

# **An Integrated Autism Management Platform for readiness of inclusive schooling**

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## **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

## 1. Introduction

Despite progress, women and girls continue to face multiple barriers based on gender and its intersections with other factors, such as age, ethnicity, poverty, and disability, in the equal enjoyment of the right to quality education. This includes barriers, at all levels, to access quality education and within education systems, institutions, and classrooms.

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]

According to census 2011, in India, out of the 121-crore population about 2.68 crore persons suffer from disability. In the disability spectrum about 1% of the global population experience autism spectrum disorder (ASD). In an era where 'inclusive education' is being emphasized as the right path towards sustainable development [2] as **every student can learn just not on the same day or in the same way**, focused initiatives for the welfare of persons with disability are essential. Particularly, in India this field demands specialized research as the work in this field is scanty. In our Indian society there is lack of inclusive and quality learning environments and inadequate and unsafe education infrastructure, including sanitation. No formal **ALL INCLUSIVE** autism management platform 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 initiative adds easiness and simplicity to the process to classify a child according to the degree of autism. This work also helps educators to visualize and analyses periodical assessments which may help them to design Individualized Program (IEP). It is also aimed to develop a social & cultural

appropriate early educational intervention application. Overall, the present research has aimed to develop an easy reach mobile application by which educating as well as handling challenging behavior of the children with autism would be easier.

From different software trials it has been observed that children with autism, their mother or guardians and other care givers participated spontaneously. The autism screening app acts as a first-hand tool for trained parents to understand the wellbeing of their child suffering from autism related symptoms. The mobile application made a valuable contribution to early intervention program for children with autism by imparting appropriate learning opportunities readily available to them. During the pandemic period, the mobile applications engaged the children and their parents specially the mothers and made the learning a fun.

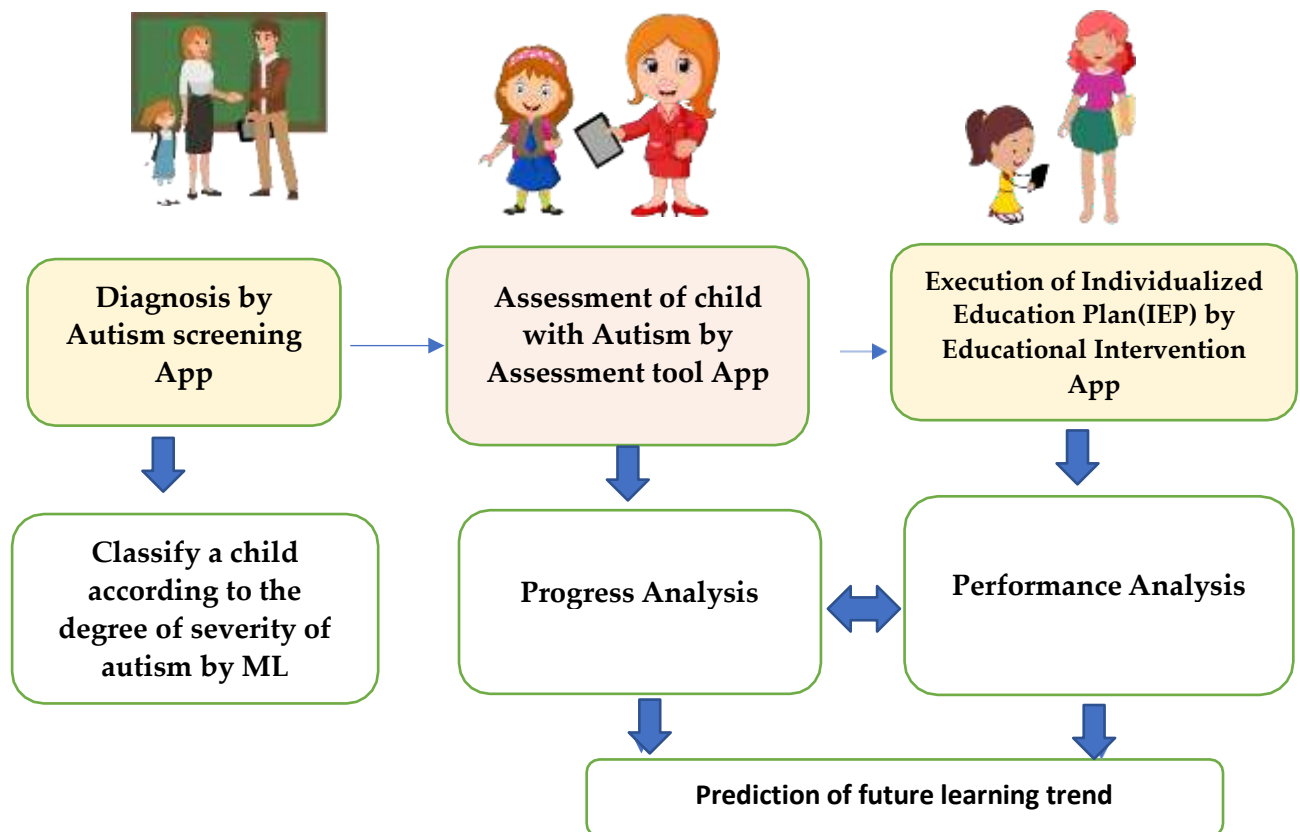
The report is ordered as follows :- section 2 illustrates the autism management platform in detail, software trials and its outcome is discussed in section 3, section 4 summarizes the Implications for rehabilitation .

## **2. About the Autism Management Platform**

Students with autism may often show some unusual and challenging behaviours. And no single method of intervention works for all [3]. Therefore, it is necessary to develop a systematic plan for each student. It is even challenging for an educator to track his/her learning progress as it is time-consuming and tiring too. When teachers and other assistants are aided with proper information and technical support, they are better equipped to deal with challenging behaviour. An autism management platform projected by the authors aims to assist the special instructors, psychologists, and parents during the crucial period of

diagnosis and early educational intervention. At first, the application software (in form of mobile application) screens a child as per the degree of autism. The next step is to assess him/her with appropriate educational assessment tool. The assessment application helps the instructor to visualize and analyse the learning progress data periodically which helps them to frame Individualized Education Plan (IEP) further. The basic educational intervention application based on pre-academic activities acts as a good teaching–learning material. The children and their parents can easily interact with such environments and learning becomes fun. It also eases the process of continuous monitoring and also helps to identify the learning pattern. The workflow of the ongoing project is depicted in the following diagram (Refer Fig. 1)

### An Integrated Autism Management Platform



**Figure 1 :** Workflow of the proposed methodology

## 2.1 About Autism Screening App

ISAA (Indian Scale for Assessment of Autism) [4] is a standardized tool for making diagnosis of persons with autism made by The National Trust for the welfare of Persons with Autism in India. Assessment is done on the basis of observation, clinical evaluation of behaviour after interaction with the subject and also on information supplemented by parents or caregivers.

### ➤ Aim

- Our goal is simple: to help special educators, parents during the stressful time of diagnosis & commencement of formal therapy.
- To enhance easiness, to improve accuracy & make it time efficient.

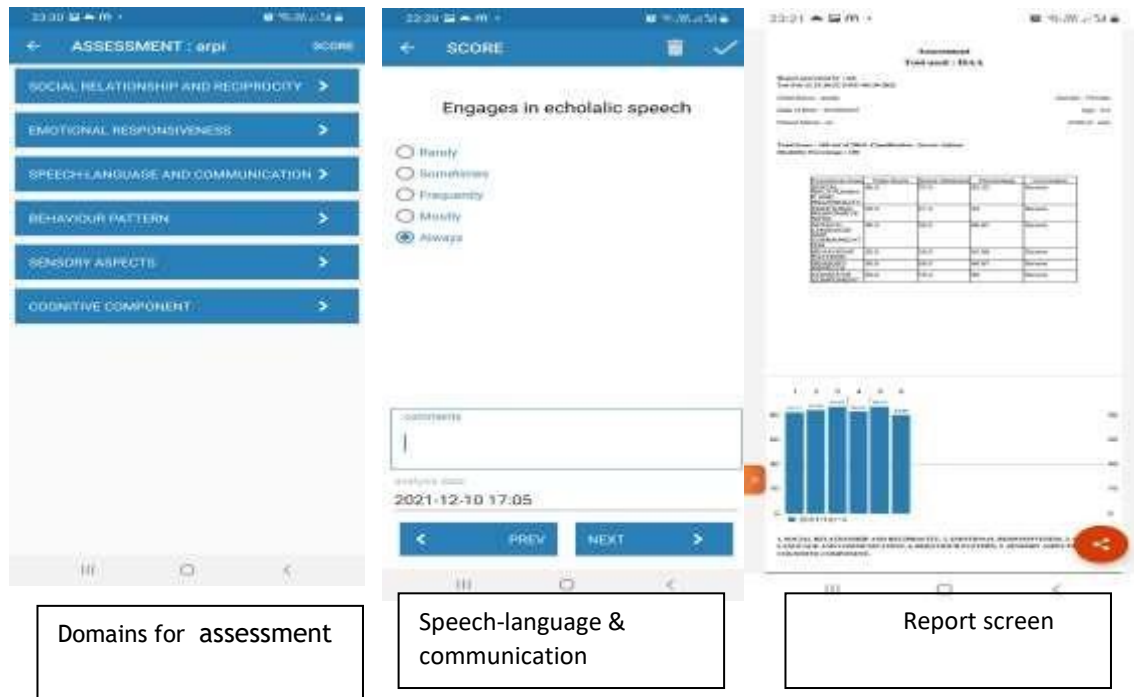
### ➤ Features of the application

- 40 items under 6 domains are rated in 5 point scale ranging from 1 (never) to 5 (always) in ISAA.
- In our application a special educator must input the levels of each activities based on keen observation and information supplemented by parents or care givers.
- ISAA tool reports the degree of autism of a child and the percentage of disability as per the score. We added a new feature i.e., domain wise degree of impairment. (Refer Fig.2)

### ➤ Benefits

- i. User friendly app will help to identify the strength and weakness of the child in a particular domain.
- ii. This information may act as a

guideline during baseline assessment done prior to a formal intervention program.



**Fig 2. Screenshots of the ISAA app**

➤ Trials taken

- About 152 children have been diagnosed by ISAA tool using the app.
- Report generated by app is appreciated by parents as they were able to find out strength and weakness of their child in a systematic method.

## 2.2 Description of Educational Assessment tool App

### ➤ Aim

- To enhance easiness, to improve accuracy & make it time efficient.
- To help educator to visualize and analyze periodical assessments which may help them to design Individualized Education Program (IEP)

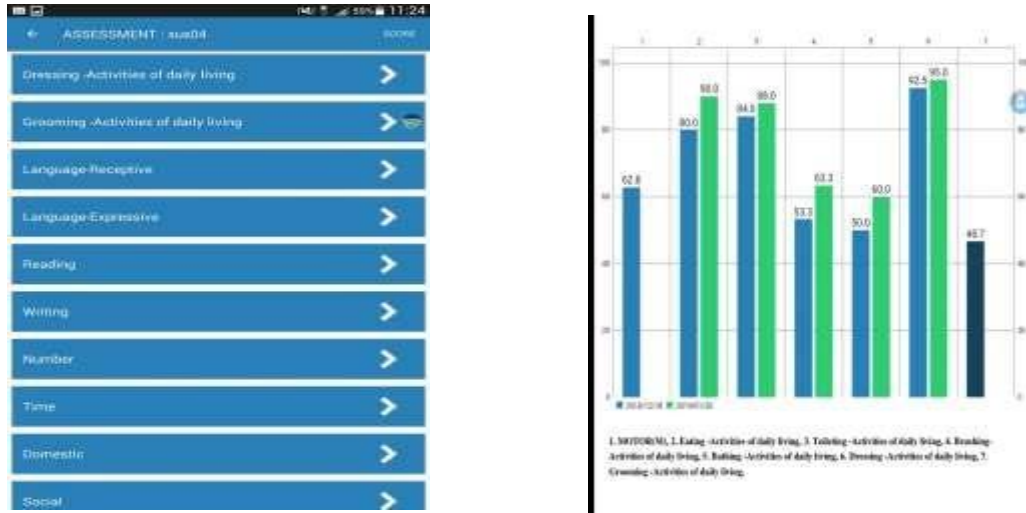
### ➤ Features of the application

- All activities irrespective of assessment tools like Indian Portage guide [5] developed by CBR network, Behavioural 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 modifications are done to maintain uniformity among the tools, to measure the progress of a child and to quantify the qualitative data.
- The educator has to observe the child's behavior and activities and record their performance level. The performance data are to be analyzed to generate the learning pattern at regular interval.

### Benefits

- Domain wise percentage indicates the levels of the performance, their strength and weakness . Also help to customize the Individualized Education Plan (IEP).
- The report incorporates graphical representation mentioning the comparison with previous assessment done (if any) (Refer Fig. 3)

- Data collected from the application shall be analysed against different features & progress to be evaluated at regular interval.



**Fig. 3 Screenshots of Assessment App**

➤ Trials taken

About 51 children students were assessed by Portage Guide, Basic MR (Part A), FACP (Pre-Primary) through the app. The qualitative feedback received lead to the design iterations.

**2.3 An Early Educational Intervention apps for age group of 2-6 years**

➤ Aim

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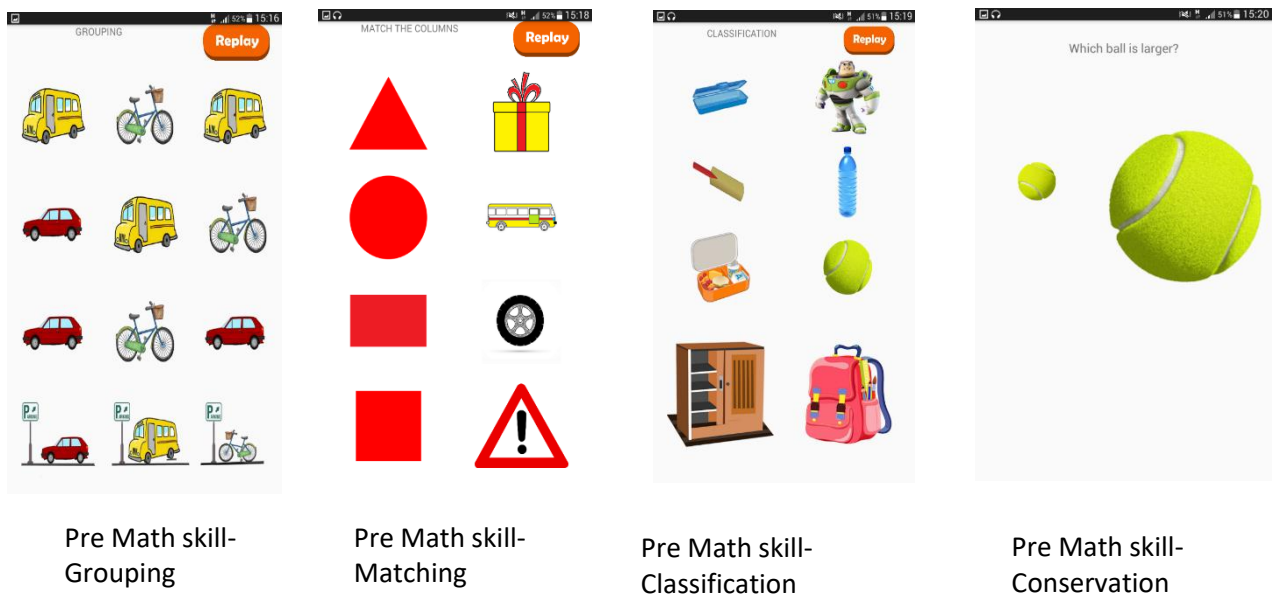


➤ Features of the application

- 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, pre writing 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.

➤ Benefits

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



**Fig. 4 Snap shots from early intervention app**

### 3. Software trials and outcome

About 152 students have been screened by the autism screening tool application which is based on “Indian Scale for Assessment of Autism (ISAA)”. Fifty one of them have received various types of educational assessment with the help of assessment application. The comprehensive way of representation of the performance data using summarization, visualization, and user- friendly interfaces helps the instructors, psychologists to visualize and analyse the learning activities of the students with the help of intervention app. Three software trials have been conducted among the students with autism of age group 3–13 years for early intervention . Among them 31 are male and 20 are female. The impression of their learning trajectory is recorded, and subsequently, learning progress profile is framed for each one. Moreover, an informative workshop was conducted to train the parents for pre-reading and pre-writing activities. After detailed demonstration from educators, mothers were interested to execute the learning sessions at their home.

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 during the crucial period of diagnosis and early 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. Also the app focuses on how to find out strength and weakness of their child in a systematic method.

#### **4. Implications for rehabilitation**

- Children with autism need the mobile application as an educational intervention program for it is readily available and user friendly.
- Educators need the mobile application to quantify the performance parameters and there by monitor/evaluate the progress of the child.
- Overall, the present research has aimed to develop an easy reach app by which educating as well as handling challenging behavior of the children with autism would be easier and cost effective.

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