

Research Article

Cangame App: A Multidisciplinary Approach for the Treatment of Autistic Child

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Introduction

The autism, also known as autistic disorder, childhood autism and precocious infantile autism, is the most well-known pervasive developmental disorders (PDDs). Child with this kind of disorder has problem in the social interaction and spoken language. The problems of social interaction, spoken language among others limitation standards have been present since the first years in the child's life. About 60% to 70% of the individuals with autism has intellectual disability, however recent studies have been shown that this percent is decreasing. These results show a larger perception of the researchers about the operation manifestations shown autism, it allows one number each time larger of individuals be diagnosed with this condition [1]. The difficulties in social interaction on PDDs are shown through isolation or inappropriate social behavior; poor visual contact; difficulty taking part in group activities; affective indifference or improper demonstrations of affection; lack of social or emotional empathy, and repeating words without meanings. As soon as these individuals reach the adult age, there is an improvement in the social isolation, however the lack of social ability and difficulty establishing peer friendships persist. This problem has impact in the professional life of the autistic; it results in economically inactive individuals. The autism in the teenager phase has been interpreted of way mistaken for other people, as well as he/she has difficulty to comprehend and to interpret feelings as sarcasm, rage, happiness, etc. The autistic adult, even with adequate cognitive skills, tends to isolate himself/herself. The difficulties in communication occur in varied levels, so much in the spoken ability as non-speech, these difficulties propitiate the social isolation. Some children do not develop speech abilities. Other have an immature language characterized by jargon, echolalia, pronoun reversions, monotonous intonation, etc. The ones who have an expressive capacity, they do not have ability to start and to keep appropriate talks. The language and communication deficits persist in the adult live and a significant portion of autistic remain non-verbal. The ones who acquire verbal abilities can demonstrate persistent deficits in establish conversation, such as lack of reciprocity, difficulties comprehending language subtleties, jokes, etc.

The thought generated in us the need to propose effective and appropriate interventions to help autistic child and his/her families.

Work Context

The autism is a disturbance of development characterized by serious and specific delay, also for dysfunctions of spoken language, social behavior and cognitive development [2]. The autism is considered one of the most serious infant Neuropsychiatric disorder which has affected from 2 to 5 infants to each 10.00 children [3]. It is more prevalent in boys, however, when it occurs in girls, they generally are much more affected than in boys.

In text [4], we can realize the importance and reason of the development of Cangame. According to the author, there is not a specific treatment for the autism cases, but several individual approaches whose results are many. Examples of this treatment: psychoanalysis, psychotherapy and family therapy, Audiology, special education, sensory stimulation, sensory isolation and electroconvulsive. Besides the treatments with medicines: psychotropic substances, cerebral stimulants, vitamins and lysergic acid.

A method can work for a child and cannot work for another, because of factors as variation of the intellectual capacity, comprehension and use of the spoken language, development stage, age of the child in the period of treatment, stage of gravity disease and family structure. Each therapeutic method gets to improve a specific symptom, but does not kill it completely; because of this, it is necessary to adapt the method to a problem and specific phase of realistic way.

Though the scope of technology, computers are promising tools to assist people's development with autism. Since 1973, some researches have been showing positive results in the computers utilization to treat people with autism [5]. Nowadays several jobs explore the use of computer as support for people's development with autism. There are jobs in the area of the virtual reality [6], robotics [7], facial recognition [8], and cooperative games [9] among others, which use technology for that purpose. One of the main factors that motivate the computers use in the treatment of these people is the possibility to create controlled and interesting environments without distractions. These are important characteristics for the success of the people's treatment with autism [10]. According to Moore [11] were investigated the effect of the use of a computer program to teach vocabulary for children with autism. The obtained results show that children learnt more using the computer than assisted by the teacher. According to [12] the use of a program for treatment of the social behavior of children with autism. The children had to meet a solution for different scenarios that involved problematic characters and social conflicts.

This theoretical background justify the importance of our research for the scientific scenery. However, it is important to list some important characteristics for Cangame's elaboration:

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A. Phases of life - the mobile application is customizable according to life phase of their users, it attends their needs while child, young and adults also enabling the monitoring a lifetime of the user.

B. Telemedicine - the activities produce a mistakes and successes report that will be sent to a cloud where doctors, educators and family can accompany the treatment evolution.

C. Customizing of the application - the mobile application is customizable by user under creation aspect and content, and the form of interaction contributes with learning process.

Overview of Management of Treatment

Cangame Maker uses PECs (Picture Exchange Communication System) methodology by means learning routines. This methodology enables PECs is customized according to user's context home.

PECs are composed by images, videos, audios and texts. The mobile application measures user's development by means of periodic reports, it allows be created a learning environment that promotes the development of the spoken language and of the social autonomy, in this way to attend the following requirements:

- A. Promote the autistic's development through learning process;
- B. Be a development support instrument for the autism in all phases of life;
- C. Stimulate spoken language and social interaction;
- D. Reduce time and cost regarding the treatment and autistic's development;
- E. Be a tool that can be used by all professionals involved with people's treatment with autism;
- F. Promote social autonomy;
- G. Create learning routines based on specific needs of each autistic;
- H. Be an interaction facilitator between the autistic person and the labor market;
- I. Enable that the treatment be effected in several environments by means of the mobility.

The main factor for the development of this project is its importance for the current scenario, according to government's research of The United States; the autism cases increase 01 in 68 children with 8 years old - the equivalent to 1,47%. CDC (Center of Diseases Control and Prevention) of the government of The United States [13]. World Health Organization considers the numbers of the United States estimated for all planet, once that there is no prevalence confirmation of autism cases in other region of the planet or ethnicity. In Brazil, the estimate is more than 2 million people with autism.

On the basis of these numbers, we affirm that Cangame is an important tool of social inclusion of people with autism. Cangame is an inclusion instrument to be used in the family environment, at school and in the community.

On education, people's social inclusion with autism can be worked with spoken language activities, making potent routine activities. Cangame assists to transform complex activities in simple activities, and it also can help people with ADHD (Figure 1).

Software Methodologies

A reference that addresses this same perspective, so that it can justify and comment such research, can be found in [8]:

Planning Work: Bibliography of work in related areas, the development and implementation of the proposal, among others.

Literature Review: Accomplished readings in the areas of autism, inclusive education, supported job, assistive technology and mobile application.

Information Collection and Analysis: Material collection by means of questionnaires to identify the needs and characteristics of people with autism, thus contributing to the development of Cangame.

Development Scenario for Proposed Application: For the creation of the scenario, we consider as priority the spoken language and cognitive development. Therefore, these guidelines determine that all information and the UI components must be presented and be comprehended by everybody.

Modeling and Prototyping: The prototype should promote the professional, social and educational inclusion, as well as access to the treatment and learning.

Trials: The tests were accomplished in usability character, comprehension of the activities and response time. Considering the use of mobile application in the treatment form and risks. In order to the risks did not impair the treatment.

Mapping of needs to autistic: The mapping occurred about the needs that are specific according to the phrase of autistic's life. In addition, the needs that family, educators and professionals have to promote the treatment and learning.

Refinement of the Proposed Approach: The proposed process should be refined as the initial prototype is developed and tested and as the results of evaluations are obtained.

The methodology can be modified according to the requirements requested by the supervisor or requirements established by requiring a new schedule.

Overview of Applicative Cangame

Cangame is a mobile application for android system. This mobile application assists in people's treatment with autism; it helps in the cognitive development and social interaction by means of routines activities. The proposal of customizing activities, it allows us to create specific content for autism. Using suitable photos, texts, audio and videos for the cognitive development and social interaction. The same can be used by parents, educators and health professionals who monitoring autistic's development.

This is a mobile application for routines activities elaboration and social learning; it also is called Cangame Maker, which is a learning instrument for people with autism, and ADHD.

Proceeding: first, create the autistic profile so that professional can identify mistakes and successes and allow him/her to do adaptation of the activities according to autistic's needs. Second, create PEC using photos taken with smartphone or available images on internet. After choose an image, add a text, an audio or video with purpose of reinforcing or intensify the learning. This way, contribute for cost and time reduction or treatment (Figure 2).

In sequence, create customized activities by categories of social routines about family, home, job etc., which generate reports about mistakes and successes. These reports will be shared with all professionals involved in the development process of the autistic.

Conclusion and Outlook

The development of this project, Cangame, in its research process provided us a great experience in the scientific academic field in software, besides the access to the market. Nowadays, Cangame became a commercial product with impact in the areas of health,

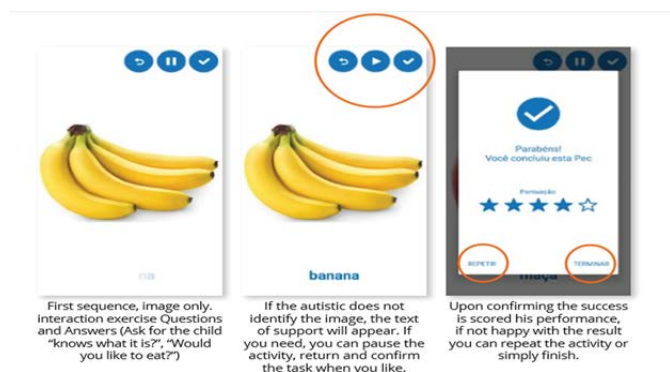


Figure 1: Learning in a simple way to know the fruits

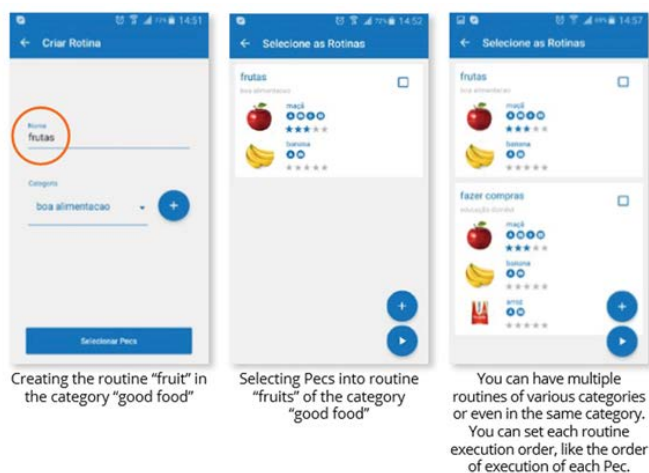


Figure 2: Creating routines of learning, classified by categories and using resources of Video, audio and text

social and educational.

At present, Cangame is in study process of news products that will be incorporated. The new products will turn this mobile application into a package of services that will attend the needs to treatment of the autistic and his/her cognitive and social development. Among them, it highlights NFC (Near Field Communication) because some learning activity cannot be scheduled or have schedules pre-established. However, it is necessary to guarantee for the autistic appropriate conditions for decision taking to avoid social embarrassment. Thus, the social labels of communication are going to act as a support mechanism; for that, the information contained in smartphones will help in the creation of a PEC or a learning routine. These actions will provide facilities and autonomy.

Cangame, besides focusing on the use of the daily routine and in health, also is a tool that researches the process of professional

inclusion beside companies that act in the market at supporting jobs and promoting social inclusion.

With the purpose of obtaining registration beside FDA (Food and Drug Administration), new mediation and evaluation points are in development by researchers of this project who seek partnerships that contribute to the insertion of this product in the American market of autism.

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