LivingLabs ict

Apulia innovation in progress

ROBIN Project

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Abstract

The ROBIN project aims to realise a computer-based exercise platform that can promote a multi-faceted representation of data and thus constitute a valid tool in teaching activities, mainly in presence of specific learning impairments. The platform is reinforced by the use of an anthropomorfic robotic system, developing a playful and stimulating environment able to support children affected by dyslexia.

Keywords

Dyslexia, teaching, robot-aided learning.

Living Lab

New Media and Robotics - ROBIN

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Robin

The ROBIN project realises a multimedia robotic system integrated with the OMNIACARE software platform, developed by eResult, that enables to cope with the miscellaneous disability-related conditions. Among the different types of disabilities, the SLD – Specific Learning Disabilities take on great importance and among them in particular the ones related to dyslexia disorders.

"Dyslexia" is a specific difficulty that refers to the ability to read accurately and fluent and which is often characterized by poor writing skills. The dyslexic subjects have great difficulty in learning to read, reading is slow, laborious, and usually inaccurate. The ability to read is struggling to become an automated task and continues to require a major investment of cognitive resources. Reading disability affects about 3-5% of Italian children [Stella G. 2001] and it is the most prevalent of all learning disabilities. Developmental dyslexia is diagnosed by specific difficulties with reading that cannot be explained by intelligence or lack of educational opportunities [id.]. The literature has demonstrated the functionality of the use of ICT to support dyslexic pupil in the learning tasks, but often the technological tools are developed to be used in rehabilitation treatments one by one, hardly usable in the context of teaching class. [Pinnelli S., Sorrentino C., 2013].

ROBIN, by means of OMNIACARE-based exercise platform, aims at developing a playful and stimulating environment able to support children affected by dyslexia not only in the cognitive stage in order to facilitate their learning activity, but also and particularly in their relational and growing path.

TECHNOLOGY

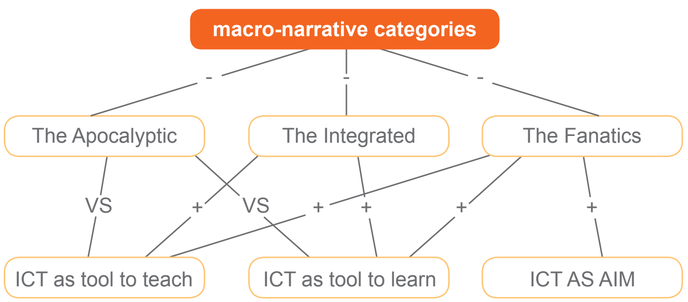
The goals are pursued through the use of a kit consisting of an anthropomorphic robot, NAO, which interfaces with a laptop and the OMNIACARE platform, hosted on a remote server accessible via the Internet and capable of recording all the performance data of the exercise.

METHODOLOGY

The ROBIN system and the services it provides have been shaped around the UCD - User Center Design methodology. It is a design philosophy and a process which focus the attention on the user's need, expectations and limits in respect to the final product. The user is therefore placed at the center of each step of the development process in order to maximize the usability and acceptance of the product, optimizing it around the needs of the users. The UCD methodology is characterized by a multi-level co-design and problem solving process which requires designers not only to analyse and foresee how the user will utilize the final product, but to test and validate at the same time their assumptions by taking into consideration the end-user's behaviour during the usability and accessibility tests (test of user-experience) into the real world. The UCD methodology arrives at the creation of the final product through an interactive process that provides the development of a first prototype and a following test and assessment stage on the basis of which to proceed with the development of the next prototype. Each cycle therefore leads to the creation of a product that is closest to the real and practical needs of the user.

ANALYSIS OF USERS

Although over the last twenty years have been tested and produced many hardware and software for education, even for students with special needs, but often they have been developed without a real and critical analysis of the user needs. The starting point of Robin, however, was just that. The desire to explore and embrace the part of the school community the experiences, attitudes, expectations and needs that technology should groped for an answer. To explore the problems and potential of ICT to support learning processes with dyslexic students was used the survey technique of focus groups: a special type of group interview that is designed to produce data on a specific topic by comparing participants [Zammuner V. L. 2003].



The comparison between the clusters of FG conducted with groups of adults (A, B, C, E), has also highlight three different macro-narrative categories.

In the FG with adults 4 meaning cores emerge about the function of the interaction with ICT and with the robot Nao. On these cores focused discussion, analyzing them in terms of expectations and critical aspects. In the first case emerged the desiderata, in the second one some suggested solutions to some of the problems (see figure)

The results of the FG have become the guidelines for the development of the LMS. It provides three main categories of work, each with three different types of activities. Each activity is calibrated to 3 school levels: first cycle of primary school, second cycle of primary school, first cycle of secondary school, for each school level, all activities are graded on at least three levels of difficulty.

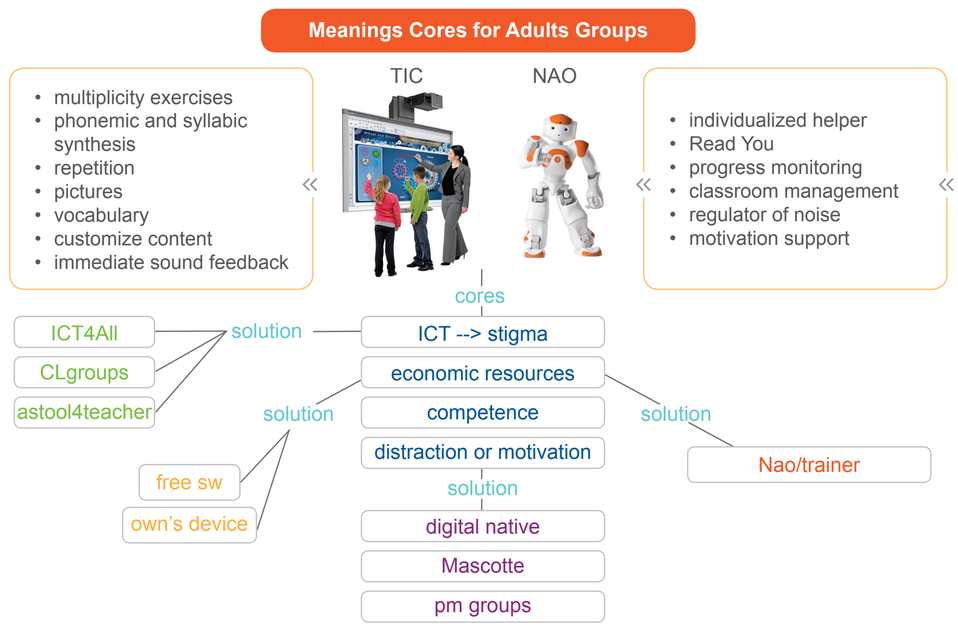


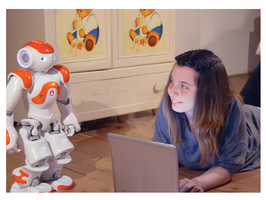
Figure 3 Map of the FG Adult results

ACTIVITIES

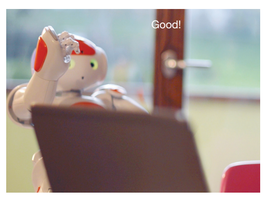
1. Reading comprehension (with the evaluation index of readability Gullpease and with the possibility to obtain the reading accompanied)
2. Educational games with the goal of strengthening the phonological competence
3. Activities to strengthen visual-spatial skills

PROJECT SCENARIO

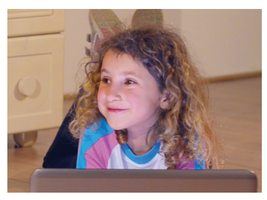
01 The teacher processes through the system different exercises related to a specific subject specifying the results to be achieved and the timetable and connecting them to the pupil's profile.



02 The pupil carries out the planned activities helped by the robot.



03 The robot through automatic pre-set questions verifies then the pupil's understanding level and returns positive and/or reinforcement feedback.



04 The pupil increases its own autonomy and perceived self-confidence and gets strong sensation of gratification.

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Progetto realizzato in collaborazione con

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