Impairments which are common to many of these disorders
- Improvements with speech could benefit every side of therapy

# Vocalizations

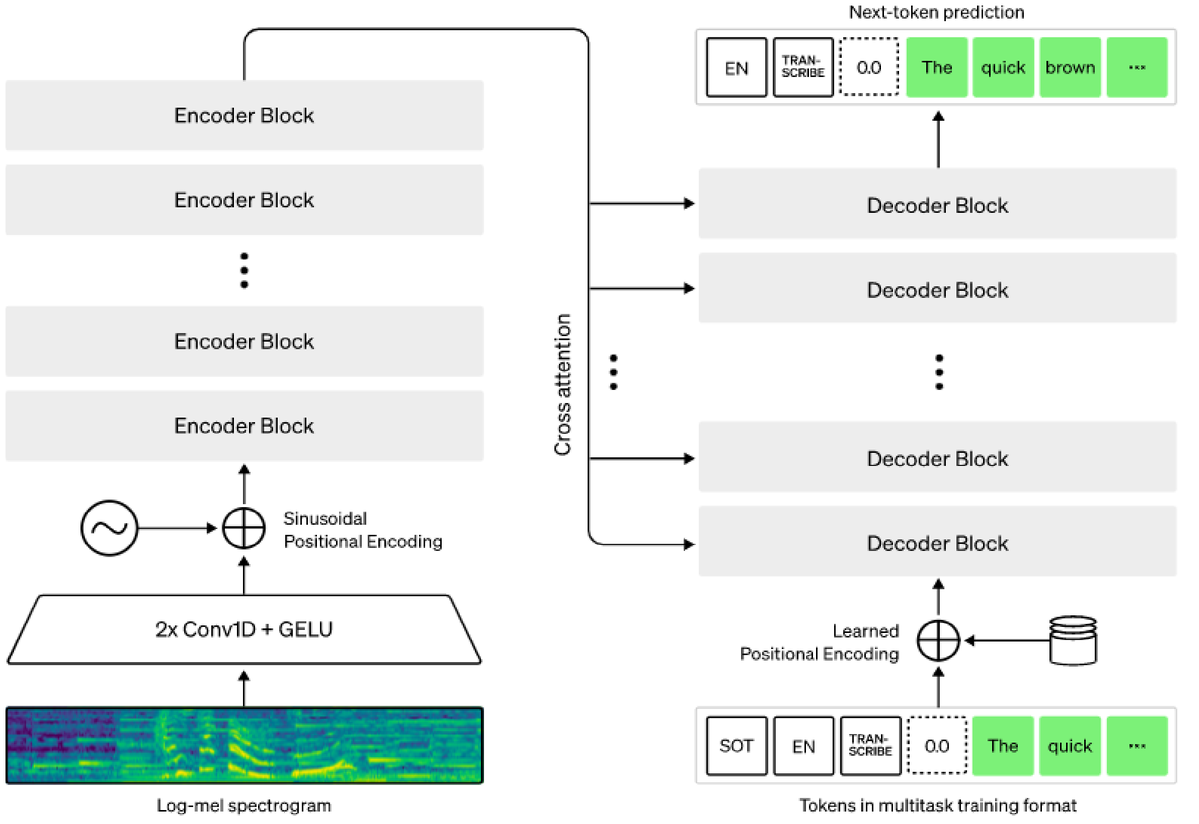


# From Conversational Agent



# Whisper

Addition of a State-of-the-art
Speech-to-Text



# Personalization

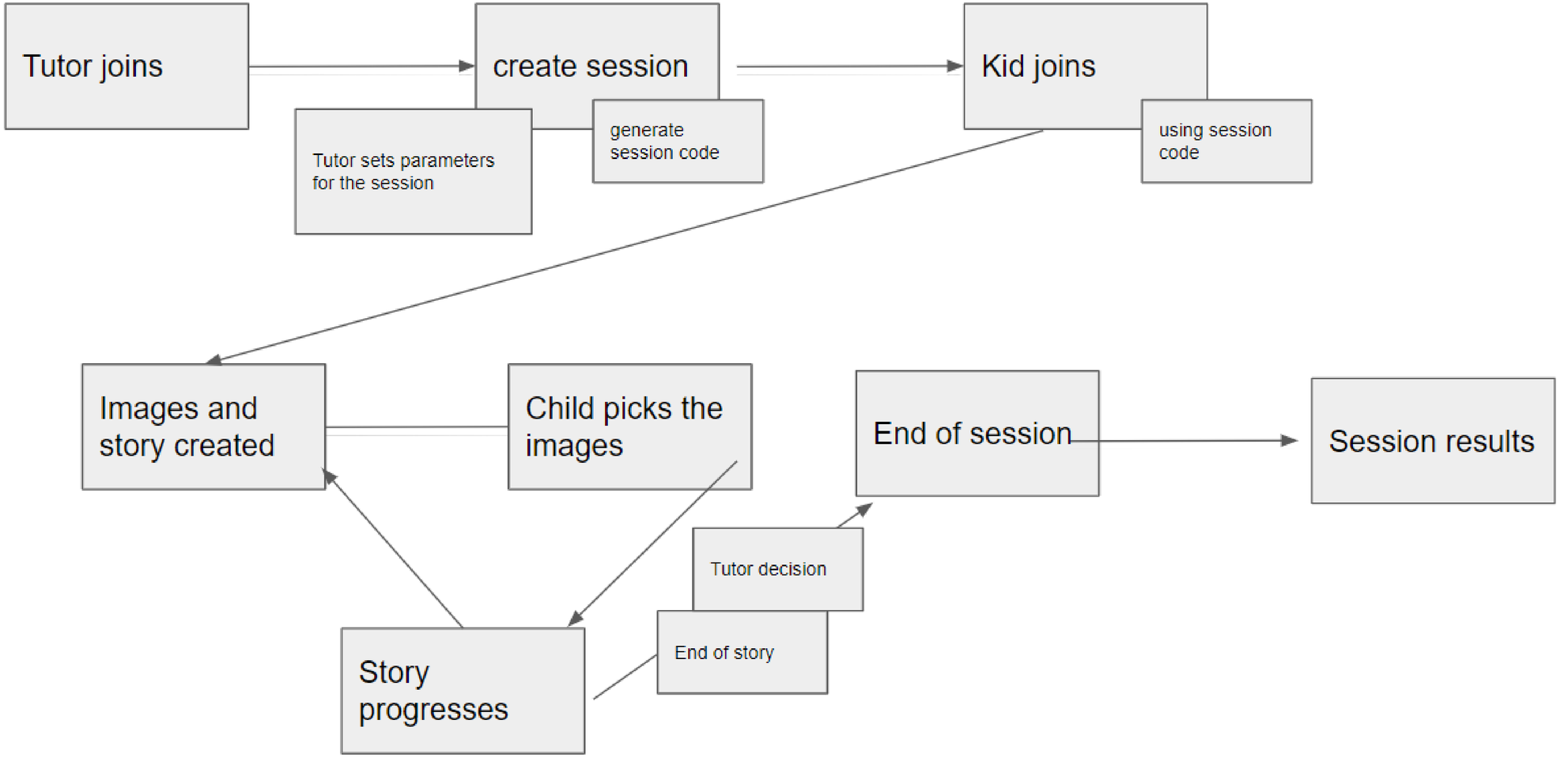
From the dialogue with the therapists it emerged the key point was the ability to customize the proposed solutions

Age
Cognitive Ability
Disorders
Individual Preferences
Length of the stories
Involvement with the tool

# Storytelling

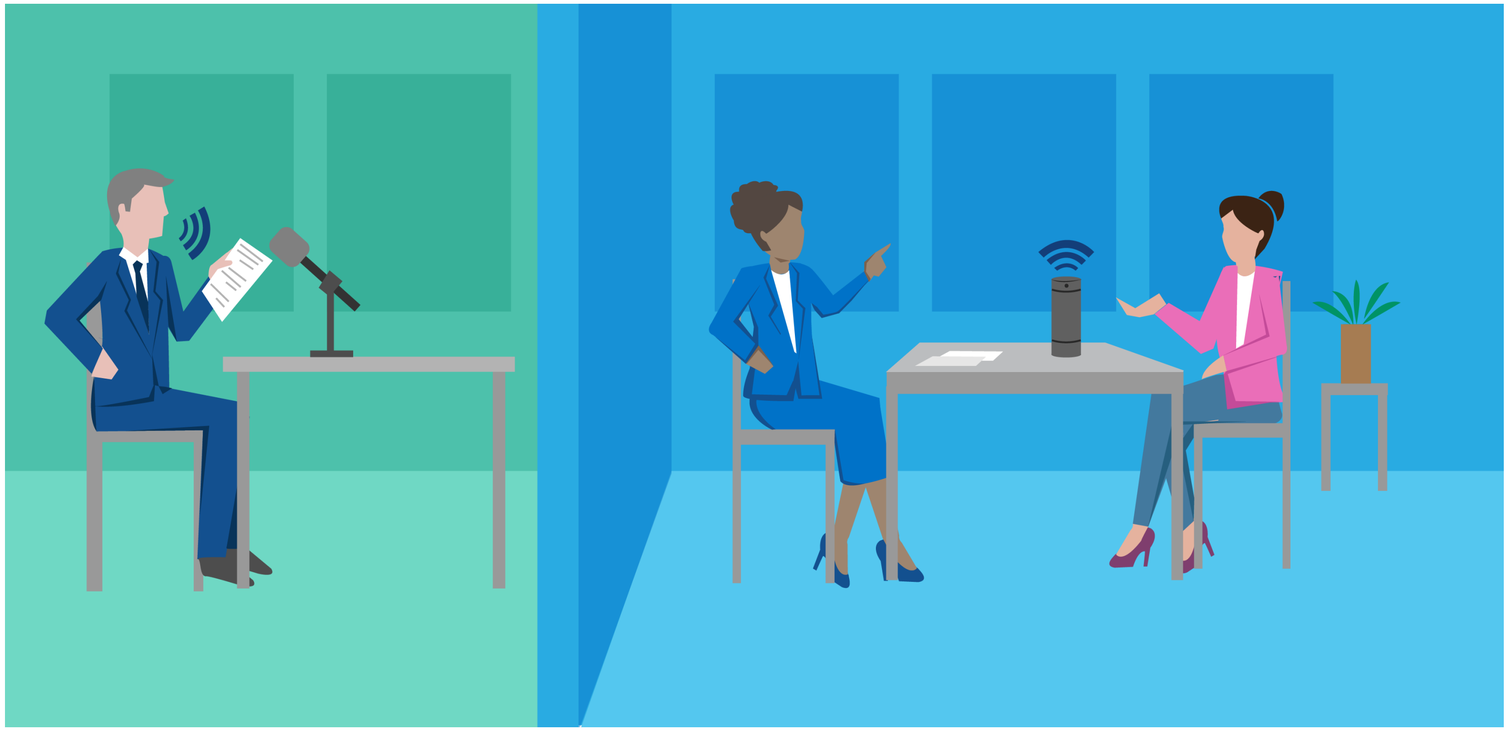
- Stories according to children passions and interets
- Engagement
- Use of visuals and sounds
- Possibilities to tell meaningful stories and veicolate meaning

# Flow


Tutor joins
create session
Tutor sets parameters for the session
generate session code
Kid joins
using session code
Images and story created
Child picks the images
End of session
Session results
Tutor decision
End of story
Story progresses

# Wizard of Oz

Wizard of Oz (WoZ) is a method where participants interact with a system that they believe to be autonomous, but in reality, is controlled by an unseen human operator in the next room



# Scegli il protagonista

Dinosauro

Principe

Razzo

# ARTIGLIO

# Scegli il luogo

Castello

Foresta

Spazio

# FAMIGLIA

# Scegli l'avventura

Drago

Tesoro

Mago

CONIGLIO

# COMPLIMENTI !!!

# Data collection

- Virtuous cycle for the improvement of proposed tools
- Data gathering for similar tasks
- Creation of virtual data-set  for therapists

# Further on

- Hugging face: for the creation of disney-like art
- Dall-E: for the creation of art from text
- OpenFace: for the recognition of facial movements
- MediaPipe: for body and face recognition
- Emotional recognition: based on the work of Emoty by Fabio Catania