

AN INTEGRATED AUTISM MANAGEMENT PLATFORM FOR READINESS OF INCLUSIVE SCHOOLING

Abstract

The researchers have designed and developed a comprehensive approach for managing autism in this study. An automated, time-saving mobile application for autism screening is included in the product. The implementation of a user-friendly, time-efficient assessment tool mobile application with a visual depiction of a child's progress profile is also included. For children between the ages of 2 and 6 years, a social and culturally relevant early educational intervention software application is also deployed to facilitate continuous monitoring, detect learning patterns, and provide parent education. The overall goal of the current research is to create an accessible software product that would make it easier to educate and manage the problematic behavior of children with autism. It also acts as a first-hand tool to screen and manage autism and helps to avoid unnecessary costly tests and procedures.

Keywords: Autism spectrum disorder, ASD screening, autism intervention, educational assessment

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I. INTRODUCTION

The right to an equal education, regardless of gender or how it interacts with other criteria like age, race, poverty, or disability, is still a struggle for women and girls, despite advancements. This covers obstacles in education systems, institutions, and classrooms as well as obstacles to access quality education at all levels.

The international community has recognized the equal right to quality education of everyone and committed to achieve gender equality in all fields, including education, through their acceptance of international human rights law.[1]

Out of 121 crore people, 2.68 crore in India have disabilities, as per the 2011 census report. On the disability spectrum, autism spectrum disorder (ASD) affects around 1% of the world's population. Focused measures for the welfare of people with disabilities are crucial in a time when "inclusive education" is being promoted as the best path towards "sustainable development" [2] because every student can learn, even if not on the same day or in the same way. This field requires specialized research, especially in India where there is a dearth of work in this area. There aren't enough inclusive, high-quality learning settings in Indian society, and the infrastructure for public schools is inadequate and unsafe, including the lack of cleanliness. No formal **ALL INCLUSIVE** autism management platforms is available in Indian context which address right from screening of autism, their assessment to intervention program.

The authors focused on an integrated Autism Management program for children with autism. The programme makes the process of categorizing a child according to his or her level of autism easier and simpler. This work also assists educators in visualizing and analyzing ongoing assessments, which may aid in the creation of "Individualized Education Plans" (IEPs). It is also aimed to develop a social & cultural appropriate early educational intervention application. The overall goal of the current research was to create an accessible smart phone application that would make it easier to educate and manage the problematic behavior of children with autism.

From different software trials it has been observed that children with autism, their mother or guardians and other caregivers participated spontaneously. The autism screening app acts as a first-hand tool for trained parents to understand the well being of their child suffering from autism related symptoms. By providing appropriate learning opportunities that are easily accessible to children with ASD, the mobile application significantly improved early intervention programs for these kids. During the pandemic period, the mobile applications engaged the children and their parents especially the mothers and made the learning a fun.

The paper is organized as follows: - section 2 illustrates the autism management platform in detail, software trials and its outcome is discussed in section 3, section 4 summarizes the Implications for rehabilitation.

ABOUT THE AUTISM MANAGEMENT PLATFORM

Students with autism may frequently display some strange as well as challenging behaviors. And no one intervention technique is effective in every situation [3]. Consequently, it is essential to create a methodical approach for each pupil. Even an instructor finds it difficult to monitor his or her own progress because it takes so much time and energy. Teachers and other care givers are better prepared to handle difficult conduct when given the right information and technical support. The authors' proposed platform for managing autism is intended to support parents, psychologists, and special educators during the critical phases of diagnosis and early educational intervention. A child is initially screened by the application software (in the form of a mobile application) according to their level of autism. The following step is to evaluate him or her using the proper educational assessment method. The assessment programme assists the instructor in periodically visualizing and analyzing the data on learning progress, which aids in the continuing development of the Individualized Education Plan (IEP). The pre-academic activities-based fundamental educational intervention application serves as effective teaching and learning content. With such settings, interaction between parents and children is simple, and learning is made enjoyable. Additionally, it makes the process of continual monitoring easier and aids in recognizing the pattern of learning. The workflow of the current project is shown in the schematic below (see Figure.1).

An Integrated Autism Management Platform

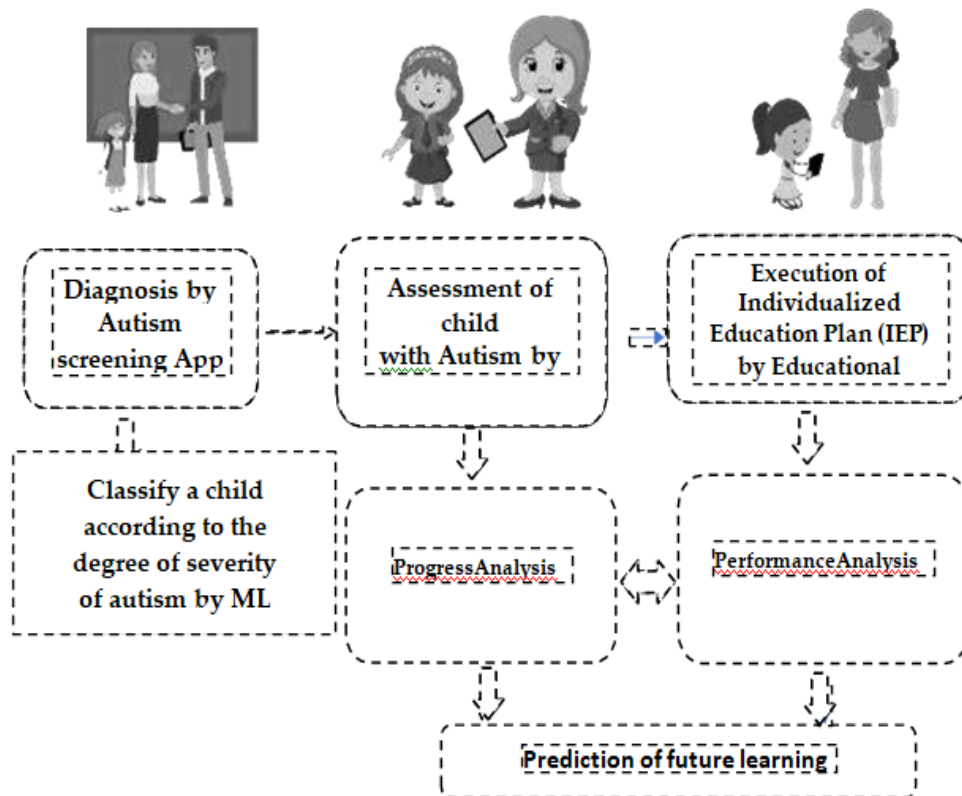


Figure 1: Workflow of the Proposed Methodology

II. ABOUT AUTISM SCREENING APP

The National Trust for the Welfare of Persons with Autism in India created the ISAA (Indian Scale for Assessment of Autism) [4] as a standardized diagnostic instrument for autism. Assessment is done on the basis of observation, clinical evaluation of behavior after interaction with the subject and also on information supplemented by parents or caregivers.

1. Aim

- Our main objective is to support parents and special educators during the challenging times around diagnosis and the start of formal therapy.
- To enhance easiness, to improve accuracy & make it time efficient.

2. Features of the Application

- 40 items under 6 domains are rated in 5 point scale ranging from 1(never) to 5 (always) in ISAA.
- A special educator must enter the level of each activity in our application based on careful observation and data provided by parents or other careers.
- The ISAA tool provides information about a child's level of autism as well as the percentage of disability based on the score. We now have a new function called domain-specific degree of impairment. (See Figure 2)

3. Benefits

- The user-friendly app will assist in determining the child's strengths and weaknesses in a certain domain. ii. Prior to a formal intervention programme, a baseline evaluation may use this information as a guideline.

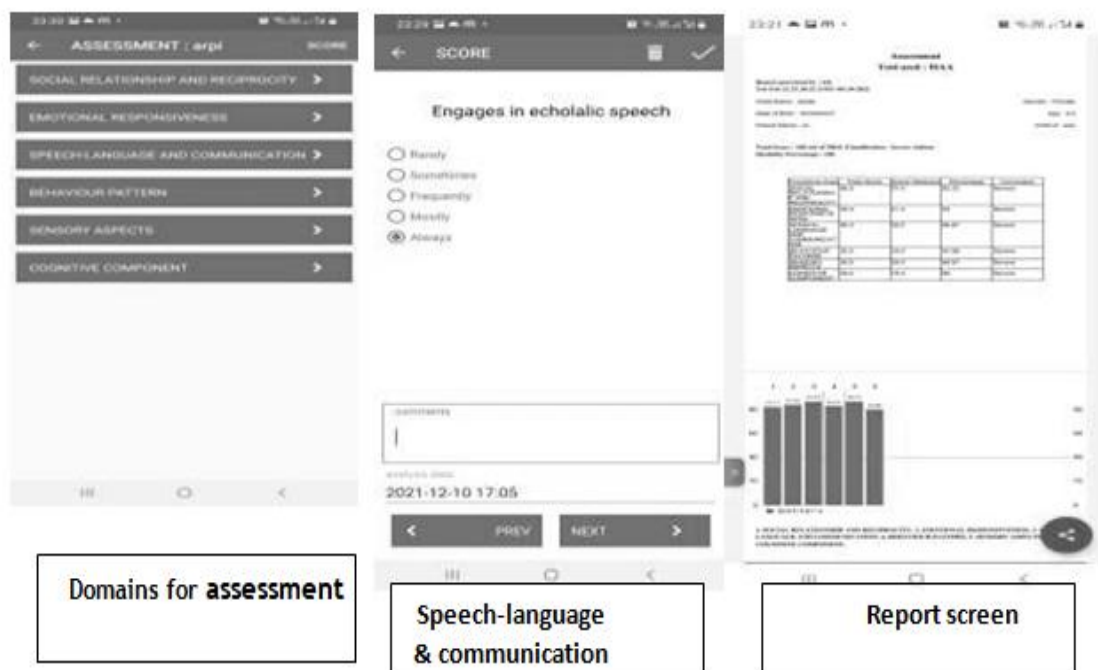


Figure 2: Screenshots of the ISAA app

4. Trials Taken

- By using the app, the ISAA tool has diagnosed about 152 children.
- Parents value the report the software generates because it allows them to identify their child's strengths and weaknesses in a methodical way.

III. DESCRIPTION OF EDUCATIONAL ASSESSMENT TOOL APP

1. Aim

- To enhance easiness, to improve accuracy & make it time efficient.
- To assist educators in creating individualized education programmes (IEPs) by helping them visualize and analyze periodic assessments.

2. Features of the Application

- All activities irrespective of assessment tools like “Indian Portage guide” [5] developed by CBR network, “Behavioral assessment scales for Indian Children with mental retardation (Basic-MR)”[6],“FACP (Functional Assessment Checklist for Programming) [7] (Part A/B)”etc. are rated on a 6-point rating scale(0-5).The adjustments are made to keep the instruments consistent, track a child's development, and quantify qualitative data.
- The teacher must keep track of the student's performance level while observing their behavior and activities. The analysis of the performance data will produce the learning pattern at regular intervals.

3. Benefits

- Domain-wise percentage shows the performance levels, their strengths, and their weaknesses. Also help to customize the Individualized Education Plan(IEP).
- The report in corporate graphical representation mentioning the comparison with previous assessment done(if any)(Refer Fig. 3)
- Data collected from the application shall be analyzed against different features & progress to be evaluated at regular interval.

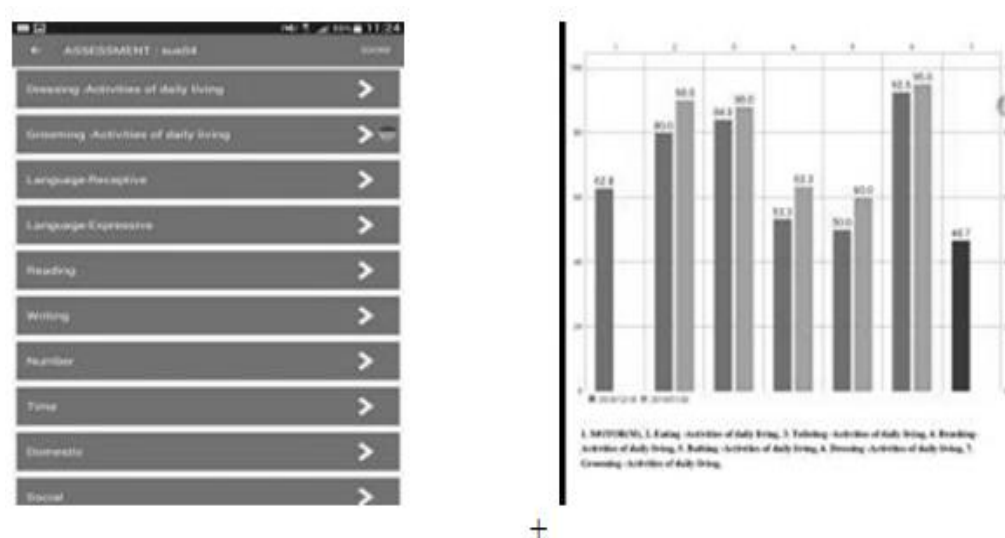


Figure 3: Screen shots of Assessment App

- 4. Trials Taken:** Through the app, 51 students were evaluated using Portage Guide, Basic MR (Part A), and FACP (Pre-Primary). The design iterations were prompted by the excellent feedback we got.

IV. An Early Educational Intervention apps for age group of 2-6 years

1. Aim

- Ease the process of continuous monitoring
- Identify the Learning pattern
- Offer Parent Education

2. Features of the Application

- Culture appropriate content and activities for each 3 major functional area (Pre-academics skill, Self help skill, social skill)
- Pre academics functional area comprising of 4 sub domains viz. pre math skill, pre reading skill, prewriting skill and functional literacy skill.
- The pre math skill comprises of various age appropriate interactive activities for developing matching, grouping, classification, sequencing, pattern making, conservation idea of a child.(Refer Fig 4)
- Pre reading skill includes sight word matching, identification of words, reading words, matching colors, fruits, picture reading.
- Pre-writing skill activities follow the conventional approach of writing such as scribbling, tracing, dot joining, copying, writing from memory.
- Functional literacy skill helps the child to learn the alphabets A-Z and numerals 1-10.
- To monitor the progress of a child performance metrics like completed learn units, throughput and pace are calculated.

3. Benefits

- Performance data collected from the intervention app will lead to construct the learning pattern.

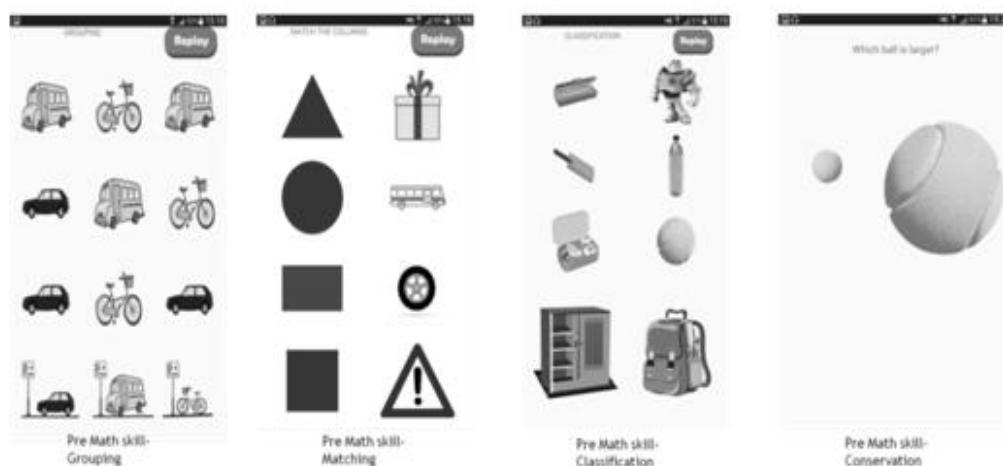


Figure 4: Snap shots from early intervention app

V. SOFTWARE TRIALS AND OUTCOME

The "Indian Scale for Assessment of Autism (ISAA)"-based autism screening tool application has evaluated about 152 students. With the use of the assessment application, 51 of them have received various forms of educational evaluations. With the use of an intervention app, instructors and psychologists may visualize and study the learning activities of their pupils. It is possible due to the comprehensive way of representation of performance data by utilizing summarization, visualization, and user-friendly interfaces. For early intervention, three software trials have been done with students with between the ages of 3 and 13. Among them 31 are male and 20 are female. Their learning trajectory is observed, and a learning progress profile is then created for each individual. In addition, a useful workshop was held to teach the parents how to prepare their children for pre-reading and pre-writing exercises. Mothers were eager to carry out the learning sessions at home after extensive demonstrations from the teachers.

From qualitative feedback collected from trained parents' majority of whom were mothers and other women care giver, it is noteworthy to mention that the autism screening mobile app assisted them at the critical juncture of early diagnosis and educational intervention. Being in close contact with their children, mother's observation may be considered as the best observation. Instead of being confused/ panic they can monitor their child's symptoms by using the app. The textual and graphical output may inform them about the degree of autism. The software also focuses on providing parents with a methodical way to identify their child's strengths and weaknesses.

VI. IMPLICATIONS FOR REHABILITATION

- Due of its accessibility and user-friendliness, the mobile application is essential for usage as an educational intervention programme for children with autism.
- In order to measure the performance characteristics and afterwards track and assess the student's progress, educators need a mobile application.
- Overall, the goal of the research was to create an accessible app that would make it simpler and more affordable to educate children with autism and deal with their troublesome behavior.

ACKNOWLEDGEMENT

The instructors, the children (Pradip Centre for Autism Management) and their parents who voluntarily participated in this research study and made the research possible are all thanked on behalf of the authors.

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