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

<table>
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<th>Player</th>
<th>Age</th>
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<th>Verbal</th>
<th>Literate</th>
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<tr>
<td>D</td>
<td>5</td>
<td>M</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

- 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 conceives 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

There was an increase in the number of communication intentions observed.
Case Study
Intentions of Communications

There was an increase in the number of communication intentions observed.
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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