



ComFiM: A Cooperative Serious Game to Encourage the Development of Communicative Skills between Children with Autism

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Autism



- Impairments in skills related to three main areas:
 - Social Interaction;
 - Communication;
 - Repetitive and restrict behavior and interests.



Autism

- 50% of the people diagnosed with autism have problems in developing any kind of functional language.
- Those who develop it usually have impairments to:
 - Use it effectively to interact socially;
 - Share information;
 - Synchronize or maintain dialogues.





Games

- Definition:
 - Formal system, rules, player exerts effort and is emotionally attached to results.
- Serious Games:
 - Learning and development of skills through challenge;
 - Connection between real and virtual world;
 - Purpose of learning (but still entertaining).





Main Contributions

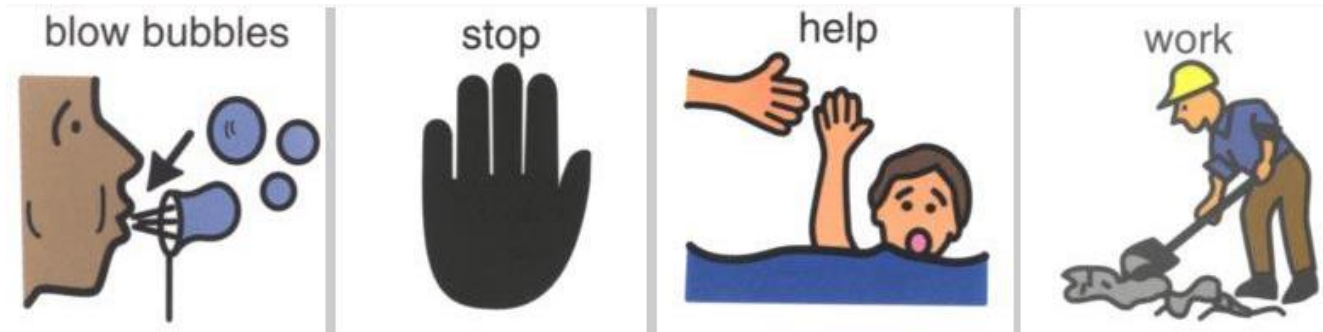
- Development of a cooperative multi-player game to encourage communication as an interactive and dynamic process;
- Provision of an environment that can be customized according to the target group needs;
- Evaluation of ComFiM in generating communicative situations and the intentions of in the target group.



ComFiM

Design Decisions

- Simple interfaces (without much visual stimuli);
- Guided interfaces (small set of answers to choose between);
- Use of real images (greater chance of recognizing them);
- Use of a tutor (to guide the user);
- Communication based on the PECS;

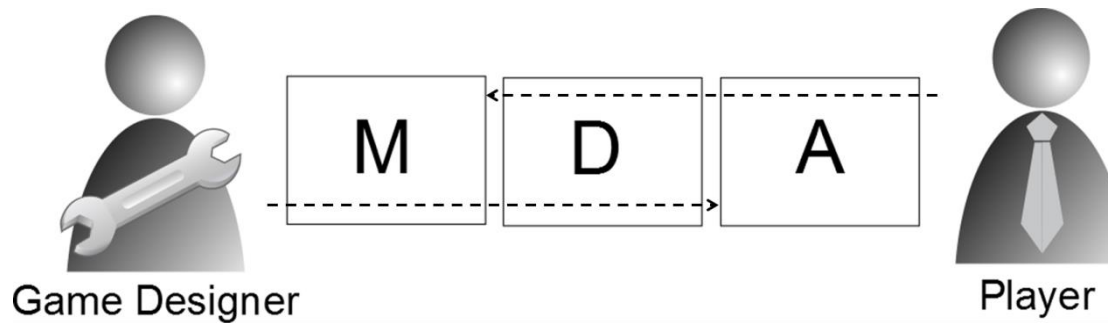


- Customized environment.

ComFiM

Design Decisions

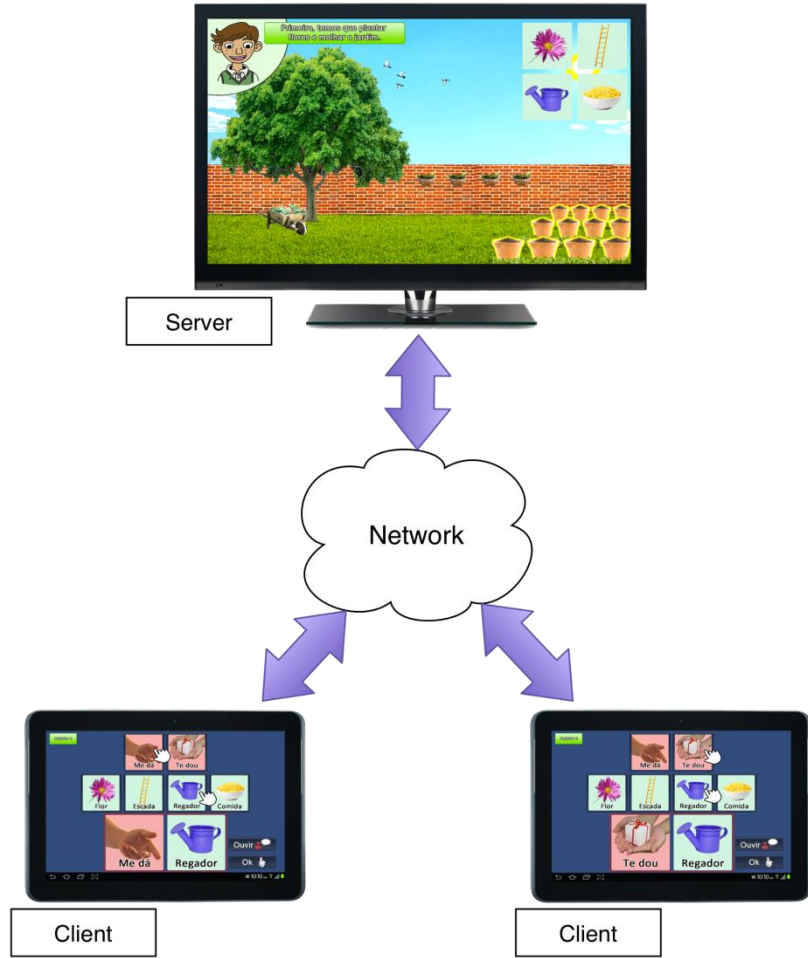
- Use of the MDA Framework:



- Design the mechanics that lead to the following aesthetic experiences:
 - Challenge, in overcoming challenges proposed by the tutor;
 - Fellowship, in the interaction between players to solve the challenges;
 - Discovery, in the learning of new vocabulary.

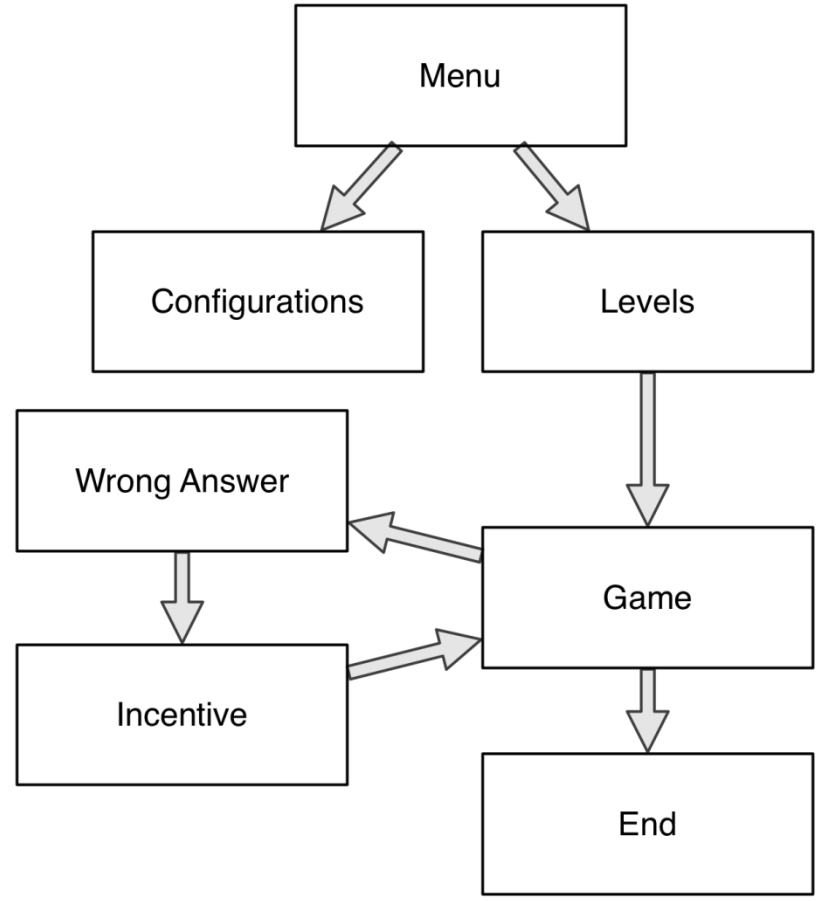
ComFiM

Architecture



ComFiM

Structure



ComFiM

Levels

- Learning (level 1):
 - Individual
 - Tutor as a communication partner
- Ask/Receive (level 2):
 - Collaborative
 - Tutor as a mediator of the communication
 - Each player plays a role that changes per turn
- Collaboration (level 3):
 - Collaborative
 - Tutor as a mediator of the communication
 - Each player plays all possible roles per turn





Study Case

Player	Age	Gender	Verbal	Literate
A	11	F	Y	N
B	11	M	N	N
C	5	M	N	N
D	5	M	Y	N

- Test sessions were carried out for 9 weeks;
- Each session comprehend various essays;
- Each session had a therapist assisting the children;
- Each essay had a duration from 5 to 10 minutes.





Study Case

Level 1

- **Goals:**

- Identify how the children conceive the messages sent by the tutor;
- Identify how the children deal with the technology;
- Identify the existing collaborative relationship between them.





Case Study

Level 1

- Analysis:

- All children completed the level with full control of the tablet;
- Some showed difficulty in sharing attention between the tablet and the TV;
- Some acquired new vocabulary;
- It was observed a great interest in the technology;
- The younger children presented impatience in interacting with the game.





Case Study

Levels 2 and 3

- **Goals:**

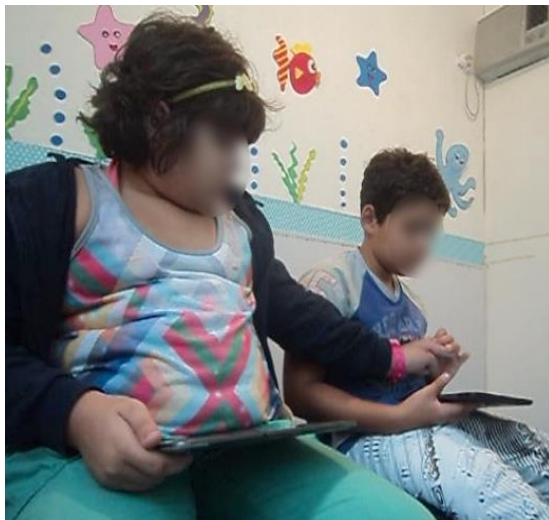
- Identify how the children adapt to the new level;
- Identify how each player understands the role of the tutor as a mediator and of his partner as a collaborator;
- Identify communication intentions showed by each player to motivate some action of his partner and thus achieve the goal of the game.



Case Study

Level 2

- Analysis:
 - Some children had an initial difficulty in identifying that his partner was no longer the tutor;
 - Others had difficulty differentiating when they should play each role;
 - It was observed different intentions of communications.





Case Study

Level 3

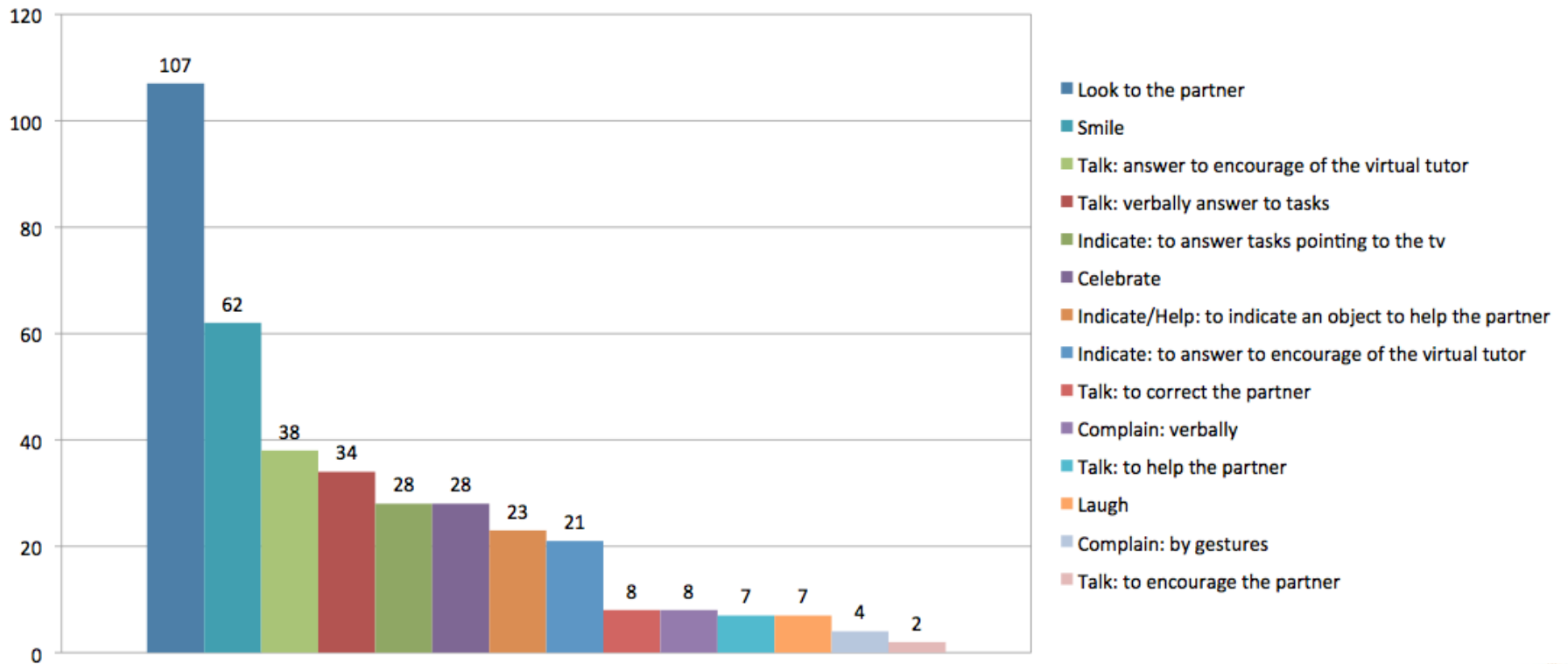
- Analysis:
 - Some players had difficulty in understanding that in the same turn they should play each role and perform the task jointly;
 - It was observed an increase in the amount of intentions of communication.





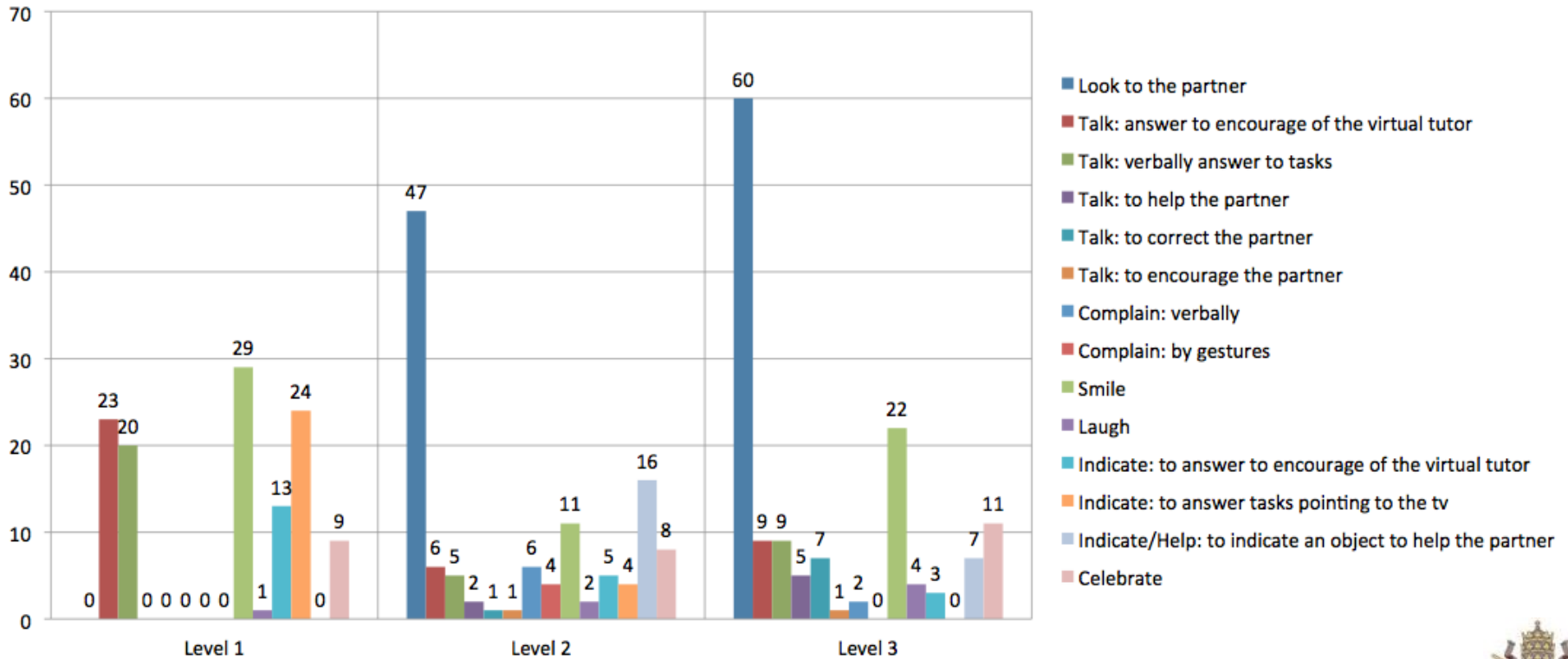
Case Study

Intentions of Communications



Case Study

Intentions of Communications





Conclusions

- ComFiM allowed the generation of a considerable set of communicative situations;
- The children were able to understand different roles present in a simple communication;
- The game showed that tablets can be used to encourage communicative activities;
- Some changes could be made to provide a better environment to work the communication skills of people with autism.





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