Learning Kit For Children With Special Needs: The RGACD Learning Kit

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Abstract:

Background: We, the Research Group to Aid Child Development (RGACD), are working in the vein of converging various sides of medical and physical sciences. Here, we present a Microcontroller based learning system, which has been named "The RGACD Learning Kit".

Methods: It is a Microcontroller and Infrared sensor based unique portable, a plug and play styled learning tool mainly targeted towards children with special needs to aid their physical and mental development. The kit is equipped with 3-D models of everyday objects and other common surroundings. Based on the response of the user it will show various knowledgeable videos about the objects on a connected screen or Personal Computer. The kit has been made to be highly interactive by introducing two modes**:** a) Learning mode- where the user picks a random object and learns about it. b) Teaching mode- Where the kit's system randomly generates an object's name in the screen and prompts the user to pick it up. If the wrong one is picked up, it will inform the user that it is wrong and if the user is right he/she will be applauded by the kit's system and the corresponding video will start to run.

An advantage of this system is that the code architecture has been made in such a way that videos can be added or replaced easily. It can be updated to suit any culture by replacing or adding videos too. The learning kit currently features various categories such as animals, shapes etc. The interface and the videos of the kit are developed specially considering children with visual, speech and hearing impairment. The videos contain text which helps children with hearing impairment to get a clear hold of the object shown. It also helps the children with speech difficulties by increasing their vocabulary with related pictures. The interface is colorful with bigger fonts. The videos are also colorful, clear and attractive to children. Children with Autism are visual learners and this kit helps to increase their cognition as well as communication level. As the kit is equipped with 3-D models of various objects it helps the development of fine and gross motors of the children. The children with visual impairment get proper orientation with the shapes of everyday object and surroundings without even seeing them properly by holding the 3-D model of an object and by hearing the essential information given about the objects in the videos. The learning kit's functions were deliberately made easy so that it can be easily accessible for children of every kind and the two modes of the kit are developed for enhancing the development of the child's mind.

Results & Observations: The kit was tested on both children with special needs and norm

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