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Extended Abstract

Guidelines to Support Graphical User Interface Design for Children with Autism Spectrum Disorder: An Interdisciplinary Approach †

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Abstract: The study aims to describe the guidelines to support user interface design for develop technology centered in the specific learning style, abilities and needs of children with Autism Spectrum Disorder (ASD). This research study describes the conclusions drawn following a process of interactive design of software, ASD Module, In-TIC PC. Four groups of participants were involved in the process: specialists with experience in the intervention with people with ASD, specialists with experience in the development and design of technology for people with disability, children with ASD and their families (n = 39). The techniques used to formalize the collection of information from different groups of participants were observation, interview, group discussions and a questionnaire. The results of the study target the development of a design guide that includes the evidence, the basic ideas and suggestions deduced from the design and development process of the ASD Module. This translates into a list of rules with suggestions to consider in the design and adaptation of technology for children with ASD. These guidelines of interface design provide useful information for researchers, developers, social and healthcare professionals and families, with the aim of offering alternatives for children with ASD and facilitating the understanding of daily life.

Keywords: Human-Computer Interface; Interdisciplinary Projects; Pedagogical Issues; Activities of Daily Living; Autism; children

1. Introduction

The type of technology used in interventions with people with ASD is varied: computers, mobile devices, video recordings, robots and virtual reality. In the last two decades, software developed in this field has increased in numbers [1]. In this regard, a clear example is the free or low-cost initiatives that offer technological solutions for people with ASD.

Technology developers expressed a clear interest to design programs that met the needs of this population [2–4]. Therefore, at present, not much evidence describes the developmental and design procedure that allows generating technology centered in the specific learning style, abilities and needs of children with ASD.

2. Material and Methods

A cross-sectional study design was employed. The Autonomous Ethics Committee of Research in Galicia approved the protocol (code: 2014/558).

2.1. Participants and Settings

Four groups of respondents were participated in the study (n = 39): Professionals with experience in the intervention with people with ASD (first group); Professionals with experience in the development and design of technology for people with disability (second group); Family members of people with ASD (third group) and children with ASD (fourth group).

2.2. Procedure

Research has been based on user-centered design and has followed an iterative procedure. This is a cyclical process, divided into the following phases:

- Study and analysis of the recent scientific evidence on the design of technology for people with ASD. Participants: 2nd Group.
- Study and analysis of the recent scientific evidence on the skills and ways of processing information by people with ASD. Participants: 2nd Group.
- Observation, analysis and discussion on the skills and ways of processing of this population and their influence on the design of technology. Participants: 1st, 2nd, 3rd, and 4th Groups.
- Design and development of the application. Participants: 2nd Group.
- Software testing by professionals and family members of people with ASD. Participants: 1st and 3rd Groups.
- Software quality improvement. Participants: 2nd Group.
- After this iterative process, the resulting application was tested by the 4th Group, that is, children with ASD.

3. Results

The result of the study targets the development of a design guide that includes the evidence, the basic ideas and suggestions deduced from the design and development process of the ASD Module. This translates into a list of rules with suggestions to consider in the customization and adaptation of technology for people with ASD. The rules extracted from the process are listed below:

1. The Software and its Contents Are Based on a Person's Abilities, Desires and Interests
2. The Design of the Interface is Simple and the Information Displayed is Simplified
3. Use of Images to Display Information
4. The Images Convey the Meaning of the Actual Element
5. The Use of Images Allows Users to Adapt According to their Level of Visual Cognition
6. The Image is Accompanied by the Written Word
7. Speech Synthesis is Used to Facilitate Communication or as Reinforcement to the Command
8. The Information is Displayed in a Multimodal Way (Visual and Auditory) and it is Adapted According to the Sensory Style Preferred by each Child
9. The Background Color is Used to Facilitate the Information Processing
10. The User has the Possibility to Customize all Relevant Aspects

4. Discussion

Some of the most complex decisions are related to the differences in the perception of people with ASD. In connection with this, it is explained that people with ASD process visual information more easily [3,5–9], although it is generally assumed that it is increasingly necessary to evaluate the sensory style of each person. Similarly, it is understood that the simultaneous display of auditory and visual stimuli help to learn, but in some cases, people with ASD need to be provided with information through their preferred sensory channel [3,10].

Finally, one of the premises supported by almost all the literature is the need for customization of technology.

5. Conclusions

This list of rules for technology design and customization provides useful information for researchers, developers, social and healthcare professionals and families, with the aim of offering alternatives for children with ASD and facilitating the understanding of daily life.

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