Proceedings of National Conference on Transformative Solutions & Innovations In Disability Rehabilitation

20-21 April 2023

NCTSIDR—2023

Conference Proceedings

(A Collection of Research Papers)

Edited by;

Shri B.V. Ram Kumar
Director
NIEPID, Secunderabad

Dr. Amrita Sahay
Asst. Prof. Rehab. Psy.
NIEPID Secunderabad

Dr. R. Shilpa Manogna
Lect. In Spl. Edn.
NIEPID, Secunderabad

Organised by

NATIONAL INSTITUTE FOR THE EMPOWERMENT OF PERSONS WITH INTELLECTUAL DISABILITIES

(Divyangjan)

Dept. of Empowerment of Persons with Disabilities (Divyangjan)
Ministry of Social Justice & Empowerment, Govt. of India

AN ISO 9001-2015 INSTITUTION

NCTSIDR—2023

National Conference on Transformative Solutions In Disability Rehabilitation

Price;

ISBN; 978-81-960494-1-6

Published by; NIEPID, Manovikasnagar Secunderabad—500 009

Foreword

It is a great privilege for us to present the proceedings of the National Conference Transformative Solutions & Innovations In Disability Rehabilitation (NCTSIDR) 2023 to the authors and delegates of the event. We hope that you will find it useful, exciting, and inspiring.

The conference will provide opportunity for rehabilitation professionals and other stake holders from diverse field to discuss about recent development in field of disability management through innovation, technology, assistive devices, ICT, machine learning etc., which will help us to enhance the existing knowledge and experience.

Rehabilitation professionals play a crucial role in the promotion, maintenance, and restoration of intellectual and developmental disability. There is a worldwide trend towards transforming rehabilitation services from traditional settings to innovation through ICT, artificial intelligence, machine-based learning, and creativity etc. Rehabilitation professionals are increasingly required to address the needs of society and individuals with disability. To improve the quality of life for individuals with disabilities, it is essential to update the knowledge of rehabilitation and allied professionals.

This national conference will help rehabilitation professional, researcher and students to know about recent trends in research and innovation are being conducted at national and international level, which enable us to create a sustainable environment for persons with disabilities towards improve their mental health, wellbeing and their quality of life etc.

Through exchange of information on the innovations and technology among experts from across the country, the conference will contribute to design and provide accessible and affordable content, services and concrete solutions, as well as programmes for persons with disabilities, particularly to access information and knowledge.

We wish all attendees of NCTSIDR 2023 an enjoyable scientific gathering at NIEPID Secunderabad.

B.V. Ram kumar
Director (Offg.)
NIEPID Secunderabad

CONFERENCE PROCEEDINGS

Transformative Solution and Innovations in Disability Rehabilitation

Rehabilitation professionals play a crucial role in the promotion, maintenance, and restoration of intellectual and developmental disability. There is a worldwide trend toward transforming rehabilitation services from traditional settings to innovation through ICT, artificial intelligence, machine-based learning, and creativity etc. Rehabilitation professionals are increasingly required to address the needs of society and individuals with disability. To improve the quality of life for individuals with disabilities, it is essential to update the knowledge of rehabilitation and allied professionals.

The conference will provide opportunity for rehabilitation professionals and other stake holders from diverse field to discuss about recent development in field of disability management through innovation, technology, assistive devices, ICT, machine learning etc., which will help us to enhance the existing knowledge and experience.

This national conference will help rehabilitation professional, researcher and students to know about recent trends in research and innovation are being conducted at national and international level, which enable us to create a sustainable environment for persons with disabilities towards improve their mental health, wellbeing and their quality of life etc.

Through exchange of information on the innovations and technology among experts from across the country, the conference will contribute to design and provide accessible and affordable content, services and concrete solutions, as well as programmes for persons with disabilities, particularly to access information and knowledge.

Research and academic papers on barred innovations, technology and transformative solutions provided to individuals with disabilities (Divyangjan), in particular, for persons with Intellectual Disabilities, will be invited from medical, rehabilitation, engineering professionals, academicians and researches field. Oral and poster presentation from professionals and students will be included and best presentation will be awarded in each category.

The purpose of organising this national conference is to brainstorm and enrich ourselves with new experiences, insights and new answers to prevailing and upcoming probable equations.

AIM OF THE PROGRAM

To provide an innovative platform for researchers/academicians/professionals/students working for PwD’s to communicate their knowledge and new discoveries.

To explore the advance technology and its challenges faced by rehabilitation professionals, parents, community, stakeholders and policy makers to implement best services model for PwD's.

To comprehend the variety of research activities carried out during the pandemic and post pandemic through ICT and artificial intelligence for wellbeing.

To explore the best use of ICT in assessment, management, employment, and overall wholistic rehabilitation of PwD's.

To create a forum to share the best practices and related limitations with their possible solutions through technological advancements like machine learning, artificial intelligence, with the special focus on mental health in current scenario.

****

Committee:

S.No	Organizing Committee	Scientific Committee
1.	B.V. Ram Kumar, Director, NIEPID	B.V. Ram Kumar, Director, NIEPID
2.	Dr. Amrita Sahay, Faculty	Dr. Amrita Sahay, Faculty
3.	Mr. G. Srinivasulu, Faculty	Dr. Shravan Reddy, Faculty
4.	Dr. R. Shilpa Manogna, Faculty	Dr. Ambady K. G, Faculty
5.	Shri. Dasarath Choudary, Faculty	Dr. Ravi Prakash, Faculty
6.	Mrs. Anupama Khanna, Sr. O.T.	Dr. Yatheendra, Faculty
7.	Shri. Ventakeshwar Rao, AO	Dr. Sunita Devi, Faculty
8.	Shri. Haribabu, OS	Dr. Hemant Singh Keshwal, Faculty
9.	Shri. V. Chary, EO	Mrs. Keerthi Sudha, Faculty

Content

1

Learning Trajectories in the First Few Months of Early Intervention in Children with ASD

Smita Awasthi, Sridhar Aravamudhan, Brunda M, Pavithra, Pravalika D., Pravesh Gangawar, Papiya Mukherjee, Rajeshwari K., Shushmita K. S, Tejashree Gambhir,

Behavior Momentum India

Abstract

Interventions for children with autism are considered as early interventions if they are carried out before the age of 6 years (Alonso-Esteban & Alcantud-Marín, 2022). The current study evaluated the early gains from behavioral interventions with 13 children with autism with a mean age of 4 years 1 month (Range: 2 years 5 months – 4 years 9 months). All children were enrolled with our organization and provided ABA-based behavioral interventions. Baseline participant details included VBMAPP scores across various domains and behavior. Acquisition of targets and progress on the mean intervention duration was 4 months (Range 3-6 months). Students acquired an average 112 new target skills (Range 38 - 228). The immediate improvements across 16 domains such as language and communication, visual performance, matching to sample, labeling, answering questions, play skills, group skills and linguistics and the learning trajectories for efficient mastery will be discussed.

Key Words: *Autism, Early Behavioral Intervention, ABA, Learning Outcomes*

Introduction

Autism is a neurological disorder characterized by severe deficits in language development, communication difficulties, social engagement and the presence of restricted interests and repetitive behaviors (Hodges, Fealko & Soares; 2020). Medical treatments in autism are limited to treatment of comorbidities or associated symptoms and does not alleviate symptoms; while there is ample evidence that therapy and intervention is the only form of treatment which plays a critical and significant role in bringing changes in individuals. However therapy is considered a slow process and often there are intriguing questions and doubts about what works best. Families often resort to an eclectic approach with a few hours of different types of therapies ranging from two 45-min sessions in a week of 2-3 different therapies. Doubts often linger on the type of therapy which demonstrates best outcomes, and the right intensity.

Applied behavior analysis (ABA) is a science based treatment based on learning theories and operant conditioning. It includes the use of positive reinforcement (verbal praise, tokens, or rewards), prompt and prompt fading strategies and shaping procedures for specific teaching targets. The evidence base for ABA as the treatment of choice for autism is mentioned both in the Nelson's book of Pediatrics as well the Indian Association of Pediatrics guidelines.

"Early intensive behavioral interventions" have established significant evidence in demonstrating remarkable outcomes in significant gains in cognition, IQ, behavior, attending skills, language, imitation, pre-academic and academic goals etc. (Smith, 1999). Lovaas (1987)

evaluated the effect of EIBI in 3 groups of children. The experimental group (n = 19) received 40 hours/week of 1:1 intervention. The control group (n = 19) received less than 10 hours/week of intervention and a third group (n = 21) did not receive treatment from this group of researchers. After 2-3 years almost 47% participants from the experimental group showed increase in their IQ and were able to join regular school in Grade 1. On the other hand only one participant (2%) from both the control groups demonstrated similar improvements. These gains were found to be maintained six years later (McEachin et al., 1993). A randomized controlled trial by Dawson et, al. (2010) on forty-eight children between 18-30 months demonstrated significant improvements with gains over the comparison group and a possible change to a less severe diagnosis. While the above studies provide evidence for behavioral early intensive intervention it is unclear which variables led to these improvements.

In the current research we study the learning trajectories in a short period of early intervention and try to identify the variables which can make large scale impact for efficient gains.

Participants:

Thirteen participants with a diagnosis of autism joined BMI centers between July 2022 – Nov 2022. Four female and nine male participants between 2.5 years and 4.9 years started therapy. All participants had been recently diagnosed and enrolled for 10 hours/week of ABA based therapy provided by behavior technicians under direct supervision of a behavior analyst. They were not receiving any other therapy.

Baseline Assessment:

The VBMAPP (Verbal Behavior Milestones Assessment and Placement Program, Sundberg, M.L., 2008) was used for an initial assessment for the baseline Milestone score for each participant. The assessment measure a variety of skills such as communication requests, listener responding, labelling, socialization, play, imitation etc. An assessment on each participants baseline % eye contact, problem behaviors and various cooperation targets were also measured.

Setting and Materials:

The sessions were conducted at the table top as well in the play park under motivating conditions A variety of toys, favourite items such as bubbles, play doh etc, clicker, timer paper, and pencil were used.

Dependent Variable:

The dependent variables for each participants were the acquisitions of skills across domains, total mastered skills; changes in the VBMAPP milestone score; reduction in behavior, % changes in eye contact and achievement in cooperation targets. The Mastery criteria for each skill was standardized at 3 days of correct response. Behaviors were recorded as frequency or duration. The mastered skill applies to even one imitation or labelling achieved.

Procedure:

The intervention started with preparing the learner to learn. High value reinforcers (7 – 12) per child were identified. The reinforcement system was applied to build positive contingencies. Transitioning from preferred to preferred and non-preferred, learning to wait, and returning reinforcers were targeted. A happy relaxed and engaged learner who exhibited fluent responses within 2-sec on instruction without behavior or initiated actions voluntarily indicated readiness to learn. Once pre-requisite skills were mastered teaching language started on various domains on child specific component skills on short reinforcement schedules and prompt fading procedures.

Results:

The results on the VBMAPP for all 13 participants are provided in Graph 1. The mean VBMAPP score for all participants in the pre-intervention stage was 27/170 (Range 5 – 69) while post intervention was 75/170 (range, 30 – 128). The number of targets acquired by each participant across each domain are provided in Table 2. For example participant SS a 3 year 7 months child had 4 mastered skills at baseline. Post intervention in a period of 5 months he acquired 201 new skills averaging approx. 9 skills/week. All 13 participants acquired an average 112 targets (range 38 – 228) with an average learning rate of 7.8 targets acquired/week.

Graph 1

Pre-Post VBMAPP Scores on the Milestones grid For Each Participamt

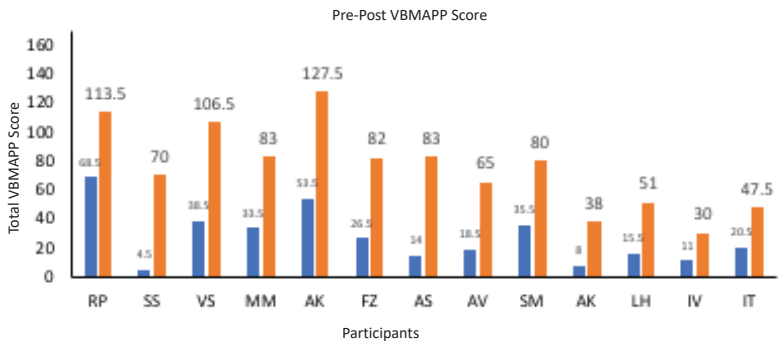


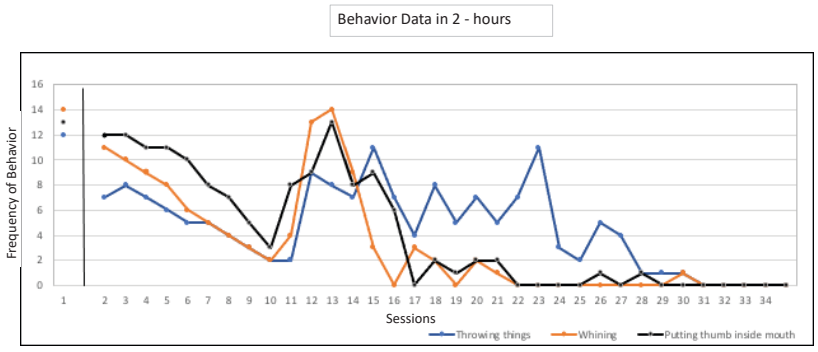
Table 2

Mastered Targets Across Domains For each Participant in 3-6 months

Participant	RP		SS		VS		MM		AK		FN		AS		AV		SM		AK		LH		IV		IT	
Baseline/Post	B	Post	B	Post	BL	Post	BL	Post	BL	Post	BL	Post	BL	Post	BL	Post	BL	Post	BL	Post	BL	Post	BL	Post	BL	Post
Visual Tasks	17	4	1	5	2	16	3	14	5	13	0	1	2	3	2	3	5	6	0	6	3	19	0	21	4	0
Receptive	110	36	0	94	88	148	26	75	95	30	0	49	20	71	49	60	35	27	3	44	2	67	12	152	6	50
Requesting	6	3	0	21	7	9	4	15	0	24	0	15	3	12	3	18	0	27	0	4	0	10	0	0	0	0
Labelling	82	93	0	41	75	135	48	31	72	104	0	14	34	40	64	51	154	81	0	0	0	0	0	0	8	0
Echoics	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	1	0	0
Answer Q	32	0	3	24	15	26	0	17	21	30	0	8	6	11	5	20	5	14	0	0	0	8	0	0	2	10
Reading	30		0	14	1	12	1		3	20			8	3	15	8	0	4						0	2	1
Math	1		0	2	1		1		1	4			0											0	1	
Play	1				0	1	1	2	1	1					0	1		1	0	2	0	2		0	0	2
Group	0				0	2	0		0											10				0	0	
Social	0				0		0		0	4														0	0	
	279	136	4	201	189	349	84	154	198	230	0	87	73	140	138	161	199	160	3	71	5	106	12	174	23	63

Graph 2

Behavior Graph of participant AK



Of thirteen children 10 acquired vocal communication, 1 started communicating with sign while 2 remained non-vocal and did not acquire any form of communication. In the socialization pre-requisite of eye contact, 7 children acquired eye contact while 5 did not reach the mastery criteria.

All thirteen children demonstrated reduction in behaviors. Few behaviors reduced to near zero without an alternative behavior plan after readiness to learn plan was acquired where as few behaviors such as hand flapping or mouth reduced to low levels.

Discussion & Recommendations:

This study suggests that moderately intensive early intervention of 10 hours/week can demonstrate efficient learning trajectories in young children with autism. Attention towards preparing the child to learn prior to introducing teaching targets can have direct influence on the learning trajectory. Therapists having behavioral skills training for using positive reinforcement strategies will help young children acquire instructional control under positive contingencies. This will also lead to a positive relationship of trust and a willing learner. The young child will learn to follow instructions fluently, leave his favourite items, wait, making the teacher-learner relation efficient. Acquisition of pre-requisite skills directly influences learning readiness so when teaching begins targets can be acquired as the child's best potential. It is significant to note that that at no point in the therapy the child was forced or made to sit in a locking chair. The child was free to move and leave the learning area at his free will and teaching procedures were modified to build child's motivation or a detailed preference assessment was conducted to improve the teaching environment.

Limitations:

The study does not differentiate between skills taught and learnt without additional training. The independent variable needs to be described in further detail. The treatment integrity checks were not documented. The mastered skills need to differentiated between easy and difficult skills such as learning to clap hands vs learning the concept of all which is a higher order skill. Further factors affecting rate of acquisition and extraneous variables were not explored.

References:

Dawson, G., Rogers, S., Munson, J. et al. (2010). Randomized, controlled trial of an intervention for toddlers with autism: the early start Denver model. *Pediatrics*,125(1), e17–e23.

DeFilippis, M., Wagner K.D. (2016). Treatment of Autism Spectrum Disorder in Children and Adolescents. *Psychopharmacology Bulletin*, 15, 46(2),18-41.

Hodges, H., Fealko, C., Soares, N. (2020). Autism spectrum disorder: definition, epidemiology, causes, and clinical evaluation. Translational Pediatrics. 1, S55-S65.

Lovaas, O. I. (1987). Behavioral treatment and normal educational and intellectual functioning in young autistic children. *J Consult Clinical Psychology*, 55(1):3–9

McEachin, J. J., Smith, T., & Lovaas, O. I. (1993). Long-term outcome for children with autism who received early intensive behavioral treatment. *American Journal on Mental Retardation*, 97, 359–372.

Smith, T. (1999). Outcome of early intervention for children with autism. Clinical Psychology: *Science and Practice*, 6, 33–49.

Sundberg, M.L. (2008). VB-MAPP Verbal Behavior Milestones Assessment and Placement Program: A Language and Social Skills Assessment Program for Children with Autism or Other Developmental Disabilities. Guide, AVB Press.

2.

The Efficacy of Telehealth in Language and Communication Teaching – A Test- Retest Study with 89 children with ASD

Smita Awasthi, Sridhar Aravamudhan, Anupama Jagadish, Bhavna Joshi, Papiya Mukherjee, Rajeshwari K, Razia Shahzad Ali and Sreemon Edasserykkudy.

An organization in India had to transition its services from in-clinic to Telehealth when a lock down was implemented in March 2020 in the face of the Covid-19 pandemic. Eighty-nine students with diagnoses of autism or other learning disabilities participated in this study. Fifty-one therapists, 9 behavior supervisors and a Doctoral level Board Certified Behavior Analyst collaborated with parents. Smartphones, and in a few cases, iPads and laptops were used at student and therapist homes. The modes of instruction included direct therapist training, parent facilitated training and parent implemented training. The duration of telehealth sessions improved during the first 10 weeks and the next six months of study for the cohort of 89 students as did the number of trials. Most students continued to acquire targeted skills and a comparison with previous 2 months acquisition rates are discussed. An online survey returned responses from 32 parents who made positive comments about the transition and the quality of services, confirming the social validity of the methods and the outcomes. The model can be useful to provide services in rural or remote areas with low concentration of behavioral intervention service providers.

Keywords - *Autism, Covid-19 India, ABA, telehealth, parent training*

Introduction

During the Covid Pandemic lockdown the closure of all educational institutions had an immediate effect on educational, therapeutic, and other intervention services provided to persons with autism and developmental disabilities. Special education and ABA-based intervention service providers had to close their clinics with virtually no notice period. Therapists could not travel to their client's residences to provide services. Families of children with autism and learning disabilities suddenly faced hardships on many fronts. Children with learning disabilities lost their routine of going to special education centers or schools, faced a loss of predictability of their schedules, lost opportunities for social interactions, had extended periods of idleness at home, lost skill acquisition opportunities, and their inappropriate behaviors probably worsened.

This qualitative and quantitative study aims to extend the Espinosa and colleagues (2020) study in Italy and Frederick and colleagues (2020) study in the United States to another geography, India. The study also aims to address additional questions from previous studies, such as (a) Can students with ASD be trained on skills typically addressed in IBI sessions in-clinic (list in VB-MAPP; Sundberg 2008) using telehealth? (b) Can therapists and students use commonly available low-tech devices such as smartphones for telehealth sessions? c) Can session durations and rate of trial presentation be maintained at the level of in-clinic sessions? d) Can students continue to acquire targeted skills? If so, will such acquisition be at a higher rate or a lower rate? e) Can parent training through telehealth using BST help parents train their children to acquire new skills in the language and communication domains.

Method

The participants in this study were 92 persons with autism and developmental disabilities referred to as students. They were from Bengaluru, Hyderabad, Mumbai, Noida, and Lucknow in India. They had confirmed diagnoses of autism or other disabilities from a medical professional such as a developmental paediatrician, neurologist or psychiatrist, or a multidisciplinary team. Students' mean age was 8 Years and 11 Months, with the youngest being three years and four months old, and the oldest, 33 years and ten months. Before the lockdown, students received ABA-based behavioral interventions from the organization for periods ranging from 6 months to 7 years, except for one student who enrolled in the IBI program at the beginning of the lockdown. Their in-clinic sessions daily ranged in duration from 2 to 8 hours, barring weekends, public holidays, or periods of illness.

Materials

Materials used were mostly Smartphones (80%), some tablets, or laptop computers.

Therapists used pictures from sites offering free reuse images, such as Pixabay.com. Reading and math exercises using stimulus sheets were prepared in the student's home. Therapists using smart phones sourced the materials for the session from their homes.

Settings and Sessions

All organization personnel, students and parents attended sessions from their respective homes. Student Sessions over telehealth ranged from 20 minutes to 3 hours day, 5-6 days a week. Telehealth was conducted using WhatsApp video or Skype. Parent behavioral skills training (BST) sessions occurred 1 – 5 times a week and lasted 30 mins to 1 hour per session.

Modes of Training

There were three modes of training based on the student profile. These were therapist-student- direct (TSD), Therapist – Student- Parent Mediated (TSPM) and Parent trained using behavioral skills training (PBST). In the TSD mode, the therapist used only vocal prompts or text

prompts. The reinforcement schedules were the same as those used in in-clinic sessions before the lockdown for every student. Therapists with laptops presented stimuli singly or in arrays using PowerPoint slides and shared their screen with the student. They transmitted auditory instructions over Skype or WhatsApp video platforms. Most therapists used smartphones because they did not have a laptop arranged objects or text stimuli in front of the smartphone camera. For array presentations, the therapist positioned the smartphone with the longer edge resting on the table in a landscape mode, with a support at the back, facing the therapist. They arranged the stimuli in front of the smartphone. The therapist set the phone camera to selfie mode. The maximum array size used was four. The student could then see the stimuli, hear the therapist's instructions and prompts, and respond with a vocal-verbal response or a written response as required. The students held up any written response in front of their smartphone camera.

TSPM sessions were for students who had difficulty attending to the therapist via video meetings or required physical prompts during training. The targets for skill acquisition, prompting procedures, reinforcement schedules, and mastery criteria were the same for each student as in-clinic. Mand training (Requesting training) for tangibles and listener responding skills continued to be in their education plan. The parent was present, sitting beside the student throughout the session. The prompting method for different types of trials and prompt fading methods were described to the parent in meetings before the session. The parent delivered pre-selected reinforcers on cue from the therapist during the session.

In PBST mode, behavior supervisors assigned to each parent trained the parent on specific skills to implement behavioral interventions with their children. Three behavior supervisors were involved in training a total of 10 parents. All three behavior supervisors had laptops and shared instruction documents and checklists with parents by email. The behavior supervisor and the parent agreed on specific protocols, such as protocols for identifying new reinforcers, mand training, and using DTT to teach listener responding skills (Table 2). The behavior supervisors used pre-session verbal and written instructions, demonstration, role-play with parents, parent's practice with their student-child, question and answer sessions, and feedback in this study.

Experimental Design

This study used a multiple treatment (two treatments) design, comparing in-clinic condition with telehealth condition

Dependent Variables and Measurement

The dependent variables for TSD and TSPM students were daily session duration, the number of instructions per session, and the number of targeted skills acquired. The dependent

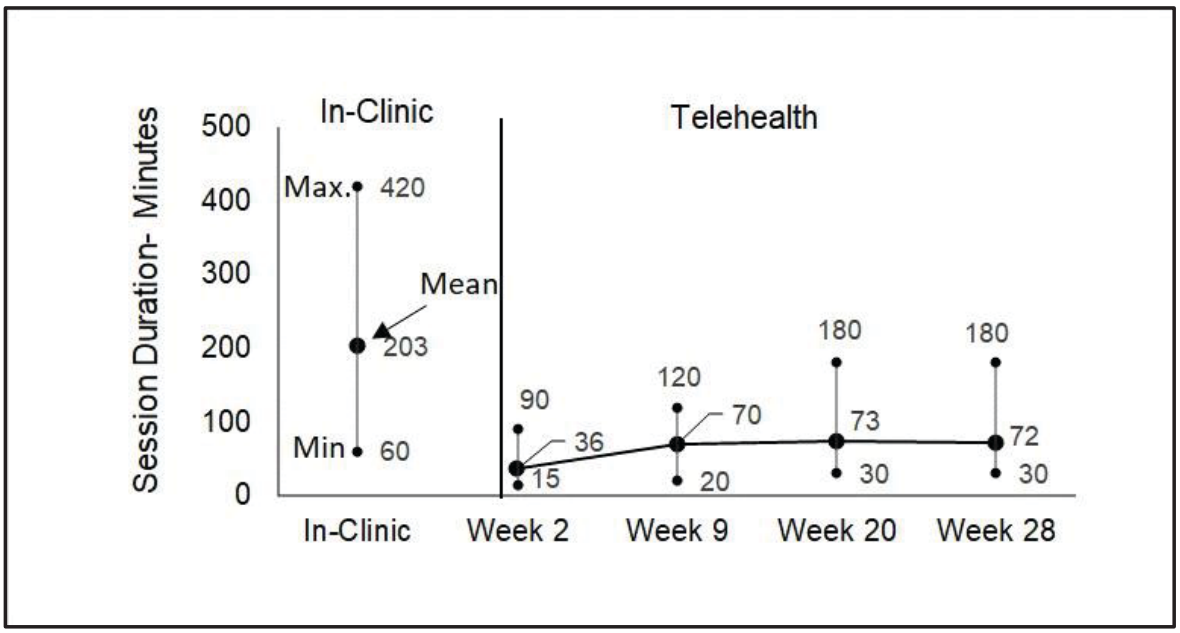
measures for the PBST intervention were (1) Weekly parent training duration, (2) The number of protocols parents implemented correctly with their student-child, and (3) The number of targeted skills acquired by the student with the parent implementing the interventions.

Results

The results are depicted in Figures 1-3.

Figure 1

Session Durations – TSD and TSPM Students in Minutes In-clinic and in Telehealth



As seen in figure 1, the session durations improved during telehealth, but the mean was 36% of in-clinic. Figure 2 shows that all students continued to acquire skills distributed evenly between more and fewer skills acquired. Figure 3 demonstrates that all parents were successful in learning the protocols. The in-clinic PBST student's skills are lower as one student joined towards end of the condition. Parents learnt fewer protocols later but continued to maintain child's new skill acquisitions.

Thirty-two parents filled out an online form and submitted it. Though sixty-six percent of the parents felt that their child had acquired fewer skills in the lockdown, more than 80% rated the telehealth initiative, therapist's enthusiasm, and clinical recommendations as excellent or very satisfactory.

Figure 2

Skills Acquired TSD and TSPM Students

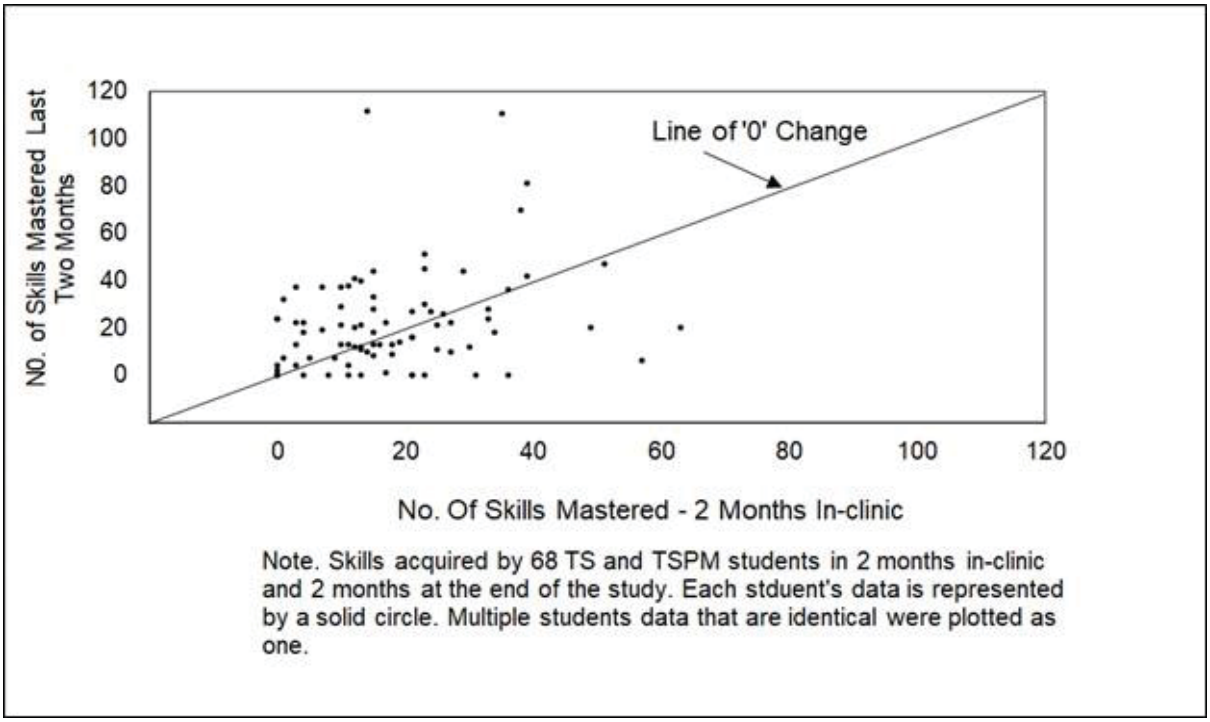
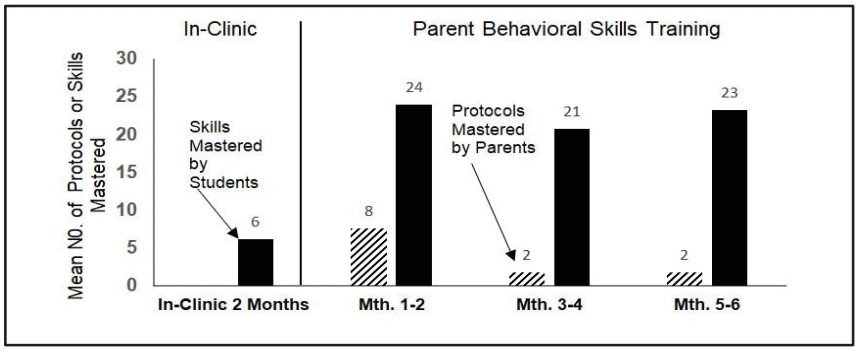


Figure 3

BST – Protocols Mastered by Parents and Skills Acquired by Students



Discussion

All 75% of the students who stayed on the study continued to acquire new skills though the mean session durations were 30% of the in-clinic hours over the 6-month telehealth intervention for TSD and TSPM students. This continued acquisition suggests that telehealth implementation holds promise for the continuation of services in lockdown conditions for a significant proportion of the students whose parents can commit even a limited number of hours daily. In

countries like India, laptops may not be available to all therapists and students. This study confirms that ABA-based skill acquisition interventions can be provided with smartphones over the internet, with materials available at therapists and students' homes.

Of the ten parents implementing interventions with their children, nine were able to implement ABA-based protocols with fidelity with their student-children in the first two months. In these six months, two of the ten parents could continue and train their student-children on the full range of skill acquisition targets (15 or more skills) from in-clinic sessions before the lockdown. The remaining eight parents learned to implement between 5 and 10 protocols. In the subsequent blocks of two months, though the number of new protocols mastered by them was fewer, their children continued to master new skills within the domains trained.

The social validity results compiled from 32 parent responses to a survey have been mostly positive. They suggest that parents welcomed continuing ABA-based intervention services through telehealth. The high ratings on the telehealth initiative, therapist efforts and enthusiasm, and an increase in parent familiarity with and confidence in ABA science lend strength to telehealth's social validity.

Limitations and Recommendations for Future Studies

More than 150 parents contacted did not opt into telehealth. The reasons and barriers to adoption need to be understood to help them better. There were a significant number of students who acquired fewer skills. Apart from the reduction in session durations, other variables need to be explored. A comparison of types of skills acquired in-clinic versus telehealth was not attempted in this study. However, it will be useful to see if the medium lends itself better to teach certain types of skills more than others.

References

Espinosa, F. D., Metko, A., Raimondi, M., Impenna, M., & Scognamiglio, E. (2020). A model of support for families of children with autism living in the COVID-19 lockdown: Lessons from Italy. *Behavior Analysis in Practice*, *13*(3), 550-558. doi:10.1007/s40617-020-00438-7

Frederick, J. K., Raabe, G. R., Rogers, V. R., & Pizzica, J. (2020). Advocacy, collaboration, and intervention: A model of distance special education support services amid COVID-19. *Behavior Analysis in Practice*. doi:10.1007/s40617-020-00476-1

3.

Telehealth with Smartphones- A Discussion Paper on the India Experience During Covid-19 Pandemic

Smita Awasthi, Sridhar Aravamudhan, Anupama Jagadish, Bhavna Joshi, Papiya Mukherjee, Rajeshwari K and Sreemon Edasserykkudy, Behavior Momentum India

Abstract

The first case of Covid-19 in India was identified on January 30, 2020, the day on which the World Health Organization declared a public health emergency. On March 16, 2020, the government of India ordered closure of all educational institutions in India for a fortnight. On March 24, 2020, the government declared a nationwide lockdown with shelter-in-place orders. The in-clinic services that children with learning disabilities received in special education centers and centers providing language and communication interventions was abruptly halted. This study details how our organization in India collaborated with parents of children with autism and transitioned services from in-clinic to telehealth and scaled up to transition services to more than 80 students within two weeks. This discussion paper details the decision-making model to transition the services, adapted staff training and supervision model, and the actual teaching procedures with video examples of how teaching different skills was accomplished in video meetings using only smartphones in 85% of the sessions.

Keywords: Autism, Covid-19 India, ABA, Telehealth

Introduction

The Coronavirus disease 2019 (COVID-19), towards the end of November 2020, had affected 60.3 Mn people worldwide with a death toll of 1.42 Mn ("WHO Coronavirus Disease [COVID-19] Dashboard," 2020). The first case of a person who tested positive was registered in India on January 30, 2020. Two months later, the Government of India ordered a complete nationwide lockdown, restricting the movement of 1.3 bn people, for three weeks initially ("COVID-19 pandemic lockdown in India," 2020). The lockdown restricted people from stepping out of their homes. Despite a phased unlock process, even after nine months from the initial lock down announcement, there was no indication on resumption of schools.

Historically, the delivery of services using telehealth has attracted the attention of researchers and practitioners of behavior analysis primarily to reach services to rural or remote areas with a low concentration of service providers (Wacker et al., 2013a; Wacker et al., 2013b). Lindgren and Colleagues (2016) and implemented ABA-based telehealth procedures and achieved a greater than 90% reduction in problem behaviors with 94 children using in-clinic services, clinic-based telehealth, and home-based telehealth. They found that the costs were significantly lower than in-home therapy with both telehealth models. Tsami, Lerman, and

Toper-Korkmaz (2020) similarly demonstrated the efficacy of training parents in implementing functional analysis and functional communication training across eight rural and urban areas in 8 countries.

In addition to telehealth sessions with the students, behavioral skills training (BST; Parsons et al., 2012) to train parents on implementing behavioral protocols with fidelity could also facilitate the continuation of services for children during a lockdown. The significant components of training using BST include describing the target skill, providing written or verbal descriptions, demonstration, having the trainee practice the skill, and providing feedback.

This qualitative and quantitative study aims to extend the Espinosa and colleagues (2020) study in Italy and Frederick and colleagues (2020) study in the United States to another geography, India. It aims to address additional research questions arising from previous studies. It addresses instructions through telehealth to address skill acquisition targets based on the IBI programs of students and the adaptation of the procedures for telehealth. It qualitatively enumerates the various decisions confronting an organization while transitioning ABA-based services to telehealth and the considerations that could influence the final decisions.

Method

Organization and Personnel

In India, the organization provided interventions based on ABA to nearly 300 students across six cities through 10 clinics in the pre-lockdown days. The organization had 230 trained therapists who reported to 9 Behavior supervisors comprising of two Board-Certified Assistant Behavior Analysts (BCaBAs) and seven team leaders who had 3-10 years' experience of working under the supervision of a Board-Certified Behavior Analyst (BCBA). The behavior supervisors received ongoing training and mentoring from the Clinical Director, a Doctoral level behavior analyst (BCBA-D).

Parents and Significant others

For 67 students, their mothers played a significant role in facilitating implementation. With the remaining students, their fathers, both parents together, siblings and care takers played the role of facilitators. During telehealth intervention, parents of 16 students (17%) only attended case meetings, parents of 66 students (72%) facilitated the implementation of sessions by being present throughout the sessions, and parents of 10 students (11%) implemented interventions with their student-child directly with training provided by behavior supervisors. The parent's role is described in more detail in the procedure's sections.

Depth Interviews to Identify Logistic Challenges in Implementation

In this study, from an implementation perspective, it was important to describe the challenges and factors that influenced several key decisions with respect to transitioning to

telehealth. Six weeks into the telehealth intervention, a BCBA interviewed the first author, the clinical director, and three behavior supervisors using a questionnaire with a set of open-ended questions. Each interview lasted 30-45 minutes. The interviewer transcribed their answers to the questions and enumerated the most important decisions, relevant decisions, and challenges to smooth implementation.

Results

We discuss the results of the depth interviews in terms of technology to use, how to deliver the instruction to students via telehealth, the other operational decisions and key ethical considerations in the foregoing sections.

Technology to Use, Service Delivery Method and Other Operational Decisions

The clinical director, behavior supervisors, therapists, and parents held consultations to arrive at the crucial decisions to transition to telehealth service delivery. The first decision was about technology. The organization decided to use the 'Meet Now' feature of the Skype app ("Skype," n.d.; "What is meet now and how do I use it in Skype?," 2020) or WhatsApp video calling ("WhatsApp FAQ - How to make a video call," 2020). There were no regulatory advisories against their use in India, and most parents preferred to use these platforms.

The second decision involved the mode of service delivery. If the student were verbally interactive (for a detailed description, see Espinosa and colleagues, 2020) and had a track record of staying on-task under instructions for more than 20 minutes in-clinic sessions, the organization decided the therapist would run the telehealth session directly with the student. This mode would be called therapist- Student- Direct (TSD mode). In this mode, a parent's facilitation will be starting the session by joining the video meeting and ending the session. The therapist would instruct the student to access a tangible reinforcer such as an iPad on a thin, variable reinforcement schedule. Another decision was that, with the TSD students, where both the therapist and the student did not have laptops, the skill acquisition targets would not target domains such as mands or listener responding, which would require a parent or a caregiver to be present. For other students whose parents consented to telehealth-based behavioral intervention services, with a mutual agreement, the organization decided that at least one parent would be present nearby throughout the session to deliver physical prompts or reinforcers as required by the therapist. This decision mitigated a student's risk, especially young children engaging in unsafe behaviors in their home environment. This article will refer to this instruction mode as the Therapist- Student- Parent- Mediated (TSPM) mode. Some parents preferred to receive training from the organization using behavioral skills training (BST) and run instructional sessions with their children. This distance support mode was designated Parent Behavioral Skills Training (PBST). The organization decided that only a behavior supervisor would train the parent.

The other decisions involved specific, tangible reinforcers and instructional materials required at the student's end, the initially targeted session durations, and timings based on parent and therapist availability.

Ethical Considerations

The organization used Skype with 'Meet Now' functionality ("Skype," n.d; "What is meet now and how do I use it in Skype?," 2020) or WhatsApp video calling ("WhatsApp FAQ - How to make a video call," 2020) for conducting telehealth sessions. Parents were familiar with and preferred these platforms. The government had no advisories against using these platforms. The organization personnel used WhatsApp messenger to communicate with parents. The organization obtained informed consent by email from parents to adopt telehealth as a service delivery mode and record telehealth sessions periodically for training purposes. The clinical director trained all therapists and behavior supervisors to upload any session they recorded to a secure server residing within the country and delete such recordings from their laptops or phones before 5:30 pm each day to prevent any accidental circulation of the recordings. Ethical considerations also required additional training for therapists to implement interventions through telehealth effectively. The study addressed this consideration by therapists' and behavior supervisors' oversight.

Discussion

The distance support model outlined in Espinosa and colleagues (2020) involved using only electronic materials for instruction. The current study suggests that object and picture stimuli can be presented singly or in an array in front of a phone camera to conduct skill acquisition interventions. Therapists used PowerPoint slides or electronic materials on laptops only with 16 (19.5%) of the 82 TS and TSPM student sessions**.**

One of the significant challenges was that the process depended on the availability of smartphones and sufficiently- high bandwidth availability at the student and the therapist ends. Though living in metropolitan or tier-one cities, some families could not ensure good connectivity in their homes. Another challenge was determining the ideal videoconferencing platform, given the lack of rigorous and credible guidelines on data privacy and safety in the country. Due to parents' familiarity and preference, therapist and behavior supervisors used Skype with 'Meet Now' and 'WhatsApp video calling' for telehealth sessions. However, it may become necessary to migrate instructional sessions to other platforms recommended for high safety and security standards within the country in the longer-term.

In a telehealth service delivery system, the organization had to introduce additional safeguards to ensure that personnel did not record sessions without additional permissions. Even with children for whom informed consent was available, the behavior supervisor or the clinical director instructed therapists by email to record specific sessions. Once they completed a session

recording, they uploaded the recording to a dedicated secure site and deleted videos from their phones.

Some challenges were operational and became significant as the implementation progressed. The first involved sustaining parent motivation and availability to facilitate sessions. In-clinic sessions had the advantage of very structured entry and exit times. One of the telehealth implementation challenges was that some parents requested ad-hoc postponements or frequent changes to scheduled times depending on how they organized their day. These changes caused inconvenience to therapists and behavior supervisors who had to work hard to rearrange their schedules. When parents were out of the frame in some sessions, it was not clear if the students were receiving inadvertent prompts. Some of the students would look towards their parent before responding to the therapist in the camera. The therapists addressed this problem by requesting the parent to be seated behind the student during sessions and come forward only for trials where parent-prompts were required.

Limitations and Recommendations for Future Studies

The study has certain limitations. Many parents, more than 150 at the beginning of the study, did not opt for the continuation of services using telehealth. Due to a lack of time, efforts were not made to contact them and better inform them of the options. Of the parents who opted, for different reasons described in this study, 18 out of 92 (19.5%) opted out of the telehealth program due to poor connectivity, an inability to commit time to facilitate sessions, and the student's non-compliance or escape behaviors in telehealth sessions. Future studies could examine communication, education, and other factors to dispose parents favorably towards telehealth services.

In conclusion, despite the limitations outlined, given the uncertain times and the possibility of limited in-clinic attendance, the findings suggest that distance support using telehealth, technology, and parent training is a tool for behavior analysts to deploy, monitor effectiveness, and improve. Due to the low availability of credentialed professionals and the relatively high cost of ABA services, penetration is limited to major metropolises and a few Tier 2 cities in countries like India. However, given the high smartphone penetration, it also offers a possible cost-effective option for reaching services to rural villages where 80% of the population resides, and service availability is low. Other countries such as Pakistan, Bangladesh, Singapore, Malaysia, Nepal, and Africa have very few credentialled behavior analysts and could benefit from a telehealth service delivery model.

References

Espinosa, F. D., Metko, A., Raimondi, M., Impenna, M., & Scognamiglio, E. (2020). A model of support for families of children with autism living in the COVID-19

lockdown: Lessons from Italy. *Behavior Analysis in Practice*, *13*(3), 550-558. doi:10.1007/s40617-020-00438-7

Lindgren, S., Wacker, D., Suess, A., Schieltz, K., Pelzel, K., Kopelman, T., … Waldron, D. (2016). Telehealth and autism: Treating challenging behavior at lower cost. *PEDIATRICS*, *137*(Supplement), S167-S175. doi:10.1542/peds.2015-2851o

Parsons, M. B., Rollyson, J. H., & Reid, D. H. (2012). Evidence-based staff training: A guide for practitioners. *Behavior Analysis in Practice*, *5*(2), 2-11. https://doi.org/10.1007/bf03391819

Tsami, L., Lerman, D., & Toper-Korkmaz, O. (2019). Effectiveness and acceptability of parent training via telehealth among families around the world. *Journal of Applied Behavior Analysis*. doi:10.1002/jaba.645

Wacker, D. P., Lee, J. F., Padilla Dalmau, Y. C., Kopelman, T. G., Lindgren, S. D., Kuhle, J., … Waldron, D. B. (2012). undefined. *Journal of Developmental and Physical Disabilities*, *25*(1), 35-48. doi:10.1007/s10882-012-9314-0

Wacker, D. P., Lee, J. F., Dalmau, Y. C., Kopelman, T. G., Lindgren, S. D., Kuhle, J., … Waldron, D. B. (2013). Conducting functional analyses of problem behavior via telehealth. *Journal of Applied Behavior Analysis*, *46*(1), 31-46. doi:10.1002/jaba.29

WHO Coronavirus Disease (COVID-19) Dashboard. (2020, August 29). Retrieved November 27, 2020, from https://covid19.who.int/

4.

Building Legal Capacity among Individuals with Intellectual Disabilities: Moving Forward

Dr. Amrita Sahay Dr. Akhtar Hussain***

Abstract

Independent living involves the full participation and the ability to exercise legal rights, including decision-making abilities in daily life. Individuals with Intellectual Disability (ID) face significant limitations in conceptual, social, and practical skills. This disability is often hidden or invisible, making it difficult for those with ID to access their rights due to limited cognitive and communication skills. The usual areas of concern for decision-making include finances, healthcare, residential arrangements, education, employment, marriage, sexuality, and participation in research, but many individuals with ID struggle to access these rights properly. In India, there are numerous challenges and practical limitations that must be overcome to build legal capacity among individuals with intellectual disabilities. Severity and co-morbidity of associated disabilities are also important factors to consider. The lack of awareness about legal rights among individuals with ID and their families often results in a disregard for self-determination and decision-making abilities, and as a result, children with ID may not receive adequate training from an early age. The absence of proper parental guidance and support, as well as a lack of awareness among rehabilitation professionals, increases the challenges faced by those who are dependent on others. Preconceived biases can lead to underestimating the decision-making abilities of those with intellectual disabilities. It is important to understand supported and substituted decision-making approaches to empower their legal rights. Despite extensive evidence-based reporting and research, there is a need to assess and empower legal capacity further. Greater awareness of legal capacity for persons with intellectual disabilities is essential.

Keywords: Legal capacity, Rights, Intellectual Disability, Decision making ability.

1. Background of the study

The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) stipulates that individuals with disabilities are entitled to equal treatment under the law. Article 12 of the CRPD guarantees the right of every person to legal capacity, which involves the ability to make independent decisions and have them recognized as legally binding. The article explicitly requires governments to provide individuals with the support and identification required to enable them to exercise their legal capacity (Glen, 2015).

Further, everyone has the same right to access the legal system, and the courts and government cannot assume that a person with intellectual or psychosocial disabilities is incapable of exercising their rights due to their disability. The law prohibits discrimination against individuals based on their disability. However, despite this non-discriminatory legal framework, people with intellectual disabilities often face obstacles in fully enjoying their rights (Watson, 2016).

The UNCRPD was the first legally binding agreement to address human rights as they relate to individuals with disabilities. In accordance with the social model of disability, the

Convention obligates signatory nations to acknowledge, "people with disabilities enjoy legal capacity on an equal basis with others in all aspects of life," and to establish "appropriate measures to provide access for individuals with disabilities to the support they need to exercise their legal capacity" (MacKay, 2006; Szmukler *et al.*, 2014).

There is a pressing need to enhance the decision-making capacity of individuals with disabilities, with the UNCRPD promoting this goal. Intellectual disability (ID) is a form of disability characterized by significant limitations in intellectual and adaptive functioning, and it typically manifests before the age of eighteen. Individuals with ID exhibit considerable deficits in conceptual, social, and practical skills. Due to limited cognitive and communication abilities, individuals with ID often face challenges accessing their legal rights, rendering ID an invisible and overlooked disability. To empower individuals with ID in various aspects of their daily lives, such as education, sexuality, marriage, voting, and employment, it is essential to comprehend the facets of legal capacity involved and promote their decision-making ability (Werner, 2012).

Harris (2010) argued that personal experiences at home, school, and in the community contribute to brain maturation, indicating that life experiences shape the brain to some extent. For individuals with neurodevelopmental disabilities, achieving personal mastery of developmental challenges and tasks can provide a sense of satisfaction, just as it does for typically developing children. Legal capacity refers to an individual's ability to access their legal rights, and limiting this capacity suggests that the person cannot live independently or be a full member of society. Respect for inherent dignity, individual autonomy, independence, non-discrimination, full and effective participation and inclusion in society, respect of difference and acceptance of persons with disabilities as a part of human diversity and humanity are crucial. Making choices and decisions about one's own life is important for personal well-being and an individual's sense of identity (Bigby *et al.*, 2019).

Kristin Booth Glen, in 2015, proposed the implementation of supported decision making for individuals with mild to moderate intellectual disabilities. This concept, developed by Cannada in the 1990s, is viewed as a way to uphold the principles of the conventions (Bach, 2017). The underlying belief of supported decision making is that everyone has the right to self-determination and legal capacity, and can express their choices with support provided in a trusting relationship. Browning *et al.* (2014) suggests that supported decision-making has the potential to empower and enhance the lives of individuals with cognitive disabilities. It is a process that allows some individuals to exercise their legal capacity, promoting greater autonomy and self-determination. In contrast, substituted decision making, where a representative makes decisions on behalf of the individual, is often used for individuals with severe or profound intellectual disabilities. However, this approach tends to focus solely on cognition and overlooks the interconnected nature of human decision making (Watson, 2016).

2. Objectives of the Study

The objective of the study was to:

(1) To examine the legal capacity of persons with intellectual disabilities and determine its current status.
(2) To investigate the status of legal capacity in India, particularly with regards to individuals with intellectual disabilities.
(3) To assess the level of awareness about legal capacity among individuals with intellectual disabilities.

(4) To explore the future perceptions and potential strategies for promoting legal capacity among individuals with intellectual disabilities.

3. Methodology

The study aimed to explore the topic of building legal capacity among individuals with intellectual disabilities and used theoretical and conceptual methods for its analysis. The authors selected specific research papers to examine legal capacity with regard to individuals with intellectual disabilities in India and other countries.

4. Challenges in building legal capacity among individuals with IDs

Legal capacity building for individuals with intellectual and developmental disabilities is faced with many challenges. Severity of disability, co-morbidity with other disabilities, and lack of awareness of rights among family members can contribute to limited self-determination and decision-making abilities. This problem can be compounded for individuals who lack parental guidance and support or who are dependent on others in institutional settings. Professionals in rehabilitation may also lack knowledge of the rights of individuals with disabilities. Additionally, service systems, such as schools and medical care providers, may not cooperate effectively, leading to inadequate assessment of cognitive-legal ability and decision-making. These individuals may also be underestimated in their ability to make decisions. Parents and professionals can work together to empower decision-making abilities by promoting independence and providing opportunities for activities of daily living. Studies show that individuals with disabilities can learn skills that promote independent decision-making, leading to improved self-determination, problem-solving, and successful adjustment into home life (Craigie *et al.*, 2019; Palmer and Wehmeyer, 2003).

Moreover, individuals with IDs are at a higher risk of being exploited and having their legal rights violated. It is crucial to assess their level of comprehension and communication, including their ability to express themselves verbally, non-verbally, or through alternative means, and to understand the consequences of their decisions.

5. Future directions

We need to empower the legal capacity of individuals with IDs with comprehensive perspectives, which include individual perspectives, family perspectives, societal/community perspectives as well as institutional perspectives. The following may consider:

(1) Evidence based model may be created for best practices which will motivate to the other parents.
(2) Another important aspect is assessing the mental capacity of individuals with IDs in decision-making authority. While individuals with IDs may have limitations, they also have strengths and abilities that can be enhanced through early intervention and support. Christine Bigby, in 2017, highlighted the importance of practical strategies such as effective communication, education on practical issues, active listening, and creating opportunities to understand and promote legal capacity.
(3) Parents share common concerns about their children's future, not only financial but also related to housing, marriage, sexuality, employment, safety, and security. To support parents and caregivers, clear rules and guidelines should be established to help them understand and access their legal rights.
(4) Creating an accessible "know your rights" program for individuals with IDs and their parents is necessary. M. Browning and colleagues (2014) reported that some practitioners

are focused on the universal "right to decide" and the cultural changes needed to empower people with disabilities.

(5) Moreover, it is possible to offer support to help individuals identify their interests, intentions, and goals to aid them in their lives. Assistance can also be provided for interpreting language, using sign language, activating computer-assisted voice features, and allowing extra time for reading and comprehension. Parents/guardians, rehabilitation professionals/service providers, legal authorities/lawyers can serve as vital resources to help build legal capacity.

(6) In India, there is a significant gap in research, particularly in this field. It is crucial to conduct comprehensive studies on decision-making quality and its practical implementation on the ground level.

(7) Furthermore, the government should initiate training programs on legal aspects for related professionals, especially for assessment and further management programs.

(8) Finally, it is necessary to ensure that legal services are easily accessible to both parents and individuals with intellectual disabilities at the community level.

6. Conclusion

In this present study, the authors have made an effort to delve into the fundamental concepts of legal capacity as they relate to individuals with intellectual disabilities (IDs). Throughout the article, the authors have underscored the prevalent challenges that both individuals with IDs and their families face, as well as the obstacles that professionals working in the field encounter in their efforts to empower individuals with IDs to exercise their legal capacity and make decisions for themselves.

In light of these challenges, the authors have presented a number of recommendations for the future. These recommendations are geared towards bolstering the legal capacity of individuals with IDs and other cognitive disabilities, and improving their decision-making abilities. It is hoped that these suggestions will inform policymakers, advocates, and other stakeholders working towards creating a more inclusive legal system that prioritizes the rights and autonomy of all individuals, regardless of their cognitive abilities.

References:

Bach, M. (2017), “Inclusive citizenship: Refusing the construction of ‘cognitive foreigners’ in neo-liberal times”, *Research and Practice in Intellectual and Developmental Disabilities*, Taylor & Francis, Vol. 4 No. 1, pp. 4–25.

Bigby, C., Whiteside, M. and Douglas, J. (2019), “Providing support for decision making to adults with intellectual disability: Perspectives of family members and workers in disability support services”, *Journal of Intellectual & Developmental Disability*, Taylor & Francis, Vol. 44 No. 4, pp. 396–409.

Browning, M., Bigby, C. and Douglas, J. (2014), “Supported decision making: Understanding how its conceptual link to legal capacity is influencing the development of practice”, *Research and Practice in Intellectual and Developmental Disabilities*, Taylor & Francis, Vol. 1 No. 1, pp. 34–45.

Craigie, J., Bach, M., Gurbai, S., Kanter, A., Kim, S.Y.H., Lewis, O. and Morgan, G. (2019), “Legal capacity, mental capacity and supported decision-making: report from a panel event”, *International Journal of Law and Psychiatry*, Elsevier, Vol. 62, pp. 160–168.

Glen, K.B. (2015), “Supported decision-making and the human right of legal capacity”,

Inclusion, The American Association on Intellectual and Developmental Disabilities, Vol. 3 No. 1, pp. 2–16.
Harris, J.C. (2010), *Developmental Perspective on the Emergence of Moral Personhood, Cognitive Disability and Its Challenge to Moral Philosophy*, Wiley-Blackwell Oxford, UK.
MacKay, D. (2006), "The United Nations Convention on the rights of persons with disabilities", *Syracuse J. Int'l L. & Com.*, HeinOnline, Vol. 34, p. 323.
Palmer, S.B. and Wehmeyer, M.L. (2003), "Promoting self-determination in early elementary school: Teaching self-regulated problem-solving and goal-setting skills", *Remedial and Special Education*, Sage Publications Sage CA: Los Angeles, CA, Vol. 24 No. 2, pp. 115–126.
Szmukler, G., Daw, R. and Callard, F. (2014), "Mental health law and the UN Convention on the rights of persons with disabilities", *International Journal of Law and Psychiatry*, Elsevier, Vol. 37 No. 3, pp. 245–252.
Watson, J. (2016), "Assumptions of decision-making capacity: The role supporter attitudes play in the realisation of article 12 for people with severe or profound intellectual disability", *Laws*, MDPI, Vol. 5 No. 1, p. 6.
Werner, S. (2012), "Individuals with intellectual disabilities: a review of the literature on decision-making since the Convention on the Rights of People with Disabilities (CRPD)", *Public Health Reviews*, Springer, Vol. 34, pp. 1–27.

Corresponding Author:
***Dr Amrita Sahay,** *Assistant Professor in Rehabilitation Psychology*
National Institute for the Empowerment of Persons with Intellectual Disabilities, Regional Center, NOIDA C-44A, Sector 40, NOIDA, Gautam Budh Nagar, UP-201301,
Email:amritarml@gmail.com

** **Dr Akhatr Hussain**, *Librarian, Hamdard Institute of Medical Sciences & Research, Jamia Hamdard, Guru Ravidas Marg, New Delhi*-110062
Email:drakhtarhimsr@outlook.com

5

A Retrospective study on Disability Awareness among General Teaching Professionals

- Karnambigai Suriya D
Integrated B.Ed.-M.Ed. ID (Final Year)
Ramakrishna Mission Vivekananda Educational and Research Institute,
Faculty of Disability Management and Special Education,
Coimbatore Campus
Tamil Nadu
Email ID: suriyadurai5@gmail.com
Mobile no: 7708095759

Abstract

Current policies and schemes pertaining to disability rehabilitation aim at including Persons with Disability in all aspects. Needless to say, that community involvement has a great impact to upgrade the level of services provided for a right based society. In order to achieve this, awareness about disability among teaching professionals (general) is one among the essential components of true mainstreaming resulting in inclusive community. This study aims to investigate 1) the level of disability awareness among teaching professionals 2) the medium through which they have gained the information 3) What is the status of their interaction and observation, with Persons with Disability. The researcher has attempted to find out answers to those mentioned above by administering closed ended questionnaire. In total, 52 subjects were included in this study under random sampling. The mean score shows clearly that 84% teaching professionals are partially aware, 3.8% have sufficient information whereas 11.5% have no significant information about disability, its types and implication. In this research paper, the researcher has also presented a set of recommendations for the sensitization and better understanding among teaching professionals based on literature review, informal interview with special educators and the experiences shared by parents.

Key words: Disability, awareness, teaching professionals, special educators

Introduction

Every child deserves to get access to education, and it is fundamental right. It is the greatest tool which can bring equality and justice in every sector of society. By providing equitable quality Inclusive Education to all, inequalities can be removed from the society and a balance can definitely be maintained amongst all. Despite the participation of increasing numbers of persons with disabilities in mainstream classes, many educators and administrators have limited knowledge about Disability (Burgstahler, 2003). Many viewed persons with disabilities as not belonging in society, feeling that these individuals might best be served by being hidden away in institutions. Interactional models promote the idea that the interaction between the individual and the environment determines if a disadvantage exists at all. The social model assumes that the environment should be changed or "fixed" to provide access to persons with disabilities. Thus,

workplaces, schools, shops, religious institutions, and entertainment venues can all “disable” persons who might otherwise function comfortably and effectively (Oliver, 1990). Such “disabling” can occur when infrastructure is built that overlooks the necessity to include persons with disabilities (Paar & Butler, 1999). Most teachers, regardless of their number of years of teaching experience, disability categories and labels were viewed as helpful in determining educational placement, programming, or learning goals. Many teachers consider placement in a general education classroom to be unrealistic for students with labels of intellectual disabilities or autism, and other disabilities. They believe that the solution to the placement of persons with Disability, in “safe” environments, which are identified as self-contained classrooms. That the removal of rejected students from general education settings might serve to further stigmatise and marginalise them, and that this solution would do little to address the attitudes of non-disabled persons, has not been considered by teachers (Lalvani, 2015). Disability awareness can help dispel negative societal attitudes and beliefs that often create an additional barrier to those with disabilities. Positive exposure and education are what is needed when developing a disability awareness program. Disability awareness is often defined as a positive attitude and increased empathy toward persons with disabilities (Wilson & Lieberman, 2000). Disability awareness may "aid in providing students and teachers with an understanding of the challenges faced by persons with different abilities". This is a primary goal and essential component of disability awareness. Three key benefits to disability awareness are that (1) persons with disabilities are more accepted by their peers, (2) they experience an increase in socialization, and (3) there is an improved perception of their abilities (Hames, 2005). Supporting and teaching disability awareness has increasingly been the subject of some attention and research. Methods for teaching about persons with disabilities include providing information about disabilities, facilitating direct and indirect contact with persons with disabilities, group processing, simulations, and using the sport education model to include all children (Flower, Burns, & Bottsford-Miller, 2007; Foley et al., 2007); Inclusion affords persons with disabilities a range of learning opportunities both within and outside the general education classroom (Baker and Zigmond 1995). As a result, inclusion may pose fundamental changes in expectations for general education classroom teachers who now must prepare to teach persons with disabilities in addition to typically learning students.

Statement of the problem

Most teachers, regardless of their number of years of teaching experience, they perceive persons with disability are to be taught in self-contained classroom. Many teachers considered placement in a general education classroom to be unrealistic for students with labels of intellectual disabilities or autism, believing that children with autism require a separate programme. It is essential to orient general educators about general information, etiology, and management about disability. But beforehand, the researcher wants to check the awareness level of general educators about disability.

Objectives

1. To investigate the level of disability awareness among teaching professionals
2. To find out the medium through which they have gained the information
3. To explore the status of their interaction and observation, with Persons with Disability

Research Questions

1. What is the level of disability awareness among teaching professionals?
2. What is the medium through which they have gained the information?
3. What is the status of their interaction and observation, with Persons with Disability?

Methodology

Research Design

Retrospective research has been considered as the appropriate design by the researcher for the present study, that comes under descriptive survey research design.

Sample

The sample for the present study is the teachers working in general schools in various districts of Tamil Nadu.

Research tool

NIMH GEM Questionnaire was adapted with 3 domains and total of 30 questions are administered to the general educators. The higher the misconceptions indicate the lower level of awareness among educators and vice versa. The tool was given to the professionals in the field for validation process. Face validity and content validity were assured.

Data Analysis

The data was analysed and represented in chart using simple percentages. The percentage of awareness level of disability among general educators is tabulated.

Table 1: Awareness level of general educators about disability

Level of Awareness	Highly aware	Partially aware	Not aware
Percentage (%)	3.85	84.62	11.54

The above-mentioned table shows the awareness level of general educators about disability in percentages.

Figure 1: Representation of percentage of disability awareness among general educators

Table 1 gives the percentage of respondents (n = 52) in this study who have high, moderate, and low levels of awareness about disability according to the adapted GEM questionnaire (ref). It

shows that majority of the respondents (84.62% or 44 out of 52) are partially aware of the disability. Percentage of general education teachers with low awareness or high misconceptions is 11.54% (6 out of 52) and that of teachers with high awareness is 3.85% (2 out of 52).

Table 2: Mean and standard deviation of the data

Level of Awareness	Highly aware	Partially aware	Not aware
Mean	9.5	17.18	21.83
Std Dev	0.71	2.24	1.60

Table 2 presents the mean and standard deviation of score on the adapted GEM test (ref) for each of the three levels of awareness. Figure 2 presents the graphical representation of the same. The bars in the graph show the mean scores for the high, moderate and the low awareness levels of disability among general education teachers.

Figure 2: Representation of mean awareness levels for each level of awareness on disability among general educators

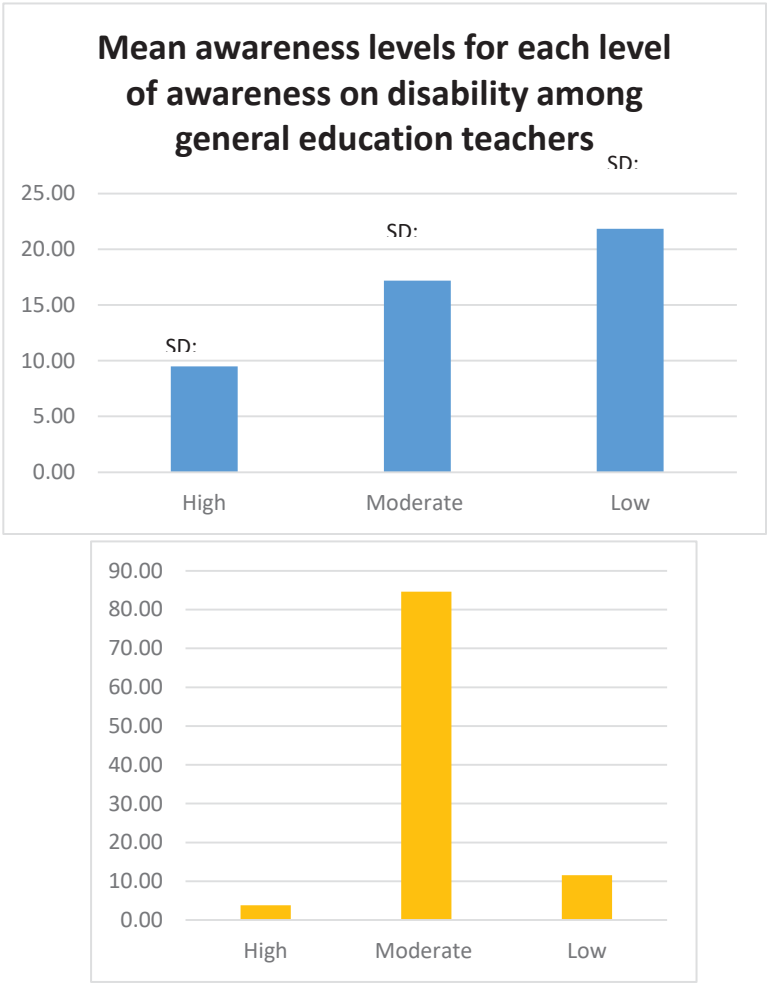
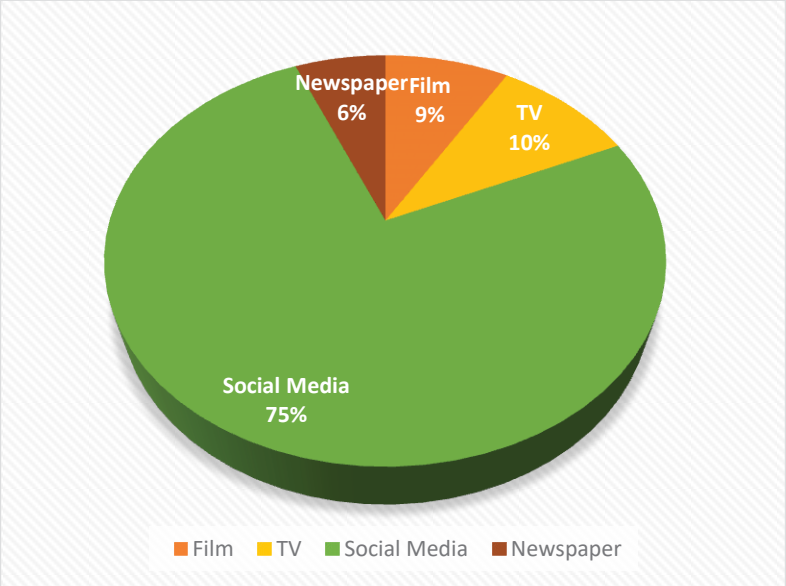


Table 2 shows the standard deviation for each of these mean scores is provided above the bars. The figure shows that the mean for high level of awareness is 9.5 +/- 0.71, for moderate level of awareness is 17.18 +/- 2.24 and that for low level of awareness is 21.83 +/- 1.60. It can be seen from the above tables and figures that the percentage of general educators with moderate level of awareness about disability is 84.62% and the mean score for this group is 17.18 +/- 2.24.

Table 3: Representation of medium through which general educators gained information about disability

Medium	Newspaper	TV	Film	Social Media
Percentage (%)	6	10	9	75

Figure 3: Represents the medium through which the general educators received information about disability

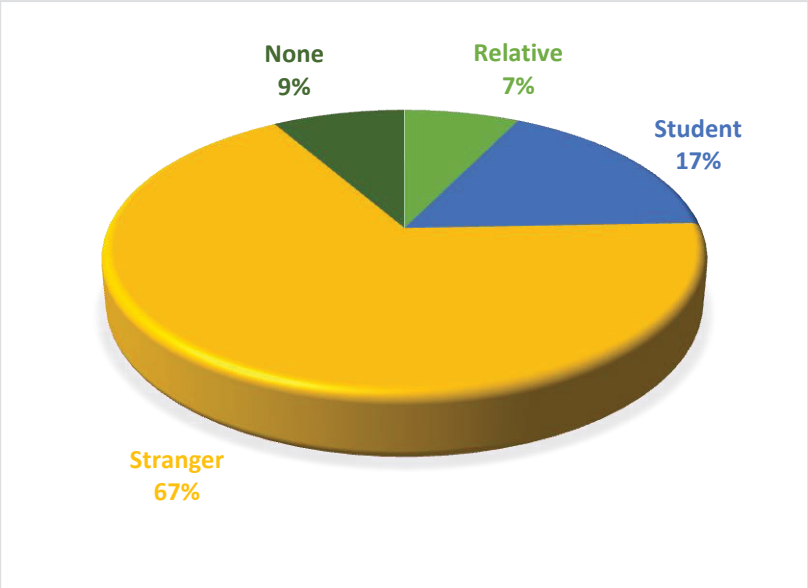


The above-mentioned Pie chart represents the data of medium through which general educators received information about disability. 75% of the general educators have gained knowledge by means of social media. Majority of the respondents used social media such as WhatsApp, Facebook, etc. 10% of the respondents have acquired information from television, 9% of the respondent's received information from Film and 6% by means of newspaper.

Table 4: Representation of levels of interaction with disability among general educators

Level of interaction	Relative	Student	Stranger	None
Percentage (%)	7	17	67	9

Figure 4: Represents the level of interaction and observation of persons with disability among general educators.



The above-mentioned Pie chart represents the data about the level of interaction and observation of general educators with persons with disability. Majority (67%) of the respondents have observed persons with disability in the community as a stranger and they may not have interacted, 17% of the respondents have observed and interacted with the students at school. 7% of the population have observed and interacted as a family member or a relative. 9% of the participants have not yet observed or interacted with persons with disability.

Recommendations for the sensitization based on literature review:

- Awareness training is beneficial when they incorporate hands-on activities demonstrating what life with a disability may be like (McGinnis, 2006). Disability awareness programs can take all forms including simulations, discussions, literature exposure, real life contact and collaboration and role playing. The purpose of the exercise was to help students to

understand the stigmatization of persons with disabilities rather than understand disability itself.

- Traditionally, disability awareness topics are presented in class via disability simulation activities, (Flower et al., 2007; Herbert, 2000). While conducting simulations, it is important to ensure that they focus on what persons with disabilities can do rather than on what they could not do (French, 1992). If the simulation ends without discussing how provisions can be designed to be accessible to people who are differently abled, participants could be left with the notion the disability causes lack of access.
- In order to maximize the inclusion of persons with disabilities in all life activities, (a) society must create accessible environments, (b) persons with disabilities must develop strategies for dealing with functional limitations imposed by their disabilities, and (c) program and service staff must provide reasonable accommodations for persons with disabilities.
- Online videos can be a great means to motivate students to take a more active role in their learning (Burta, 2007; DeAvila, 2008; Skiba, 2007), These videos can be a powerful way to teach disability awareness (Campbell, 2007). For example, teachers could assign students a specific video to review, such as one on disability sport; after watching the assigned video, teachers could then facilitate discussion with students.
- Implementation of social, individual, and interactional model.
- First, it suggests that there is a need for a conceptual shift in the ways in which educators, and indeed all professionals, conceptualise disability. Moving away from deficit-based models, professionals need to examine the socio-culturally constructed and contextualised nature of disability, and to consider the alternative perspectives of persons with disabilities. (Lalvani P., 2015)
- A study of disability training programs at two universities indicates that "faculty attitudes could improve if a variety of training opportunities [were] available" (Lombardi et al., 2013, p. 230)
- Participating in disability awareness training programs develops staff and administrators' understanding of student needs and develops more positive attitudes toward working with persons with disabilities (Murray, Lombardi, & Wren, 2011)
- The exercises that help students to understand the stigmatization of persons with disabilities rather than understand disability itself. Some strategies should highlight solutions employed by an individual (e.g., the student's use of assistive technology to access a computer); others can show solutions implemented by other individuals.
- Online videos can be a great means to motivate students to take a more active role in creating disability awareness. Students can watch the online video, discuss it, and play it and discuss it again, bringing the learning experience to a deeper level (Columna, L. et al., 2009).
- Today social media allows advocacy organizations to raise awareness about disabilities and to stimulate public communication and interaction. The organizations have to deal in their advocacy work with two sets of media strategies, some of which are more appropriately done online (campaigns, fund raising, engaging in debates of interest for members, raising awareness on disability etc.) and others that are preferably done offline (member information, staying in touch with primarily the elderly etc.). It is considered necessary to maintain offline tools, and a full analog to digital transition is neither relevant nor of immediate interest.

- Films can be effective teaching tools to increase understanding of a wide range of physical, cognitive, and emotional/behavioural disabilities. Educators should remember, however, that simple exposure doesn't enhance positive attitudes, but focused, reflective viewing can help achieve this goal (Stephen P. Safran, 2000).

Conclusion

Disability awareness is crucial as it can help improve the knowledge, attitudes, and acceptance of persons with disability. Awareness can be initiated by providing information about disabilities, videos, discussions, providing accessibility in all aspects, simulations, classroom activities. The outcome of such disability awareness interventions is effective. 84% of the respondents are partially aware and they have gained knowledge by means of social media. General educators have a huge responsibility as acceptance of persons with disability emerges with children at the earlier stage of life. It is essential to make sure that persons with disability are included by peers at schools and the role of general educator is to promote inclusion among persons without disability, administrators, and parents.

Limitation

This study focused on the general educators in the state of Tamil Nadu only. In addition, the number of samples was 52.

Recommendations from special educators and parents of persons with disability

Special Educators and parents suggest that awareness could be created by providing:

- lectures, to conduct social activities to make Persons with Disability involve.
- events such as walkathon including Persons with and without Disability.
- orientation programme for the stake holders of the general school Administrators, general educators, parents of students without Disability and the students to promote inclusive education.
- accessible infrastructure enhances the participation of Persons with disability as every other individual.
- orientation to the employers to reduce the misconceptions, prejudice and to change the attitude about persons with disability.

References

French, S. (1992). Simulation exercises in disability awareness training: A critique. *Disability, Handicap & Society*, *7*(3), 257-266.

Zigmond, N. (1995). Inclusion in Pennsylvania: Educational experiences of students with learning disabilities in one elementary school. *The Journal of Special Education*, *29*(2), 124-132.

Safran, S. P. (2000). Using movies to teach students about disabilities. *Teaching exceptional children*, *32*(3), 44-47.

Burgstahler, S., & Doe, T. (2004). Disability-related simulations: If, when, and how to use them in professional development. *Review of Disability Studies: An International Journal*, *1*(2).

McGinnis, J. (2006). Elementary School and University Collaboration for a Disability Awareness Workshop. *Delta Kappa Gamma Bulletin*, *73*(1).

Foley, J. T., Tindall, D., Lieberman, L., & Kim, S. Y. (2007). How to develop disability awareness using the sport education model. *Journal of Physical Education, Recreation & Dance*, *78*(9), 32-36.

Columna, L., Yang, S., Arndt, K., & Lieberman, L. (2009). Using online videos for disability awareness. *Journal of Physical Education, Recreation & Dance*, *80*(8), 19-24.

Murray, C., Wren, C. T., Stevens, E. B., & Keys, C. (2009). Promoting University Faculty and Staff Awareness of Students with Learning Disabilities: An Overview of the Productive Learning u Strategies (PLuS) Project. *Journal of Postsecondary Education and Disability*, *22*(2), 117-129.

Murray, C., Lombardi, A., & Wren, C. T. (2011). The effects of disability-focused training on the attitudes and perceptions of university staff. *Remedial and Special Education*, *32*(4), 290-300.

Lindsay, S., & McPherson, A. C. (2012). Strategies for improving disability awareness and social inclusion of children and young people with cerebral palsy. *Child: care, health, and development*, *38*(6), 809-816.

Lalvani, P. (2013). Privilege, compromise, or social justice: Teachers' conceptualizations of inclusive education. *Disability & Society*, *28*(1), 14-27.

Roth, D., Pure, T., Rabinowitz, S., & Kaufman-Scarborough, C. (2018). Disability awareness, training, and empowerment: A new paradigm for raising disability awareness on a university campus for faculty, staff, and students. *Social inclusion*, *6*(4), 116-124.

Symeonidou, S., & Loizou, E. (2018). Disability studies as a framework to design disability awareness programs: no need for 'magic' to facilitate children's understanding. *Disability & Society*, *33*(8), 1234-1258.

Gelfgren, S., Ineland, J., & Cocq, C. (2022). Social media and disability advocacy organizations caught between hopes and realities. *Disability & Society*, *37*(7), 1085-1106.

6

Parents' Perception of Employment of Persons with Intellectual Disabilities- A Phenomenographic Study

*Ms. Roopavathy.S, **Mr. Karthigai Selvam,***Dr. Saumya Chandra

Abstract

Irrespective of the several initiatives taken by the national and state-level government ministries, educational institutions, and NGOs to include persons with disabilities in the employment arena, the perceptions of parents of PwD in general, and Persons with Intellectual Disabilities in specific, differ in varying degrees. The paper attempts to study the perception of employment among parents of PwID using the phenomenographic research method. Although the National skill development corporation through Skill Development Centers for Persons with Disability has brought in several skill training programs to enable and empower Persons with Disability in acquiring meaningful and productive employment, parents of PwID had different perceptions about employability ranging from the absence of scope for employment or employment based on compassionate grounds on one end to increasing employability through soft skills or computer skills on the other extreme. To better understand their perception which directly impacted their ward's employment, a sample of 50 parents of Persons with Intellectual Disabilities from various special education and vocational training centers were involved in a sample survey that questioned their different perceptions about employability. The responses were analyzed phenomenographically in three stages following Marton and Saljo (1995) where the identified data based on the phenomenon were sorted into pools of meaning and the pools of meaning were contrasted and categories were generated with descriptions followed by a reliability check. The derived results will be useful for researchers, vocational trainers, and employers to better understand the different perceptions in the employment of PwID and design useful interventions, vocational counseling, training, and increased placement of Persons with Intellectual Disabilities

Keywords: Parents of PwID, perceptions, employability, phenomenography

Introduction

The International Labour Organization (ILO) promotes equality of opportunity and treatment for persons with disabilities in the world of work. Access of persons with disabilities to decent work is important both as an essential right and in terms of the economic advantages it brings. To achieve this goal, the ILO works to increase the employability of persons with disabilities, to support employers in becoming more inclusive, and to promote enabling legislative and policy environments

Influenced by international developments several countries made various legislative and policy changes that were aimed at ensuring greater participation and equality of persons with

disabilities in all matters including employment. The laws pivoted on two visible major legislative strategies- the first being the one which prohibited discrimination and assure equality of opportunity of persons with disabilities in employment through reasonable accommodation while the second provided for a quota system through which real equity in employment could be organized at least in the public employment sector.

Persons with Disabilities Act, of 1995 addressed the issue of employment of persons with disabilities in a multi-focused approach. It promoted the employment of PwD in the public sector through a scheme of quota to the extent of 3% in all government departments both central and state inclusive as stated under section 33. The private sector was encouraged via schemes implemented by the government, which incentivized them whose workforce consisted of 5% of PwD as per Section 39.

Though India has ratified the United Nations Convention on the Rights of People with Disability (UNCRPD), they continue to face many difficulties in the labour market. PwD faces enumerable challenges to finding meaningful employment in the world of work. Their need for gainful employment remains largely unmet despite of implementation of the PWD Act 1995.

According to the Department of Empowerment of Persons with Disabilities, (2016) Disability, unemployment, and poverty play a triarchic role in the lives of PwD distancing them from a qualified and dignified living in the community.

Persons with Intellectual Disabilities

"For most young people in the general population, the transition to adult life is characterized by a diminution of parental control and involvement in the child's life." (O'Brien, 2006) "When mainstream learners exit high school, it is an exciting experience for them and their families as they enter a more independent life." (Hart, 2006) On the contrary, when the transition to adult life is considered for learners with intellectual and developmental disabilities, the possibilities are limited as the reality suggests a greater reliance on parental resources rather than any reduction in dependence on their parents. (O'Brien, 2006)

To learn and retain new information and adapting to new situations is a challenge for Children with Intellectual and Developmental Disabilities. The overall rate of development in most of the domains (physical, cognitive, language, social, emotional) is slow in children with IDD compared to their typical peers, to the extent that they need external support to cope and comply with required daily living skills during their early lives. Early intervention at the right time helps prevent secondary complications and disabilities. "They experience difficulty with concentration, poor communication skills, problems understanding instruction, and difficulty in becoming independent. The extent of limits of learning is a function of the severity of the disability." (Rose Saunders et al, 2005)

Rosche et al. (2004) studies that inability to participate in leisure pursuits, confronting hostile attitudes or total avoidance from peers, experiencing patronizing behaviour from adults and exclusion from mainstream schools are some of the numerous physical and social barriers disabling the environment where learners with intellectual disability grow up.

Gallagher, (2002) states that equally, the opposite is also evident namely paternalism, overprotection and infantalisation. Also he adds that Intellectual and developmental disabilities, the most powerful and most stigmatizing label in vogue, creates strong negative expectations and stereotyping that leads to prejudice. Instead of empathizing with people with intellectual and developmental disabilities, people settle either for sympathy or for rejection. Roche et al, (2004) state that parents' unintentional comments on stereotyped ideas about their child's disability adversely affect the younger adolescent's self-image and self-confidence loading substantial damage throughout their life.

Attitudinal and Community barriers stem from the belief that Persons with Intellectual Disabilities do not have the capacity and motivation to make informed choices states Zhang & Stecker, (2001). Further, they state that 'learned helplessness' as the main internal barrier with PwID themselves which makes them believe that they are incapable of involving in their own vocational planning. Their experience of inability to control the environment, and learning of uncontrollable events, leads to a psychological state of helplessness. Also, they state that the syndrome of learned helplessness affects their cognitive growth and results in a non-responsive, disinterested, dull appearance of their selves to others, Zhang & Stecker, (2001)

Studies indicate that Persons with Intellectual and developmental disabilities (PwIDD) have significant difficulties in coping with adult life. Among many strategies used by them to cope with the disability, the most common is regression. Maybe, they find it easier to retreat to an earlier age and stage they are already familiar with than to struggle with interdependence. Taanila et al, (2005) opine that behaviour disorders, problems at work and in their social relationship, physical and mental health issues alongside their co-morbid conditions, and additional disabilities are a few common problems faced by them during their adolescent age.

Studies indicate that Persons with Intellectual disabilities (PwID) have significant difficulties in coping with adult life. Among many strategies used by them to cope with the disability, the most common is regression. Maybe, they find it easier to retreat to an earlier age and stage they are already familiar with than to struggle with interdependence. Behaviour disorders, problems at work and in their social relationship, physical and mental health issues alongside their co-morbid conditions, and additional disabilities are a few common problems faced by them during their adolescent age states Taanila et al, (2005).

Matos et al., (2019) study that the intention of skill training and capacity building in vocational training is to make PwID an earning and contributing member in family and society and Country as they are a component of country's intellectual capital at their own levels and economic contributions from disability sector in India is estimated around 5% to 7% of GDP which approximates to Rs. 9.5lakh crore to 13.3lakh crore per annum.

Need of the study

PwID need to participate in income generating activities as their age appropriate peers. Employment is most important in one's life because having a job and keeping oneself meaning and productively engaged is valued as it enhances ones social status. Majority of adults invest their large portion of their day in job and the resultant income by way of wage /salaries leaves them with a choice to have money to participate in other activities. It widens their social circle, increases integration, provides contacts and opportunities for other assimilated activities, and

paves way for supported decision making in personal and work life states Fiona Shearman & Cassie Sheehan, (2000).

Parents' perception of employment of their Wards with Intellectual Disabilities (Wards with ID) plays a pivotal role in deciding and continuing the employment/vocational training, age at employment, and the type of employment which includes sheltered employment, open competitive employment, self-employment, or supported employment that best suits their family needs besides interest, capacity, level and income required for a dignified living of the PwID.

The paper attempts to study the process of employment as experienced by their Wards with Intellectual disability, as compilation of their expectation and reality with the objective of providing clarity to stakeholders of PwID which includes counsellors, vocational trainers, employers, policy makers, parents of PwID, apart from PwID themselves.

In Marton's, (1981) own words, phenomenography is interested in investigating people's conceptions of the world or their experiences of it from a "second-order" perspective. The investigation of PwIDs experience of employment and their parents forms the basic objective of this study. It is concerned with investigating the qualitatively different ways in which parents of PwID experience, conceptualise, perceive, and think about various aspects of employment in the world of work. It aims at revealing the individual and collective levels of variation by focusing on the way parents of PwID experience specified aspects of employment as a means of understanding other people's understandings so that these in turn can be described according to one of the categories that will explained.

Objective of the study

To study the parents perception of employment of Persons with Intellectual Disabilities to understand different perceptions, the aspects that build up their views, and the contributing factors.

Method

The researchers followed a Qualitative empirical study with a phenomenographic approach. Semi structured interview was used to collect data from the samples.

Sample

Convenient sampling technique was followed and 50 samples were selected. Out of 50, 11 males and 39 females who are parents of PwID were interviewed by 2 researchers

Inclusion Criteria

The samples included satisfied the following conditions

1. Their Wards with ID were working in any one of the following employment set ups
    a. Open competitive employment
    b. Sheltered employment
    c. Self-employment
2. They have completed minimum one year of experience

3. They were drawing a monthly income of more than at least Rs 1000/-
4. Four different geographical representations were included.

Data analysis

Phenomenographic analysis was performed as instructed by Sjostram, Dahlgren, 2002

Table 1 Parents demographic characteristics

No of sample	Gender	Locale	Type of Employment of PwID	Perception of parents of PwID of employment
1	Female	CBE	Sheltered	Job permanence
2	Female	CBE	Sheltered	Job permanence
3	Female	CBE	Sheltered	Job permanence
4	Female	CBE	Sheltered	Job permanence, Exemptions
5	Female	CBE	Sheltered	Job permanence
6	Female	CBE	Sheltered	Job permanence
7	Female	CBE	Sheltered	Job permanence, Exemptions
8	Female	CBE	Sheltered	Job permanence, Exemptions
9	Female	CBE	Sheltered	Job permanence, Concessions
fo10	Female	CBE	Sheltered	Job permanence, Concessions
11	Male	Chennai	Sheltered	Job permanence, Concessions
12	Female	Chennai	Self	Identity, Own pace
13	Female	Chennai	Sheltered	Job permanence, Increased pay
14	Female	Chennai	Sheltered	Job permanence, Increased pay
15	Female	Chennai	Sheltered	Job permanence, Increased pay
16	Female	Chennai	Sheltered	Job permanence, Increased pay
17	Female	Chennai	Sheltered	Job permanence, Increased pay
18	Female	Chennai	Sheltered	Job permanence, Increased pay
19	Female	Chennai	Sheltered	Job permanence, Increased pay
20	Female	Chennai	Self	Identity, Own pace

21	Female	Chennai	Self	Identity, Income
22	Female	Chennai	Sheltered	Meaningful engagement
23	Female	Chennai	Sheltered	Meaningful engagement, Safety
24	Male	Chennai	Sheltered	Meaningful engagement, Safety
25	Female	Chennai	Self	Identity, Income
26	Male	Chennai	Sheltered	Meaningful engagement
27	Female	Chennai	Sheltered	Meaningful engagement, safety
28	Male	Chennai	Sheltered	Meaningful engagement, safety
29	Male	Chennai	Sheltered	Meaningful engagement, safety
30	Male	Chennai	Sheltered	Meaningful engagement
31	Male	Chennai	Open competitive	Equal opportunity, equal pay
32	Female	Chennai	Open competitive	Equal opportunity, equal pay
33	Female	Chennai	Sheltered	Meaningful engagement
34	Female	Chennai	Open competitive	Equal opportunity, equal pay
35	Female	Chennai	Sheltered	Meaningful engagement
36	Female	Madurai	Sheltered	Meaningful engagement
37	Female	Madurai	Sheltered	Meaningful engagement
38	Female	Madurai	Open competitive	Equal opportunity, equal pay
39	Female	Madurai	Sheltered	Meaningful engagement
40	Female	Madurai	Sheltered	Meaningful engagement
41	Male	Madurai	Sheltered	Meaningful engagement
42	female	Madurai	Sheltered	Meaningful engagement
43	Male	Trichy	Sheltered	Meaningful engagement
44	Female	Trichy	Open competitive	Equal opportunity, equal pay
45	Male	Trichy	Sheltered	Meaningful engagement
46	Female	Trichy	Sheltered	Meaningful engagement

47	Male	CBE	Self-employment	Identity, recognition
48	Female	CBE	Sheltered	Meaningful engagement
49	Female	CBE	Sheltered	Meaningful engagement
50	Female	CBE	Sheltered	Meaningful engagement

*Sheltered Employment: PwID engaged in employment under single roof and indulging in group work, under supervision of Floor Supervisor.

**Self-employment: PwID engaged in own business, small to mid-sized production, cottage industry type along with parents/caretakers

***Open competitive: PwID employed in open employment and work in equal terms along with typical population without special concessions or exemptions

Table 2. **The phenomenographic analysis procedure**

1. Familiarizing	In the first step, the first and second author read through the transcripts in their entirety several times to obtain an overall impression.
2. Condensing	In the second step, the authors identified and marked out significant passages concerning parents' views on the employability of people with intellectual disabilities. These passages were summarized in a text document.
3. Comparing	In the third step, the significant passages were re-read by the three authors and compared. Similarities and variations were searched for. Different aspects of the phenomenon were identified.
4. Grouping	In the fourth step, the authors searched for patterns, and data excerpts with similarities were grouped together. This included going back to the transcripts, consulting the material, and regrouping several times until saturation was reached. The grouping process resulted in three descriptive categories, which were mutually exclusive, but internally related. Taken together, the descriptive categories formed the outcome space of the analysis.
5. Articulating	The next step in the analysis was to capture the essential meaning of the three categories, focusing on how the different aspects were perceived and related internally.
6. Labeling	In the sixth step, the categories were named after their core meaning. Steps 3-6 were repeated in an iterative procedure to make sure the similarities in and differences between the three categories were distinguished and explicit. The categories were labeled employability as Restricted by disability,

employability as independent of disability, and employability as contingent.

7. Contrasting	A contrasting analysis of the outcome space was carried out by investigating the internal relationships across the categories. Aspects expressed were contrasted with each another to describe the relationship between the categories. This contrasting process was characterized by the negotiation of consensus between the three authors. When searching for similarities and differences between the three categories, the aspects were contrasted in a search for possible relations between all the aspects that were described. Three themes emerged across the descriptive categories; Individual , Workplace and Community

The analysis procedure consists of seven steps and is described in Table 2

Findings

Out of 50 respondents, 14 responses were grouped under employment as restricted by disability, 12 responses were grouped under employment as independent of disability conditions and 24 responses were grouped under employment as contingent on disability conditions as per Table 3.

Table 3. Overview of the categories and selected quotes.

	Restricted	Independent	Contingent
Individual-related Aspects	My ward with Intellectual disability has physical and cognitive limitations despite which he has to be on equal terms with typical employees and is not expected to request exemptions, concessions, or subsidies based on his limited capacity.	My ward with ID has physical & cognitive limitation but job skills are independent of disability and employment need to be judged based on skill competence.	My ward with ID has physical and cognitive limitations that entitle him to work in an environment that is adapted and made accessible (Physical and cognitive access) matching his needs

Workplace-related aspects	Employers recruit workers who match their required skill sets and have the competency to contribute maximum to the betterment of workplace. Hence all jobs do not match my ward with ID since he has to share the same space with typical employees in the workplace.	Employment has to be provided as independent of limitations due to disability. Recruitment based on exemplary job skills possessed by my ward ID yield better results	Employers provide jobs that matched the skills, combat the challenge and the limitations of my ward with ID. Accept meaningful engagement in workplace during the active time of the day and minimum pay by way of stipends.
Community -related aspects	Community accepts and recognizes my ward with prejudice and pre-determined conditions. My ward is left behind or restrained from events that calls for community participation. Engaged in meaningful employment does not bring change in community attitude	When my ward is employed in a job that helps in bringing out his best skills, he is entitled for maximum participation in the community as well. His inability does not restrict his independence	Acceptance and participation are way behind compared with the discrimination and isolations still in vogue. Ensuring accessibility to community facilities, and providing participation in community events satisfy the condition for participation

Results and Discussions:

The seven step analysis of the semi structured interview with parents yielded the result to study the different perceptions Parents of PwID had in respect to employment of their Wards. The perceptions varied at different extremes from accepting the limitations and challenges of their Wards and its reflection in the world of work at one end to defying the existing systems defending their Wards towards a more supporting, inclusive workplace and community as well. The different perception of the world experienced by them is identified, analysed, categorised and grouped based on in-depth analysis of the conversations held between the samples and researchers. Table 3 given above categorized the emerged group into three namely employment as restricted by their Ward's disability, employment as independent of disability conditions, and employment as contingent based on disability conditions.

Employment as restricted by disability conditions

The responses grouped under this category were based on the perception of Parents of PwID whose responses contained phrases such as challenges in daily living activities, lack of time and

travel concepts, being aggressive, impulsive at home and workplace, displaying anxiety and anger at home and workplace, and abusive at times. These restricted their opportunity to showcase their Wards for better employment options and they perceive employment as rigid where the rules are equal to all the employees and where the platform is common. They perceive employment as a meaningful engagement of their Wards in a place other than their residences and their Wards cannot expect exemptions, extensions, or concessions, in connection with their disability in the workplace. The jobs are chosen by the employers based on their preferences which the employers opine will hold good for PwID without making changes in recruitment or work rules. Parents of PwID perceive that to be fair on part of employers who generally recruit competent, highly skilled, qualified, and experienced typical workers for the best pay and they do not have obligation to recruit their Wards with physical and/or cognitive limitations at par in salary and other perquisites with such typical employees. Community aspects were perceived as restricted, discriminated, and isolated which deterred their Wards with ID from fare inclusion and participation. They perceived community as an entity not rendering required support, accessibility at the required situations.

Employment as independent of disability conditions

The responses grouped under this category were based on the perceptions of Parents of PwID whose responses contained phrases such as capacity linked with employment, job skills that match the requirement for employment is free of disability conditions, employment training crucial to improve performance in the workplace, every individual with ID is unique and is bestowed with unique skills for which they are respected, provided with employment matching their skills, and acknowledged for that. Parents also perceive self-employment at par with open competitive employment where they rank self-identity prior to income generation. Workplace aspects are perceived as providing skill based employment and salary with respect for their Wards with ID as people first and disability next. Community is leading itself towards accessibility and inclusion and parents demand it as right to include their Wards with ID in community facilities and community events. Also they perceive community to be supportive of self-employment, provides venue for production and marketing of products. Self-employment is perceived by parents of PwID as superior to open competitive or sheltered employment owing to reasons that it allowed their Wards to work in their own place, phase and pace. Besides ensuing individual identity, and work place safety, self-employment allowed family to work together as cottage industry, where they worked to decide their income.

Employment as contingent on disability conditions

The responses grouped under this category were based on the perceptions of Parents of PwID whose responses contained phrases such as employment that matched the capacity of their Wards with ID, work without complexities, repetitive, monotonous, without challenges, with adequate and/or close supervision and support, periodical training, with parental support, as PwID cum Parents of PwID job initiative where the work did not challenge them cognitively and it exerted them to the optimum level. They perceive employment as a meaningful shift in place where their Wards with ID were occupied the entire day with laborious repetitive tasks, with optimal workloads which rendered them physically exhausted as they returned home. Further they perceive employment as a meaningful engagement activity rather than an income generating activity. They perceive that employment of persons with ID yields no pay, and meagre payments

as stipends suffices them. Also they perceive employment, with workloads, repetitive nature of work without involving creativity, low pay, as contingent on disability conditions. They accept that job is conceived and designed with conditions to suit the limitations and challenges of their Wards with ID. They are adapted and made accessible to their Wards to include them in the world of work and upon these factors, low pay, and loss of pay for leaves availed by PwID, low or no recognition in workplace, delayed income revisions, delayed promotions are considered normal and acceptable. They perceive community aspects to extend moral support and inclined towards meeting the requirements of their Wards with ID at policy level and towards implementation amidst discrimination and isolation.

The Emergent theme

Based on the contrasting analysis of the perceptions of parents of PwID of employment, the emergent theme revealed three causal and contributing interlinking factors that can serve the stakeholders of PwID towards planning and decision making in recruitment, training and employment of PwID in three set ups namely open competitive, sheltered and self-employment as illustrated in given figure .

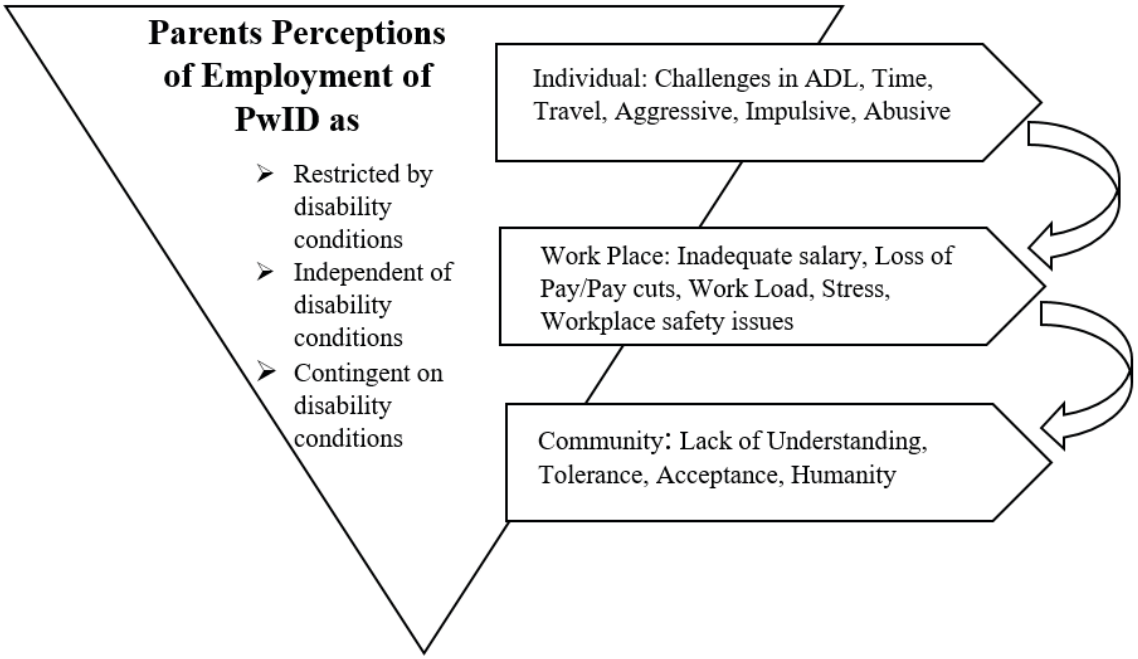


Fig.1 Emergent Theme- Parents perception of employment of Persons with Intellectual Disability

Conclusion

The three causal and contributing interlinking factors that emerged from parents' perception of employment of persons with ID explains the niche areas for consideration and contribution of stakeholders who include PwID at the centre, parents, therapists, special educators, vocational instructors, employers, policy makers and community towards ensuring a more inclusive and participative employment environment that can positively impacts their lives towards a meaningful, sustainable and dignified living in future.

References

1. Mohit, A., Pillai, M., & Rungta, P. (2006). *Rights of the Disabled* (p. 13). New Delhi: National Human Rights Commission.
2. https://nhrc.nic.in/sites/default/files/DisabledRights.pdf
3. Scheme, D. D. R. (2019). Department of Empowerment of Persons with Disabilities. *Last accessed on*.
4. Shearman, F., & Sheehan, C. (2000). Vocational skills training for people with intellectual disabilities: a multi-faceted approach. *SYDNEY INSTITUTE-PETERSHAM TAFE (nd):. http://www. adcet. edu. au/StoredFile. aspx*.ILO. (2015). ILO and disability inclusion.
5. https://www.ilo.org/wcmsp5/groups/public
6. Matos, F., Vairinhos, V., Selig, P. M., & Edvinsson, L. (2019). Intellectual capital management as a driver of sustainability. *Perspectives for Organizations and Society, Springer International Publishing, Cham and Berlin*.
7. Statistics, E. (2016). Ministry of Statistics and Programme Implementation Government of India.
8. Nevala, N., Pehkonen, I., Teittinen, A., Vesala, H. T., Pörtfors, P., & Anttila, H. (2019). The effectiveness of rehabilitation interventions on the employment and functioning of people with intellectual disabilities: a systematic review. *Journal of occupational rehabilitation*, *29*, 773-802.
9. Lengnick-Hall, M. L., Gaunt, P. M., & Kulkarni, M. (2008). Overlooked and underutilized: People with disabilities are an untapped human resource. *Human Resource Management: Published in Cooperation with the School of Business Administration, The University of Michigan and in alliance with the Society of Human Resources Management*, *47*(2), 255-273.
10. Shaw, L., Daraz, L., Bezzina, M. B., Patel, A., & Gorfine, G. (2014). Examining macro and meso level barriers to hiring persons with disabilities: A scoping review. *Environmental Contexts and Disability*, *8*, 185-210.
11. Han, F., & Ellis, R. A. (2019). Using phenomenography to tackle key challenges in science education. *Frontiers in psychology*, *10*, 1414.
12. Strindlund, L., Abrandt-Dahlgren, M., & Ståhl, C. (2019). Employers' views on disability, employability, and labor market inclusion: a phenomenographic study. *Disability and rehabilitation*, *41*(24), 2910-2917.

*Ms. Roopavathy.SResearch Scholaradityarupa@gmail.com

**Mr. Karthigai SelvamResource Teacherkarthigaiselvam24@gmail.com

***Dr. Saumya ChandraAsst.Professorsaumyachandra72@gmail.com

7. Behavioral Interventions to Treat Speech Sound Disorders in Children With Autism

Smita Awasthi, Sridhar Aravamudhan, Behavior Momentum India

Abstract

Children with autism are at a higher risk of being affected by speech disorders and often require remedial intervention. Eikeseth and Nesset (Journal of Applied Behavior Analysis, 36(3), 325–337, 2003) used sufficient-response exemplar training of vocal imitation in conjunction with prompting, chaining, and shaping procedures to successfully teach 2 typically developing children to articulate several Norwegian words with blends. The present study extends and adapts these procedures to children with autism. Participants were TA, an 11-year-old boy, and KS, a 15-year-old girl, both with autism and speech sound disorders. For each participant, 3 sets of 10 words with specific blends in the initial position were targeted for training. Vocal imitation training with within-stimulus prompts was used for both participants. For KS, lip-tongue-teeth position prompts and chaining were added during the training of certain words. A multiple-baseline across-behaviors (word sets with target blends) design demonstrated improvement in the articulation of trained words and generalization of correct articulation to untrained words with both participants. The findings suggest that speech sound disorders in children with autism can be addressed with behavioral interventions.

Keywords: autism. speech sound disorder. phonological disorder. articulation disorder. sufficient-response exemplar training. echoic. vocal imitation training. chaining. lip-tongue-teeth prompts.

Introduction

The Diagnostic and Statistical Manual of Mental Disorders (5th Ed.; DSM–5; American Psychiatric Association, 2013) under the head of communication disorders lists: language disorder, speech sound disorder (previously known as phonological disorder), childhood-onset fluency disorder (stuttering), social (pragmatic) communication disorder and other unspecified communication disorders. Speech sound disorders involve omission (‘top’ for ‘stop’), distortion (‘tate’ for ‘teeth’) or substitution (‘cwy’ for ‘cry’) of phonemes or syllables (Porter, 2016). A diagnosis of speech sound disorder requires ruling out difficulties in speech production related to (1) structural or motor impairments such as dysarthria seen in cerebral palsy, (2) ethnic and regional variations such as African Americans saying ‘dis’ for ‘this’, an Australian saying ‘today’ that sounds like ‘to die’ or a person from Eastern India saying ‘bictory’ for ‘victory’ or (3) hearing impairments. Studies of vocal-verbal, 3 to 9-year-old children with ASD place prevalence estimates for speech delay, errors and persistent speech disorders between 12% to 33% (Cleland, Gibbon, Peppe´, O’Hare, & Rutherford, 2010; Rapin, Dunn, Allen, Stevens & Fein, 2009; Shriberg, Paul, Black and Santen, 2011). In comparison, the prevalence of speech errors at age of 8 in the general population is only 7.9% (Wren, Roulstone, Miller, Emond, & Peters, 2009).

In the field of Behavior Analysis, vocal imitation training or echoic training with shaping has been used to improve the articulation of whole words (Lovaas, Berberich, Perloff, & Schaeffer, 1966). Such procedures target incremental improvements in the words said. Hegde and Pena-Brooks (2007) examined the evidential basis of treatment protocols for phonological

disorders from 1970 to 2007 and recommended the use of discrete trial methods incorporating behavioral techniques such as prompting, manual guidance, fading, positive reinforcement, corrective feedback, shaping, etc. as such treatments are well established with adequate control and replicated experiments. A promising treatment package comprising of vocal imitation training with sufficient-response exemplar training (SRET), prompting, chaining and shaping was used successfully in the treatment of phonological disorders in two typically developing school-aged Norwegian children (Eikeseth & Nesset, 2003). The current study replicated and extended the Eikeseth & Nesset (2003) study over a different population, i.e., children with autism where the prevalence of speech sound disorders is significantly higher.

Method

Participants

Participants were TA, an 11-year-old boy, and KS a 15-year-old girl, both with ASD. A Behavioral Language Assessment (BLA: Sundberg & Partington, 1998) which assessed his verbal repertoires indicated low vocal play (score of 2 out of 5), good level of vocal imitation (4 out of 5), strong tacting, requesting and match to sample and listener responding repertoires. His overall BLA score was 47 out of 60. TA could articulate most functional words clearly and only faced difficulty in words starting with certain blends. KS was diagnosed with "autism" by a pediatric neurologist in Mumbai, India when she was 28 months old. She was non-vocal until she was about 13. With intensive behavioral interventions she acquired a functional speech repertoire of about 30-word approximations that were intelligible to people familiar with her. At the start of the study, her overall BLA score was 41 out of 60. She scored 2 out of 5 in vocal play, 2 out of 5 in vocal imitation and 3 out of 5 in social interactions.

Setting

The interventions were carried out in a center which provided Intensive Behavioral Interventions (IBI) based on Applied Behavior Analysis (Baer, Wolf & Risley, 1968) with a focus on operant verbal behavior (Skinner, 1957). The articulation training was delivered in one-to-one teaching sessions by graduate (B.A., or B.Sc.) and postgraduate therapists (e.g., M.Sc.,) who had at least experience of one year in delivering behavioral interventions to children with autism, under the supervision of a Board Certified Behavior Analyst (BCBA).

Dependent Variables

Accurate vocal imitation of target words modeled by the independent examiner during probe sessions was the primary dependent variable of the study. A correct response was defined as an exact imitation (point to point correspondence) in all the positions (i.e., initial, medial, and final position) for TA and initial blend ('st', 'sp' or 'sc') and at least one of the other parts of emitted word being correct during probe sessions for KS. The word targets Are presented in Table 1. Some accommodations were made for KS – Accepting omissions and substitutions of sounds other than target blend (Example: /Spay/ for Spray and /Stum/ for Steam. These were measured in probe sessions where a trained examiner tested articulation of all the words in the three word sets . Probe sessions were conducted in baseline and once after every everytime a new word articulation was mastered by the participants in any word set with training by the participants.

Table 1

Word articulation targets for the two participants with blends in initial position

Participant	Target Words
TA	ST- stem, stop, stool, step, stone, stick, style, store, stove, stack SP- spice, spoon, spill, spot, spin, spider, spit, spade, speak, spit SM- smart, smile, smog, smell, smooth, small, smoky, smash, smug
KS	ST- Stop, Stim, Stoll, Stay, Stew, Staple, stuck, steady, stove, Stack SP- Spit, Spy, Spoon, Spine, Spot, Spell, Spray, Spike, Spat, speak SC- Scan, Scar, Scoop, Skip, Score, Scum, Skin, Scape, Scoot, Scram

Procedures

There were four conditions, Baseline - Articulation status ascertained by probe, Vocal Imitation Training with Sufficient Response Exemplar Training (SRET) , Maintenance and Follow up.

Baseline

The baseline probe session included presentation of all 3 word sets (30 word targets) interspersed with 2-4 previously known sounds/words. An incorrect response led to target word being presented a second time. Tokens were delivered irrespective of correct/incorrect response after each trial and twelve tokens led to back-up reinforcer or a 1 min break. Data was collected as (Y/N) for correct and incorrect articulations**.**

Vocal Imitation Training with Sufficient Response Exemplar Training (SRET)

The training sessions lasted 3-5 minutes each and conducted 5 days / week with 3-6 articulation training sessions embedded within 2 hours of IBI program at clinic. The sufficient response exemplar training operated as follows. Training was conducted on one word from a word set at a time. The target word was interspersed with 1-4 previously known sounds/words. Tokens were delivered contingent on correct articulation of target word. An incorrect response was followed by a 2nd trial. A correct response followed by token and social praise while an incorrect response was followed by 1-2 mastered sounds and token delivery. Access was provided to preferred item when 12 tokens were earned. A 90% correct on target word triggered a probe session with all 3 word sets to assess if any other words articulation automatically improved without direct training. For example, when the student learnt to articulate the word

'stop', a probe was conducted to see if it generalized to other words in the same word set such as'stay', 'stim' & 'stew' or to words in other untrained word-sets. Training with words from each word set continued till 8/10 words in a word set were mastered. Then training began on word from next word set. Additional modifications to procedures were used. For both TA & KS stimulus salience/within stimulus prompt such as "sssssss….top" to teach 'stop' was used with gradual fading to "ssstop", and "stop". For KS, Chaining of two sounds was used for some targets – e.g. "spoo" & "n" to say "spoon." The trainer also provided exaggerated model prompts for lip/jaw/tongue position. E.g. for stove "fold lower lip inwards for "v" sound". For 'k' sound in "stuck' – A finger prompt model pointing towards mouth was used and faded after 3 days. 'Sufficient Exemplar' – training meant sufficient number of words in each word set were trained until the word-set is mastered.

Maintenance

With the mastered words additional practice opportunities were provided for 8 weeks after mastery of word set. Probes on the next word-set assessed maintenance on previous word set as well.

Follow up

In the follow up phase all maintenance trials were withdrawn and probe sessions on subsequent word sets captured follow up data on the previous word set

Results

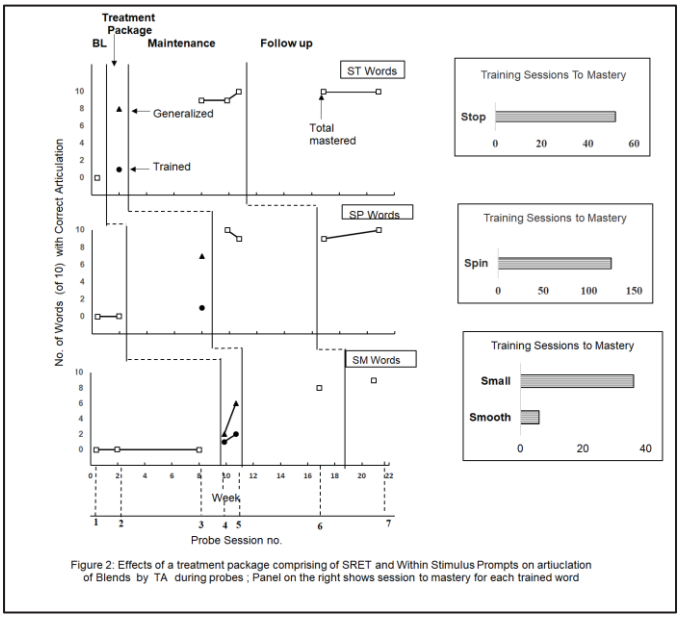


Figure 2: Effects of a treatment package comprising of SRET and Within Stimulus Prompts on artiuclation of Blends by TA during probes ; Panel on the right shows session to mastery for each trained word

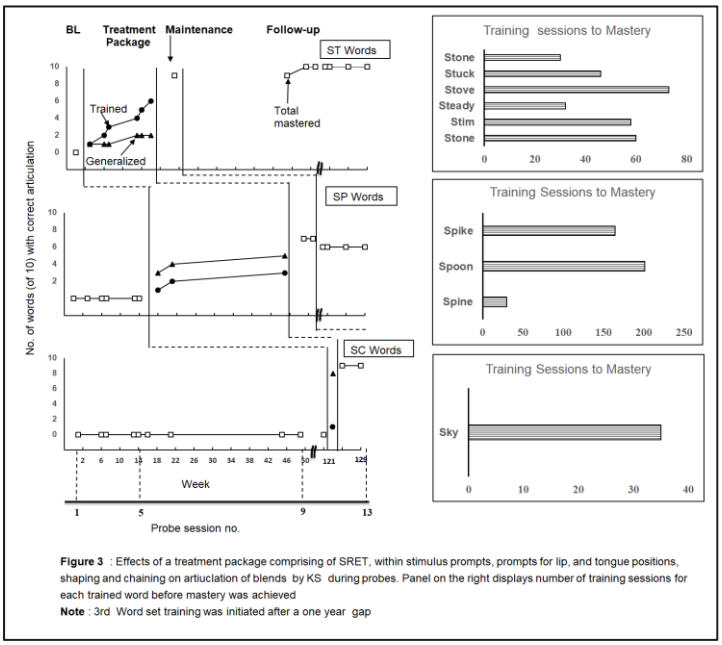


Figure 3 : Effects of a treatment package comprising of SRET, within stimulus prompts, prompts for lip, and tongue positions, shaping and chaining on artiuclation of blends by KS during probes. Panel on the right displays number of training sessions for each trained word before mastery was achieved

Note : 3rd Word set training was initiated after a one year gap

The results are shown in Figures 2 and 3. Correct articulation in baseline conditions was zero for all the target words for both the participants. In the treatment condition of TA, after 52 training sessions over 9 days, 'stop' was emitted with the immediate generalization of correct pronunciation to the eight remaining untrained words in the set. Correct articulation to the 10th word 'store' was generalized during probes in the follow-up phase with no specific training in the intervening period. After 182 sessions of training on 'spin' over 23 days, correct articulation of 'spin' occurred. The correct articulation also transferred to the remaining targeted words in the 'sp' word-set. Intervention on the third set resulted in the acquisition of correct pronunciation of 'smooth' and 'small' in 6 and 36 training sessions respectively, spread over 7 days. Transfer of correct articulation to remaining words without direct training in the 'sm' word-set was also achieved.

KS reached a level of 80% or more accuracy in the three-word-sets 'st', 'sp' and 'sc' after 299, 395 and 35 training sessions over a period of 54, 71 and 6 days respectively. In the first word-set, 'st', KS required training on six words in succession with correct articulation generalizing to two more untrained words to meet the mastery criteria for the first word-set. Two additional words, 'staple' and 'stack' met criteria in follow up probes without additional training. Correct articulation of the word 'steady' was lost in a follow-up probe after one year. In the 'sp' word-set, three words were trained in succession and articulation was generalized to five other untrained words. Correct articulation did not transfer to two other words, 'spell' and 'spat'. In the maintenance phase and follow-up phases, the rate of total correctly pronounced words dropped to seven and six respectively. Two words, 'spit' and 'spot' accounted for the loss. An additional examination showed that KS could not correctly articulate these sounds unless within stimulus prompts were reintroduced for the "ot" and "it" parts. . Once training began on the 'sc/sk' word-set, the first word, 'sky' was acquired in 35 sessions over eight days of training (373 trials). The subsequent probe showed generalization of correct articulation to seven other words in the 'sc/sk' word-set.

Discussion

Vocal Imitation training with within stimulus prompts, shaping and chaining were effective in articulation training with both children with autism with profound articulation difficulties.

Correct articulation was also shown to generalize to untrained words. The study also demonstrates the importance of defining acceptable approximations for some children where such approximations are an improvement over baseline in terms of speech intelligibility.

Limitations and Recommendations for Future Research

The introduction of the 3rd word set with KS after long gap of one year. The correct articulation in medial and final positions of words not tested for target blends. The study has lower social validity as the functional use of the trained words not tested. This could have been improved by selecting functional words. Future studies could study articulation of consonant targets in initial, medial or final positions of words.

References

Cleland, J., Gibbon, F. E., Peppe´, S. J., O'Hare, & Rutherford, M. (2010). Phonetic and phonological errors in children with high functioning autism and Asperger syndrome. *International Journal of Speech-Language Pathology*, *12, (1),* 69–76.

Eikeseth S. & Nesset R. (2003). Behavioral treatment of children with phonological disorder: the efficacy of vocal imitation and sufficient-response-exemplar training. *Journal of Applied Behavior Analysis, 36(3),* 325–337.

Hegde, M.N. & Pena- Brooks, A. (2007). Introduction to treatment protocols and the CD resource. *Treatment protocols for articulation and phonological disorders* (xii). San Diego, CA: Plural Publishing.

Lovaas, O. I., Berberich, J. P., Perloff, B. F., & Schaeffer, B. (1966). Acquisition of imitative speech by schizophrenic children. *Science*, *151*(3711), 705-707

Porter, D. (2016, July 12), *DSM-5 Category: Communication Disorders*, Retrieved from http://www.theravive.com/therapedia/Speech-Sound-Disorder-(Phonological-Disorder)-DSM--5-315.39-(F80.0)

Rapin, I., Dunn, Michelle a, Dunn, Michael A, Allen, D. A, Stevens, M. C., & Fein, D. (2009). Subtypes of language disorders in school-age children with autism. *Developmental Neuropsychology*, *34(1),* 66-84

Shriberg, L. D., Paul, R., Black, L. M., & Van Santen, J. P. (2011). The hypothesis of apraxia of speech in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *41(4),* 405-426.

Wren, Y., Roulstone, S., Miller, L., Emond, A., & Peters, T. (2009). Prevalence of speech impairment in 8-year-old-children. Poster presented at the 30th Annual Symposium on Research in Child Language Disorders, Madison, WI.

8.

Awareness on National Policy for Persons with Disabilities - 2006, among teachers working in regular school at Vaishali district in Bihar.

Mohammad Shadab Alam
JSET, SEC, NIEPID. Secunderabad, India, mdshadab393@gmail.com

ABSTRACT

The present study aims to compare the level of awareness on National Policy for Persons with Disabilities - 2006, among teachers working in regular school at Vaishali district in Bihar. The sample for the study consisted of 60 teachers those working in regular school in Vaishali district at Bihar (36 males and 24 females). Simple random sampling method was used for selecting the sample. A questionnaire was developed for measuring awareness on National Policy for Persons with Disabilities-2006. The questionnaire consisted of two parts, Part A and Part B. Part A consisted of demographic details of the teachers. Part B consisted of questions. The total number of the items in the questionnaire was 40.

Data analysis was done by using SPSS (Statistical Package for Social Science). Find the level of awareness on National Policy for Persons with Disabilities-2006, comparison of level of awareness on National Policy for Persons with Disabilities-2006 with reference to Gender, Age, Professional qualification, and experience of the regular school teachers. The results of the study very few teachers are aware on National Policy for Persons with Disabilities-2006. Further results showed that there was no relationship between the level of awareness and gender. Similar results were found with references to Age, Professional qualification, and experience.

The finding of the above study revealed that there is need to conduct awareness programs on National Policy for Persons with Disabilities-2006. If the teachers know about Policies they can utilize the provisions very effectively for their students and society. The government should take the help of the media to give more awareness programs for teachers. Conduct more awareness campaigns, and give proper training to rehabilitation workers to help the Persons with Disabilities (Divyangjan) for utilization of Acts and Policies for their wards.

Background

The aim of the present study was to find of the awareness on National Policy for Persons with Disabilities - 2006, among teachers working in regular school at vaishali district in Bihar. The total number of subjects participated in the study were 60. The researcher prepared a questionnaire on National Policy for Persons with Disabilities 2006. Data was collected by giving questionnaire to the teachers. The filled forms were collected and awareness score were analyzed with respect to the objectives of the study.

Awareness on National Policy for Persons with Disabilities - 2006, among teachers working in regular school at vaishali district in Bihar was analyzed in the present study. Survey method was used for the purpose. Demographic data of teachers were collected using a format and teachers responses were collected through the use of questionnaire. Teacher's awareness towards National Policy for Persons with Disabilities - 2006 was compared with respect to teachers Age, Gender, Educational qualification and Experience.

It was observed that teachers age do not have any effect on the awareness level as the result in non-significant. Which shows that life stage do not have effect on the teachers awareness of National Policy for Persons with Disabilities - 2006 and gender of the teachers do not have effect awareness level as it is show by results that female and male both are 50% aware of the present study. But it is very less show cannot be considered significant because there is very less differences between male and female. So this variable also no significant majority of the teachers belongs to undergraduate, graduate peoples has more awareness comparison to undergraduate. But the result in considered non-significant that shows that educational status does not have any effect on the awareness level of teachers.

Introduction

Current trend in the disabilities sector emphasizes on an inclusive and right based society, which is mandatory as per the National policy for person with disabilities 2006. Inclusive education means children learning together in the same classroom, using materials appropriate to their various needs, and participating in the same lessons and recreation: that is inclusive education. In an inclusive school, children with disabilities do not study in separate classes; instead teaching methods, textbooks, materials, and the school environment are so designed that girls and boys with a range of abilities and disabilities including physical, sensory, Intellectual and mobility impairments can be included in the same class. By definition, inclusive education includes all learners, but it may be interpreted differently according to the context. For example, while it covers the children otherwise excluded on the basis of language, gender, ethnicity, disability and other factors. We believe that making schools inclusive for boys and girls with disabilities improves them for all learners, including students facing exclusion because of other challenges, or more than one issue.

Persons with disabilities are those person who are having physical or mental retardation due to which performance of the daily living activities are significantly restricted. However these persons with disabilities have individual need. Which need to be assist planning for their support, in order to provide quality living condition for this people.

There are so many acts and policies which have been framed for the mainstreaming of these people. Our constitution has given some rights to all the people living in this land which are also applicable to persons with disabilities.

Objectives

1. To find level of awareness on National Policy for Persons with Disabilities-2006, among teachers working in regular school at Vaishali district in Bihar.
2. To compare the level of awareness on National Policy for Persons with Disabilities-2006, among teachers working in regular school at Vaishali district in Bihar with respect to their **age, gender, qualification** and **experience.**

Methodology

Purpose of the study is to find out the awareness on National Policy for Persons with Disabilities-2006, among teachers working in regular school at Vaishali district in Bihar. Methodology is a research design sample to tool and procedure included under methodology helps the research to pursue the objective sub the study systematically and arrived a conclusion.

Research design:- In the present study, descriptive survey method was used to find out the awareness on National Policy for Persons with Disabilities-2006, among teachers working in regular school at Vaishali district in Bihar.

Sample:- The sample for the present study to draw the sample 8 government school in vaishali district. In the present study researcher was used random sampling method techniques.

Size of the sample:- Researcher taken 60 sample size from primary and middle school for the present study.

Selection of the sample:- In the present study, those subjects were selected who are working as a teacher in primary and middle government school in Vaishali district. Their age range of the teachers is from minimum 20 years up to 45 years with minimum experience 2 years. Both male and female teachers were included for the study.

Inclusion criteria:

- Regular school teachers from both genders.
- Teachers having minimum 2 years experience.
- Those teachers belonging to the age range 25-45 years or more.
- Non-professional and professional qualification of the teachers.

Development of the tool:- For the present study, researcher prepared the following tool:

- Awareness on National Policy for the Persons with Disabilities-2006 Questionnaire

Preparation of the tool:- for the present study the questionnaire will prepared with the items of the questions related to the contest under National Policy for the Persons with Disabilities- 2006. Hence the items were from related to schemes, policies and acts. Multiple choice answers given the each items

and the subject selected. Initial this many items prepared such as 100 items. After validation many items select for the based on present study.

There are two parts of this checklist Part A related to demographic data and Part B related to questionnaires.

Validation of the tool

The tool is developed basing on the competitive exam questionnaire developed by different competitive board. Face validity was established by giving the questionnaire to 6 professionals who have adequate experience of working with rehabilitation field, special education field and social field to rate multiple choice answers. As per the suggestion given by the expert some questions were modified and reorganized. Since all the items were agreed by 80% of the experts, the final questionnaire consisted of only 40 items.

Scoring: The awareness comprised of 40 questions in questionnaire. Each question was provided with response for each question. Each question have four multiple choice answers, there are two types of scoring '0' for wrong answers and '1' for correct answer. Four responses are given for each items/ questions, tick ( ) the correct response in the space provided in the right side.

Procedure: Researcher personally visited 8 government schools includes primary and middle school. He explained the purpose of the present study to the Head master of those respective school his taken short permission from the respective school's head master to the randomly selected teachers. And then he was met to all teachers of this school and he also explained to the teachers, and about tool, there are 40 questions in this tool, four responses are given for each questions tick right the correct response in the space provided in the right side. And then the questionnaire was given to all the teachers with necessary instructions. The questionnaire was given by hand. They were asked to go through each question carefully and to give response to each questions, sufficient time was given to regular school teachers to answer the question in the form. They were requested to give the responses by selecting (ticking the right) response given against each item they were requested to fill-up the form within one week time. Researcher personally visited respective schools where he gave the questionnaire for the present study and collected data. The questionnaire was completed by all the teachers between 3 days to 1 week time and the filled-in questionnaires were collected.

Results and Discussion

The present chapter deals with the analysis of data. The data were collected from 60 teachers working in government school at Vaishali district in Bihar. The questionnaire consisted of two parts. Part 'A' deals with information regarding demographic details of teachers and Part 'B' deals with questions regarding National Policy for Persons with Disabilities - 2006, the data were collected, tabulated and analyzed by using SPSS (statistical package for social science) and the results were interpreted and based on the following objectives.

1. To find the level of awareness on National Policy for Persons with Disabilities - 2006, among teachers working in regular school at Vaishali district in Bihar.
2. To compare the level of awareness on National Policy for Persons with Disabilities - 2006, among teachers working in regular school at Vaishali district in Bihar with respect to their **age, gender, qualification** and **experience.**

Comparison of awareness level on NPPWDs- 2006 with respect their age.

Age	N	Mean	SD	t-value
Below 35	35	20.37	2.981	't'= 1.145
Above 35	25	19.48	2.960	p>0.05, Not Sig.

The awareness on National Policy for Persons with Disabilities - 2006, among the teachers was compared with respect to their age. It is evident from the above table that the means score on awareness for those teachers having below 35 years of age is 20.37 with SD 2.981 and mean score for those teachers who are above 35 years of age is 19.78 with SD 2.960. The obtained 't'-value is 1.145 and p is greater than 0.5, indicating that the difference between the two groups is not significant. This implies that so far as age is concerned there is no exists difference in the level of awareness on National Policy for Persons with Disabilities - 2006.

Comparisons of awareness level on NPPWDs- 2006 between male and female teachers.

Gender	N	Mean	SD	t-value
Male	36	20.06	2.966	't'= 0.175
Female	24	19.92	3.063	p>0.05, Not Sig.

The awareness on National Policy for Persons with Disabilities - 2006, among the teachers was compared with respect to their gender. It is evident from the above table that the means score on awareness for the male teacher is 20.06 with SD of 2.966 and female teachers are 19.92 with SD of 3.063. The 't'-value has been calculated to find the significance of the difference between the two groups. The obtained 't'-value is 0.175 and p is greater than 0.5, indicating that the difference between the two groups is not significant. This implies that so far as gender is concerned there is no exists difference in the level of awareness on National Policy for Persons with Disabilities-2006.

Comparisons of awareness level on NPPWDs- 2006 with respect their professional qualification.

Professional	N	Mean	SD	t-value

qualification				
Non-professionals	41	19.98	3.102	't'= 0.092,
Professionals	19	20.05	2.778	p>0.05, Not Sig.

The awareness on National Policy for Persons with Disabilities - 2006, among the teachers was compared with respect to their professional qualifications. It is evident from the above table that the means score on awareness for those having no professional qualification is 19.98 with SD of 3.102 and means score for teachers having professional qualification is 20.05 with SD of 778. The obtained 't' - value is 0.092 and p is greater than 0.5, indicating that the difference between the two groups is not significant. This implies that so far as qualifications is concerned there is no exists difference in the level of awareness on National Policy for Persons with Disabilities - 2006.

Comparisons of awareness level on NPPWDs- 2006 with respect their experience.

Experience	N	Mean	SD	t-value
Up to 5 years	35	20.40	3.002	't'= 1.236,
6-10 years	25	19.44	2.917	p>0.05, Not Sig.

The awareness level on National Policy for Persons with Disabilities - 2006, among the teachers was compared with respect to their experience. It is evident from the above table that the means score on awareness for those who have' experience up to 5 years is 20.40 with SD of 3.002 and the means score for teachers having experience between 6-10 years is 19.44 with SD of 2.917, the obtained 't'-value is 1.236 and p is greater than 0.5, indicating that the difference between the two groups is not significant. This implies that so far as experience is concerned there is no exists difference in the level of awareness on National Policy for Persons with Disabilities - 2006.

FINDINGS

1. The finding of the study that there is no significant relationship between awareness and gender of the teachers. However it was observed that female teachers had more awareness about National Policy for Persons with Disabilities - 2006. This may be because this difference may be because of the female teachers read more time and more concerned about policies, acts and schemes. That's why they are more tentative to know about available facilities, such as concession, schemes, rights and acts provided by government for rehabilitation, education and as possible as to make independent life for PWDs. So their awareness level is slightly higher than male. Female teachers are probably more involved in training the child in school. They are more taking care of the child than the male teachers.
2. The finding of the study revealed that there is no significant relationship between awareness and age of the teachers. However it was observed, however it was observed that teachers who

were below 35 years had more awareness when compared to teachers were above 35 years. It may have been because of, attributed to factors like active life, attentive about medias updated such as newspaper, electronic media, internet. They are physically and mentally strong and active than aged teachers. This difference change attributes more awareness young teachers.

3. The finding of the study, have revealed that there is significant relationship between awareness and educational qualification of the teachers. It was observed that professional qualified teachers had more awareness about present study to compare to non-professionals qualified teachers. The teachers who are getting professional education they are more aware than compare to non-professionals teachers. It may be because they are having more education, knowledge; tentative, educated people are always aware about surrounding and changes, and also able to use media and technology for more relevant information about schemes, acts and policies.
4. The finding of the study, have revealed that there is no significant relationship between awareness and experience of the teachers. However it was observed that teachers who had experience below 5 years had less awareness as compared to teachers with experience of 6-10 years.

LIMITATION OF THE STUDY

There was some limitation that researcher felt due to the time constraints as follows

1. The sample of the study is drawn from only once small district of Bihar state.
2. Significant relationship cannot be established between the level of awareness of teachers and their age, experience, educational qualification and gender because of the small sample.
3. Time to constrain all schools from the Bihar state.

RECOMMENDATION FOR THE FUTURE STUDY

1. Study can be conducted covering greater population at different geographical areas.
2. A comparative study about various legislation acts, schemes, benefits, concession and policies among teachers in wider population of the area.
3. Based on the finding of different study on different aspect such as acts, policies, schemes awareness materials need to be created for conducting awareness programme for the teachers.

CONCLUSION

The finding of the study it may be one of the research for non-implementation of various welfare provisions for persons with disabilities.

Teachers do not have information about various government Schemes, Policies, Acts and Rights of Children with Special Needs. The study highlights the need for information and training teachers about various government Schemes, Policies, Acts and Rights. As teachers are the primary services providers to persons with disabilities it is essential for them to have information regarding the scenario of the Child Rights Schemes, Policies, and Acts in the country. There is a need for create awareness among the teachers about their students (CWSN) Rights Schemes, Policies, Acts in the country, so that the children with disability can enjoy the equal opportunities in the society.

References

- Sriram, S. K. (2014). Awareness about mental retardation among regular school children. Indian Journal on Education and Psychological Research (IJEPR). Vol. 3 (4).
- Fittipaldi-Wert, J., & Brock, S. (2007). I can play too: Disability awareness activities for your physical education class. Strategies, 20(5), 30–33.
- Foley, J., Tindall, D., Lieberman, L., & Kim, S. (2007). How to develop disability awareness using the sport education model. Journal of Physical Education, Recreation & Dance, 78(9), 32–36.
- Kuppusamy, B., Narayan, J. and Nair, D. (2012). Awareness among family members of children with Intellectual Disability on relevant legislations in India. Educational research and review, Vol. 7 (14).
- Mullen, C. (2001). Disabilities awareness and the pre-service teacher: A blueprint of a mentoring intervention. Journal of Education for Teaching, 27(1), 39–61.

9.

The Effect of Non-Verbal Stimuli on Transitioning Compliance Behavior Reduction While Improving Learning Outcomes in Children with ASD

Anupama Jagdish, Sridhar Aravamudhan, Dr. Smita Awasthi, Behavior Momentum India .

Abstract

Transitioning from high-preference (high-p) to low-preference (low-p) activities can evoke problem behaviors such as crying, tantrums or Self-injurious behaviors (SIB) in individuals with IDD (Riffel, 2010). In the current study, in baseline conditions, MR, a 6-year-old boy, cried intensely (durations 57,39 and 48 min) and kicked others (8,16 and 18 times) when told to transition from high preferred to low preferred instructions. Another 10-year-old boy RO complied with only 13% of verbal instructions to transition in baseline. This was despite both being able to communicate in one and three to four word sentence respectively and demonstrate comprehension when adults spoke to them. Non-verbal stimuli, a bell and pictures were used in intervention initially. MR required only two prompts in the first session and within 13 sessions demonstrated 100% compliance with no challenging behaviors. RO similarly showed improvement in compliance in 8 sessions with picture cues and with verbal instructions thereafter. The possibility of a history of aversive conditioning with spoken words and the value of non-verbal stimuli in quickly acquiring stimulus control over transitioning behaviors will be discussed.

Key words: autism, stimulus control, activity transitions, non-verbal stimuli

Introduction

Difficulty in transitioning which means moving from one activity to another and mostly high to low preferred activity is a challenge with some children with developmental disabilities (Sainato, Strain, Lefebvre, & Rapp, 1987). Some children with autism cry, hit , kick others when told to leave their preferred activity they are engaged in and follow verbal instructions. Compliance training for parents included using behavior momentum (Mace et al., 1988); errorless compliance (Ducharme & Popynick, 1993), prompting with a 10-sec delay and physical guidance (Miles & Wilder, 2009), use of activity schedules with pictures and photographs (McClannahan and Krantz,1999; Bryan and Gast, 2000), priming or pre-rehearsal (Sevin et al., 2000), video priming (Schreibmen et al., 2000) and use of transfer stimulus (Koegel et al., 2006a) The current research examines whethr giving advance notice with a non verbal stimulus be more effective than spoken instructions in reducing problem behavior during transitioning from high preferred to a low preferred activity.

Method

Participants

First Participant - MR was a 6 year old boy who would communicate his needs in one word. He knew about 200 nouns and verb action which he could identify but would not label. He could answer simple one word questions. The child was very creative and would build blocks and make houses roads, garage etc with these blocks and puzzle pieces during his high preferred

activity time. In a standardized assessment V B Mapp Sundberg he scored 60/170 and in the barriers score he scored 40/96 because of his problem behaviors like kicking others and crying. The second participant Ro knew about 500 nouns and verbs. He could speak in four to five word sentences but he would not initiate a conversation. He had a repertoire of nearly 500 verbs and nouns and could also answer simple questions.

Settings

All experimental trials were conducted in the regular therapeutic classroom where the children attended a behavioral intervention based on ABA. Therapeutic sessions were conducted for five days a week. The setting for both students included an outdoor play area with slide, swing and other such play equipment, preferred toys and activity materials, computer station and table -chair for language instructions. In addition, we used a plate and spoon to signal transition for MR and pictures of activities for RO to transition to.

Dependent Variable

The primary dependent variable for both students was transitioning without problem behavior which was measured in percentage of the number of times a participant was asked to transition. For MR, a second DV was the frequency of kicking during transition which was measured as the number of occurrences of the behavior. The third was duration of crying whenever he was to instructed to transition. The fourth dependent variable was the number of targeted skills from his IEP that he mastered.

Procedures

Baseline

MR was given his preferred toys to play on the table. After about two minutes of play he was given a verbal instruction to transition from his preferred play to the low preferred activity which was following the trainer's language and academic instructions. With Ro, his parent would instruct him to cease current activity and move to a randomly selected specific second activity (e.g., RO, go to Swing", "RO ,go to table"). No additional prompts or cues were given. The total number of instructions in a session and the number of times he complied were recorded.

Intervention -Use of non-verbal stimuli

In the intervention phase for MR, play activities were moved away from the table to a separate play area nearby so that he could just leave the play materials with the activity partly completed and transition to the table where his program would be run. This was done to separate the play area and language instruction areas. After two minutes of play, the bell was rung by using a spoon which was banged on the plate. The banging of the plate with the spoon provided advance notice to the child that it was time to transition. In the first session he needed a slight physical prompt to transition. From the second session gestural prompt was enough for MR to understand that it was time to transition from the play area to the workstation when the bell was rung.

With RO, only Pictures of activities were used to instruct him to transition. After a maximum of 3 minutes on any activity, RO was instructed to transition to a randomly selected alternate activity. Only the picture of the next activity, along with a gesture (adult pointing towards the activity) was used to instruct RO to transition. Minimal Prompts were used such as

nudges and gestures. No words were spoken until the transition was completed. Parent's body was also used to block possibility of running away to a non-targeted activity. Prompts faded as compliance improved.

Results and Findings

First participant MR

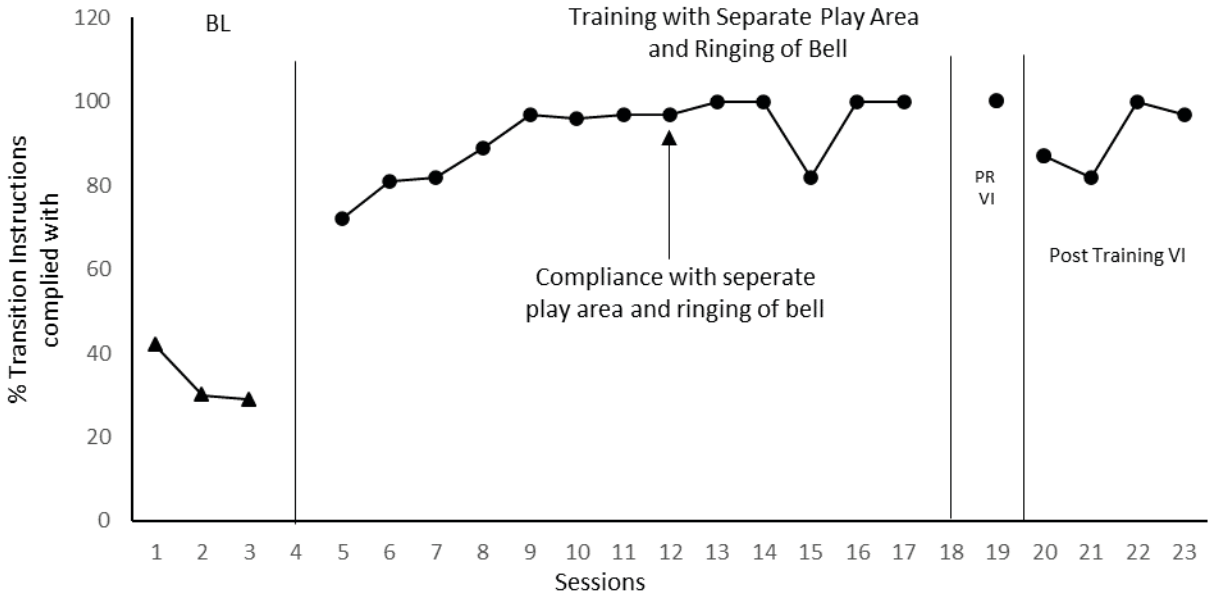


Figure 1: Percentage of transitions of MR without problem behavior in baseline and intervention conditions. PR = Probe , VI = Verbal Instruction

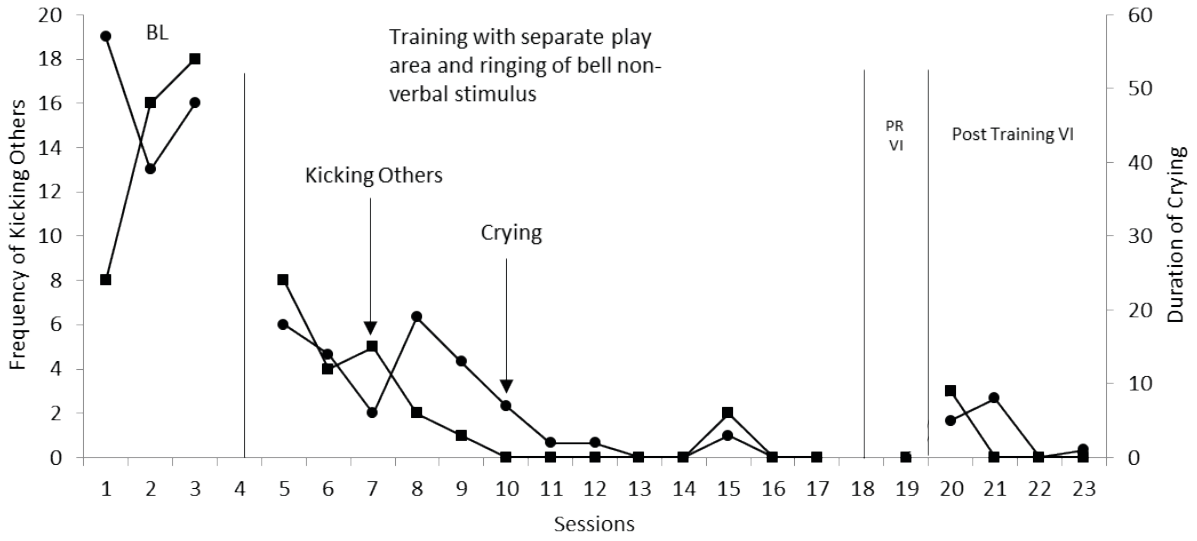


Figure 2: Problem behaviors of MR, Hitting others, Crying during transitions in baseline and intervention conditions

Figure 3: Learning graph for MR depicting improvement in language targets mastered with intervention.

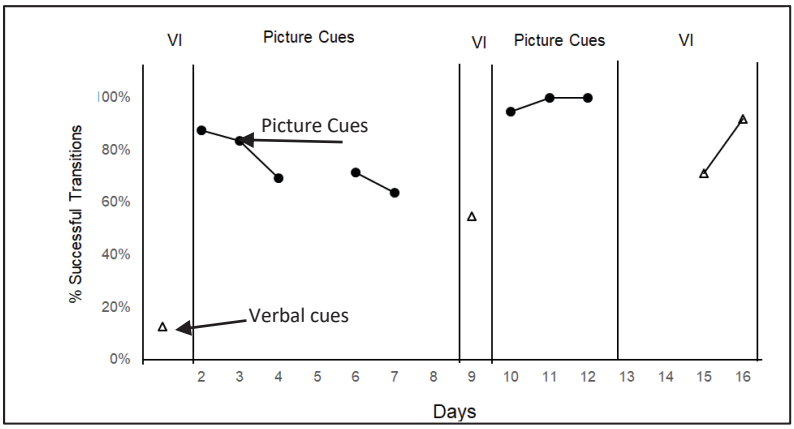


Figure 4: Successful transition of RO with picture cues

Results –

With MR there was an immediate improvement to 72% with the dropping of spoken instructions and use of bell to transition which started from the 5th session. After achieving 100% compliance in the 13th session a probe was done in the 19th session and the transition was 100% in the very first probe where the bell was faded and verbal instruction was given. After the probe from the 20th session the non-verbal stimulus of bell was totally faded and the post training phase started. Spoken instructions were given for transitioning from high preferred to low preferred task from the 20th session . There was a spike in the kicking and and crying behavior in the 20th and 21st session. In the 22nd session and 23rd session the compliance percentage was 100% and 97% respectively.

With RO , there was an immediate improvement to 80% with the dropping of spoken instructions and use of picture cues with gestural prompts to transition. After achieving 70% compliance with picture instructions in 5 sessions, when we did a probe on the ninth day, the successful transitions with verbal instructions had improved to 55%. The intervention resumed with picture cues.On the following three days he achieved the 90% compliance criteria for successful transitions with picture cues. After the intervention ended, additional probes showed an initial drop compliance with picture and verbal instructions were at 100% and 90% respectively.

Discussion

It has been observed for children with transitioning problems, it helps to separate the play and instruction areas because these places also acquire stimulus control over children's behaviour. The bell for MR and pictures for RO was more effective in ensuring compliance during transitioning than spoken instructions because of a long history of ignoring spoken or arguing with spoken instructions. Pictures and nonverbal stimuli like bell could be more effective as cues because they can be understood more easily.

Limitation

The procedure has been tested with only 2 subjects. More research and post training data is needed

References

Ducharme, J. M., & Popynick, M.(1993) Errorless Compliance to Parental Requests Treatment Effects and Generalization *Behavior Therapy,* 24*(*2), 209–226

Jay, A., S., Robert, D., R., Johnny, L., M., (2015) A Review of Behavioral Strategies and Support Consideration for Assisting Persons with Difficulties Transitioning From Activity to Activity. *Review Jounal of Autism and Developmental Disorders* 2.329 - 342

McClannahan, L., E., Krantz. P.,E.,(1999) Teaching Children to use photographic activity schedules:maintenance and generalization of complex response chains.*Journal of Applied Behavior Analysis*

Sainato, D. M., Strain, P. S., Lefebvre, D., Rapp, N. (1987) Facilitating transition times with handicapped preschool children: a comparison between peer-mediated and antecedent prompt procedure. *Journal of Applied Behavior Analysis Behav Analysis.*; 20(3): 285–291.

Stephanie, L.M., Sarah E. P., (2020) Improving On-Task Behavior in Middle school Students with Disabilities using Activity Schedules. *Behavior Analysis in Practice* Mar; 13(1): 104–113

10.

Impact of COVID-19 on the Parents of Neurotypical and Children With Disability

Vinita Gupta

Abstract:

The aim of this study is to document the impact of COVID-19 among special needs and neurotypical children through the perspective of their parents. A rapid review of published literature was conducted through a search in online databases to synthesise results from few studies regarding the impact of the COVID-19 pandemic. To meet this objective, a Survey questionnaire, validated by two professionals, was administered to the entire sample.The Chi-Square Test was used to analyse the data. The result showed that during COVID time while neurotypical children were able to adapt to online learning , parents of special needs children struggled managing the child. The major difference was also seen in the coping strategies, financial insecurity, and mental health. The families with children who have special educational needs or disabilities (SEND) faced more stressors on average than those with neurotypical children (McConnell and Savage, 2015).

Keywords: COVID-19,Children with Disabilities, Neurotypical , impact,Disabilities, Coping Strategies

INTRODUCTION

The COVID-19 pandemic has barely left any section of the society unaffected including neurotypical and disabled children and their parents which brought devastating changes in their daily routines, psychological aspects and challenges experienced in caring for their children due to the closure of support services and the increased need for medical care. The psychological impacts of the pandemic on parents were also explored, with many reporting increased levels of stress, anxiety, and behavioural changes.

This study contributes to a growing body of research on the impact of the COVID-19 pandemic on families, particularly parents and their children.. However, it is important to note that not all families have been affected equally, and those who were already struggling with poverty or other challenges have been particularly hard hit. Despite these challenges, some reported unexpected positive experiences, such as strengthened family relationships with their children and greater appreciation for their support networks. There have also been reports of resilience, adaptability and improved communication among families as a result of spending more time together. Many famiies have found creative alternatives to accommodate remote work, homeschooling, and other changes brought about by the pandemic.

The findings highlight the need for support and resources for parents during the pandemic, particularly those caring for disabled children. It is also worth noting that the pandemic has

highlighted pre-existing inequities and disparities in our systems, and addressing these fundamental issues will be critical for creating more resilient families and communities in the long-term. This may involve examining and reforming structural inequalities related to healthcare, housing, and education, among other areas.

It was realised that the pandemic has highlighted inequities in education, as many students lack access to technology or family support needed for remote learning. Policy changes are necessary to ensure equal access to quality education, including providing resources for students and families in low-income communities and investing in technology infrastructure for underserved schools.

Moving forward, it will be important for policymakers and service providers to work towards providing support and resources for families affected by the pandemic. This may include access to mental health services, financial assistance, and educational support. Moreover, policies aimed at mitigating the effects of the pandemic on families should prioritise targeting the most vulnerable and marginalised populations, including low-income households, families with disabilities and also focus on equity and inclusivity through policy changes. By addressing these inequalities, we can build stronger, more resilient communities that can weather future crises.

LITERATURE REVIEW

One study conducted in the UK found that parents of children with disabilities reported higher levels of stress, anxiety, and depression during the pandemic than parents of typically developing children (Hastings et al., 2020). The authors attributed this to the increased caregiving demands, the closure of support services, and the fear of contracting COVID-19 due to a weakened immune system.

Another study conducted in the US found that parents of children with autism spectrum disorder (ASD) experienced increased stress, anxiety, and depression during the pandemic compared to parents of typically developing children (Bishop-Fitzpatrick et al., 2021). The authors noted that the disruption of routine and the lack of access to services and therapies were major stressors for these parents.

Research has also highlighted the impact of the pandemic on children's mental health. One study conducted in Italy found that children experienced high levels of anxiety, depression, and post-traumatic stress symptoms during the pandemic (Orgilés et al., 2020). The authors noted that this was likely due to the disruption of social and school activities, as well as the stress and anxiety experienced by parents.

Studies have also looked at the impact of the pandemic on family functioning. One study conducted in China found that family functioning was negatively impacted during the pandemic, with increased conflict and decreased cohesion (Liu et al., 2020). The authors noted that this was

likely due to the stress and uncertainty caused by the pandemic, as well as the increased time spent together at home.

Similarly, a study by Craig et al. (2021) found that parents of children with intellectual and developmental disabilities reported higher levels of stress, anxiety, and depression during the pandemic, as they struggled to manage the increased demands of caregiving while also navigating the disruptions and uncertainties caused by the pandemic.

However, some studies have also suggested that the pandemic has led to some positive changes for parents and families. For example, a study by Meehan et al. (2021) found that parents of children with autism reported some benefits from the transition to remote learning, including greater flexibility in scheduling and reduced stress from avoiding the commute to school. Some parents also reported feeling more connected to their children and more involved in their education.

Objectives:

This study has following objectives:

To study the impact of pandemic on children's learning, through the perspective of their parents

Hypothesis:

The hypotheses of the study is as follows:

H0: The variables are independent, there is no relationship between the categorical variables

Methodology:

Procedure:

It was a Control Group Study. A Questionnaire was developed for the purpose of this study and was validated by two professionals. The questionnaire was developed both in Hindi and English. Informed Consent was taken from the parents ensuring confidentiality of responses. The data used in the study were pooled from an online survey of parents of special needs and Neurotypical and was analysed by Chi-Square Test using SPSS.

Sample:

The online survey targeted the parents of special needs children at NIEPID RC NOIDA. Participants were recruited through the special school namely NIEPID MSEC (Model Special School Centre) , the parents coming for the OPD Services at NIEPID RC NOIDA and the parents of neurotypical children living in Delhi/NCR. Participants of the current study were a total of 60 parents which consisted of 30 parents each of children with mild/moderate

Intellectual Disability and neurotypical children, aged between 4-10 years.The sample of the parents of special needs consisted of both father (53.3%) and mothers (46.7%). The sample of the parents of neurotypical children also consisted of fathers (13.3%) and mothers (86.7%). Purposive Sampling technique was used to collect samples. The data collection was done in March, 2023.

Inclusion Criteria:

Children with Mild/Moderate Intellectual Disability age 4-10 years

Neurotypical children age 4-10 years

Intellectual Disabled Children with neurotypical siblings

Neurotypical children with neurotypical siblings

Parents of Neurotypical children age 4-10 years

Parents of children with Intellectual Disability 4-10 years

Exclusion Criteria:

Children below 4 years and above 10 years

Children with Severe Intellectual Disability

Parents of Neurotypical children with special needs siblings

Parents of Children with Intellectual Disability with special needs siblings

Description of the tools:

Online Survey Questionnaire: A survey tool to assess the impact of COVID 19 on the parents of children with special needs was created in both Hindi and English Language. The tool has 11 items, related to the areas of life that were affected due to COVID 19 like Health, Education, Employment, Behavioural Changes, Family Dynamics, and Coping Mechanism. All of the items of the survey were multiple choice type. The questionnaire was developed for the purpose of this study only.

Statistical analysis:

The data is analysed using Spss version 26.0. To check the relationship between the categorical variables chi- square was applied.

Results:

Table 1. Association between parent groups and questionnaire items

Item	Parents of neurotypical children F (%)	Parents of special children F (%)	N	Chi-square	p-value
1. During COVID 19 what was the major area of concerns for the child?				8.11	0.044
Lack of academic development	7 (23.3%)	2 (6.7%)	9		
Lack of socialisation	10 (33.3%)	14 (46.7%)	24		
Loss of school-based activities	10 (33.3%)	5 (16.7%)	15		
Loss of structured	3 (10.0%)	9 (30.0%)	1		

activities/therapies			2		
2. What was the impact of loss of job/finances on your well being ?				12.369	0.030
Inability to buy medicine	1 (3.3%)	1 (3.3%)	2		
Insecurity of future	7 (23.3%)	9 (30.0%)	16		
Negative impact on mental health	10 (33.3%)	9 (30.0%)	19		
Negative impact on physical health	12(40.0%)	3 (10.0%)	15		
3. What change do you see in the child's pattern of learning during COVID period?				13.60	0.004
Adapted to online learning	17 (56.7%)	4(13.3%)	21		
Difficulty in learning online	6 (20.0%)	17 (8.3%)	23		
Learning new skills/new		45			

ADL activities	5 (16.7%)	(22.1%)	50		
Regression in learnt skills	2 (6.7%)	81 (39.7%)	83		
4. What coping strategy have you opted to face the new normal?				16.041	0.025
Struggled managing the child	7(23.3%)	10(33.3%)	17		
Finding alternate ways of learning, divided duties among family members	0 (0.0%)	1(3.3%)	1		
Educate self-more about the disability	0 (0.0%)	2(6.7%)	2		
Finding alternate ways of learning	9 (30.0%)	3(10.0%)	12		
Dividing duties among family members	6 (20.0%)	4(13.3%)	10		
Educate more about the needs of child	5 (16.7%)	4 (13.3%)	9		
Enable self for therapies	3 (10.0%)	0 (0.0%)			
Enable self as a therapist	0(0.0%)	6 (20.0%)			

			36		
5. What was the most difficult area in handling the child?				1.371	0.712
Quarantine period	9 (30.0%)	10 (33.3%)	19		
Social Isolation	13 (43.3%)	9 (30.0%)	22		
Using Masks	3 (10.0%)	5 (16.7%)	8		
Washing hands regularly	5 (16.7%)	6 (20.0%)	10		
6. What behavioural change do you see most in the child after COVID is over?				17.281	0.002
Sleep problems	5 (16.7%)	9(30.0%)	14		
Self-harm or other harm	0 (0.0%	9 (30.0%)	9		
Decreased interest in playing	7 (23.3%)	1 (3.3%)	8		
Difficulty in concentration	10 (33.3%)	4 (13.3%)	14		
Increase irritability	8 (26.7%)	7 (23.3%)			

			15		
7. What major change do you see in the family dynamics?				5.287	0.508
Increase in inter-connectedness	0 (0.0%)	1 (3.3%)	1		
Increase in their connectedness	7 (23.3%)	10 (33.3%)	17		
Increase in sibling bonding	7 (23.3%)	7 (23.3%)	14		
Stressful relationship among members	6 (20.0%)	6 (20.0%)	12		
Understanding child's perspective has increase	10 (33.3%)	15 (25.0%)	25		

8. Are you happy with the new online learning/ online therapies ? Do you find it useful?				10.419	0.015
Can't say	12 (40.0%)	3 (10.0%)	15		
Helpful	9 (30.3%)	16 (53.3%%)	25		
It's really helpful	0 (0.0%)	3 (10.0%)	3		
Very little helpful	9(30.0%)	8(26.7%)	17		
9. Whom would you rate the most preferred option?				17.026	0.002
Home schooling	0(0.0%)	1(3.3%)	1		
Hybrid mode	0 (0.0%)	2 (6.7%)	2		
Hybrid mode	0 (0.0%)	6 (20.0%)	6		
Hybrid mode online sessions	1 (3.3%)	6 (20.0%)	7		
Regular schooling	29 (96.7%)	15(50.0%)	44		

10. In your opinion, what significant positive impact COVID has created in your life?				23.763	0.000
Easy access to equitable interventions from across the globe	21 (56.7%)	7(23.3%)	28		
I don’t see any change	0(0.0%)	11 (36.7%)	11		
More support groups have been formed online	7 (23.3%)	4 (13.3%)	11		
More parents support groups have been formed online	0(0.0%)	1(3.3%)	11		
Parents become more empowered by learning therapies	2(6.7%)	7(23.3%)	19		

11. What are your suggestions for preventive and coping measures if any such crisis happens again?				60.00	0.299
Awareness about the problems and needs of children with disability	1 (3.3%)	2 (6.7%)	3		
	0 (0.0%)	1(3.3%)	1		
Awareness and prevention should be planned	0 (0.0%)	1 (3.3%)			
Awareness programs	0(0.0%)	1 (3.3%)	1		
	1 (3.3%)	0 (0.0%)	1		
Awareness programs should be more			1		
Be positive always	1 (3.3%)	1(3.3%)			
Can’t say right now we are not ready for this again	1 (3.3%)	0(0.0%)	2		
	0(0.0%)	2(6.7%)	1		
Distance each other safe in home	0(0.0%)	1(3.3%)	2		
	0(0.0%)	1(3.3%)	1		
Financial aids	0(0.0%)	1(3.3%)	1		
Financial aids should be given	0(0.0%)	1(3.3%)			
Financial and medical support	1(3.3%)	0(0.0%)			
Financial support at such times	1(3.3%)	0(0.0%)			
Government support should more available					
[illegible]	1(3.3%)	[illegible]			

It can be seen in the above table that the parents of neurotypical children and special children differ significantly in their responses to the question “During COVID 19 what were the major areas of concerns for the child ? (except medical)”. Most neurotypical parents thought that loss of school based activity was their main area of concern, however for the parents of special children lack of socialisation and lack of structured activities/therapies were main issues.

There is also a significant difference in the responses between parents of neurotypical children and special children in questions “what was the impact of loss of job/finances on your well-being?” , “what changes do you see in the child’s pattern of learning during Covid period?” , “what coping strategies have you opted to face the new normal?” , “What behavioural changes do you see in the child after COVID is over?” , “Are you happy with the new online learning/ online therapies ? Do you find it useful?” “preference in schooling mode options” and “In your opinion, has COVID created some positive impacts in your life?”.

Most number of parents of neurotypical children felt that the biggest loss was the impact on their physical health because of the loss of job and finances, and on the other hand the parents of the special children felt that insecurity of future and negative impact on the mental health were their biggest concerns due to the loss of job or finances. Most parents of neurotypical children felt that the children actually adapted to online learning during that time, and the parents of special children thought that their children had actually learnt new skills or ADL. Most of the parents of neurotypical children feel that they found new ways of learning as a coping strategies, and on the contrary their counterparts reported majorly that they had trouble managing a child. The parents of the neurotypical children reported that the behavioural change that was observed in the children was that they had difficulty in concentrating while the other group reported that their children experienced sleep problems and other issues related to self harm the most. When the parents were happy with the new learning being done in the online mode, maximum parents said that they could not really comment on it, however on the other hand the parents of the special children reported that I did find the online learning helpful.

The parents were asked which mode of schooling would they prefer the most, almost all parents of the neurotypical children reported regular schooling, in the case of parents of the special children, half reported regular schooling, but some also reported and expressed their desire for hybrid mode of learning. The parents were raised their opinions about any positive impacts that Covid has brought about in the lives of their children, the parents of neurotypical children said

that the easy access to equitable interventions from across the globe was a positive addition, however the parents of special children reported that they don't see any change in this respect.

Overall it can be seen that the responses of the parents of two groups of children are very distinct. Out of 11 questions asked, the maximum number of questions elicited significantly different responses from the two groups. This clearly indicates that the experience of the parents of neurotypical children and the experience of the parents of special children was quite different during Covid, which also indicates a difference in their experience in the post-pandemic era.

Discussion

The epidemic caused by COVID-19 has made child care providers face a number of difficult issues. Families in which at least one kid has neurotypical disorder like attention-deficit/hyperactivity disorder (ADHD) or autism spectrum disorder (ASD) are a demographic that has received relatively little research, despite the fact that they may be more susceptible to the effects of changes brought on by the outbreak.

In particular for families dealing with children who have neurodevelopmental problems, prolonged periods of seclusion at home can have a severe impact on the mental health of the children as well as the mental health of the adults who care for them. As a result, the present study was carried out to investigate the implications of the coronavirus disease (COVID-19) pandemic and the difficulties that were encountered by carers of children who suffered from neurotypical diseases as well as children suffering from disabilities.

The consequences of COVID-19 have been and will continue to be felt for a very long time. As parents acquire the skills necessary to work from home, children are more likely to develop acclimated to utilising online learning platforms. Nowadays, spending time together as a family doing activities outside the home is not a typical activity that people engage in. Children who are not neurotypical, such as those who have autism, will have a more difficult time adapting to these sudden, unexpected, and profound shifts in their way of life. However, this will be the case for all children.

Hypothesis H1 which stated that there will be a significant relationship between two categorical variables(neurotypical and parents with special children) has been supported. Previous research supported the presented result A review done by Shorey,et.al, 2021 aimed to synthesise parenting interventions and recommendations during the 2019 coronavirus disease (COVID-19) pandemic and to identify difficulties experienced by carers of children with neurodevelopmental problems. Embase, PsycInfo, PubMed, Scopus, and LitCovid were searched systematically. We included all article types published on the topic of intervention recommendations and families' experiences during the COVID-19 pandemic from December 2019 to November 2020. A

thematic analysis was performed, which involved charting qualitative themes, quantitative data, and article summaries. The evaluation consists of 29 articles. There were three major categories that emerged from the data: (a) behavioural and health difficulties; (b) interruptions of lifelines and daily routines; and (c) current initiatives, models, and recommendations to help families. In addition, a compiled set of parents and coping strategies like setting up regular online consultations, keeping up with online therapy, teaching a child about Covid-19 and preventive behaviours, establishing a routine and positive reinforcement system, and choosing age-appropriate activities. anomalies in neurological processes outside autism and ADD/ADHD. Healthcare organisations are urged to enhance financing for telehealth services to affected families, and the necessity of these services to parents during the epidemic is highlighted. Another research by Neece,2020 analyses the effects of COVID19 on 77 families in California and Oregon who had young children with intellectual and developmental impairments (IDDs) and who were taking part in bigger intervention trials. Five interview questions were posed to parents, eliciting responses on the pandemic's effects, services for their kid, silver linings or good elements, coping, and worries about the pandemic's long-term impact. Many parents said that the lack of these services forced them to stay at home to care for their children. Some parents saw the outbreak as a good opportunity to spend quality time with their kids. Many parents worried about the long-term effects of the epidemic on their children's growth and development, despite the fact that there were some beneficial aspects of the scenario.The findings imply that during the pandemic, parents of young children with IDD had severe difficulties at home. The health of families and the developmental results of children would greatly benefit from professional assistance, particularly during the initial phases.

Importantly, the parents whose children did not have any special educational requirements or impairments were the focus of this study as well as others like it (for example, Giannotti et al. 2021). It's possible that some parents had already developed ways to overcome challenges prior to the pandemic, which means that the new ways of working did not have as much of an impact on their mental health. This is due to the fact that families with children who have special educational needs or disabilities (SEND) face more stressors on average than those with neurotypical children (McConnell and Savage, 2015). Because our study did not establish a baseline for the parents' pre-existing mental wellbeing, it is difficult to determine whether there was a significant change in the parents' mental wellbeing. In a similar vein, studies that found parents of children with SEND experienced worse mental health during lockdown (APA, 2020) first established a baseline for the parents' pre-existing mental wellbeing.

References

Abidin, R. R. (1992). The determinants of parenting behavior. *J. Clin. Child Psychol.* 21, 407–412. doi: 10.1207/s15374424jccp2104_12

Åsberg, K. K., Vogel, J. J., and Bowers, C. A. (2008). Exploring correlates and predictors of stress in parents of children who are deaf: implications of perceived social support and mode of communication. *J. Child Family Stud.* 17, 486–499. doi: 10.1007/s10826-007-9169-7

Bayat, M., Erdem, E., and Kuzucu, E. G. (2008). Depression, anxiety, hopelessness, and social support levels of the parents of children with cancer. *J. Pediatr. Oncol. Nurs.* 25, 247–253. doi: 10.1177/1043454208321139

Caicedo, C. (2014). Families with special needs children: family health, functioning, and care burden. *J. Am. Psychiatr. Nurses Assoc.* 20, 398–407. doi: 10.1177/1078390314561326

Chan, T. O., and Lam, S.-F. (2017). Mediator or moderator? the role of mindfulness in the association between child behavior problems and parental stress. *Res. Dev. Disabil.* 70, 1–10. doi: 10.1016/j.ridd.2017.08.007

Shorey, S., Lau, L. S. T., Tan, J. X., Ng, E. D., & Aishworiya, R. (2021). Families with children with neurodevelopmental disorders during COVID-19: A scoping review. *Journal of pediatric psychology*, *46*(5), 514-525.

Cui, X. L., Zhu, B., Zhao, J., Huang, Y. G., Luo, A. L., and Wei, J. (2016). Parental state anxiety correlates with preoperative anxiety in Chinese preschool children. *J. Paediatr. Child Health* 52, 649–655. doi: 10.1111/jpc.13176

Dabrowska, A., and Pisula, E. (2010). Parenting stress and coping styles in mothers and fathers of pre-school children with autism and down syndrome. *J. Intellect. Disabil. Res.* 54, 266–280. doi: 10.1111/j.1365-2788.2010.01258.x

Hayes, S. A., and Watson, S. L. (2013). The impact of parenting stress: a meta-analysis of studies comparing the experience of parenting stress in parents of children with and without autism spectrum disorder. *J. Autism Dev. Disord.* 43, 629–642. doi: 10.1007/s10803-012-1604-y

Kim, I., Ekas, N. V., and Hock, R. (2016). Associations between child behavior problems, family management, and depressive symptoms for mothers of children with autism spectrum disorder. *Res. Autism Spectr. Disord.* 26, 80–90. doi: 10.1016/j.rasd.2016.03.009

Lee, S. J., Gopalan, G., and Harrington, D. (2016). Validation of the parenting stress index–short form with minority caregivers. *Res. Soc. Work Pract.* 26, 429–440. doi: 10.1177/1049731514554854

Moore, P. J., Chrabaszcz, J. S., Peterson, R. A., Rohrbeck, C. A., Roemer, E. C., and Mercurio, A. E. (2014). Psychological resilience: the impact of affectivity and coping on state anxiety and positive emotions during and after the Washington, DC sniper killings. *Anxiety Stress Coping* 27, 138–155. doi: 10.1080/10615806.2013.828202

Neece, C., McIntyre, L. L., & Fenning, R. (2020). Examining the impact of COVID-19 in ethnically diverse families with young children with intellectual and developmental disabilities. *Journal of Intellectual Disability Research*, *64*(10), 739-749.

APA. (American Psychological Association). 2020. Stress in America 2020: Stress in the Time of COVID-19 (Vol. 1). American Psychological Association. https://www.apa.org/news/press/releases/stress/2020/stress-in-america-covid.pdf

McConnell, D., and Amber,S., (2015). "Stress and Resilience Among Families Caring for Children with Intellectual Disability: Expanding the Research Agenda." Current Developmental Disorders Reports, 2(2):100–109. https://doi.org/10.1007/s40474-015-0040-z.

Norris, F. H., and Kaniasty, K. (1996). Received and perceived social support in times of stress: a test of the social support deterioration deterrence model. *J. Pers. Soc. Psychol.* 71, 498–511. doi: 10.1037/0022-3514.71.3.498

Puff, J., and Renk, K. (2014). Relationships among parents' economic stress, parenting, and young children's behavior problems. *Child Psychiatr. Hum. Dev.* 45, 712–727. doi: 10.1007/s10578-014-0440-z

Tumlu, G. U., Akdogan, R., and Turkum, A. S. (2017). The process of group counseling based on reality therapy applied to the parents of children with disabilities. *Intl. J. Early Childhood Special Educ.* 9, 81–98. doi: 10.20489/intjecse.368465

Zimet, G. D., Dahlem, N. W., Zimet, S. G., and Farley, G. K. (1988). The multidimensional scale of perceived social support. *J. Pers. Assess.* 52, 30–41.

11.

A Survey Study: Awareness level among General Education Pre-Service Teachers about Assistive Technology for Persons with Disability

- K. Aravind kumar
Integrated B.Ed.-M.Ed. ID (Final Year)Ramakrishna Mission Vivekananda Educational and Research Institute,Faculty of Disability Management and Special Education, Coimbatore CampusTamil NaduEmail ID: rubanaravid97@gmail.com
Mobile no: 6380221073

- Murugan T
M.Ed. ID (Final Year)Ramakrishna Mission Vivekananda Educational and Research Institute, Faculty of Disability Management and Special Education,Coimbatore Campus
Tamil NaduEmail ID: murugathi@gmail.comMobile no:9943555118

Abstract

Technology is inevitable and it plays an essential role in this 21st century. The use of technology in classroom has been evolving more higher in recent years. This technology has a great impact on the teaching and learning process, particularly for Persons with disability. Assistive Technology is one among them, used effectively in the field of Special Education which helps to address the needs of Persons with Disability. The objective of the study is to find out the awareness level of Assistive Technology for Persons with Disability among General Education Pre-Service teachers. Descriptive survey method was used to find the awareness level of Assistive Technology. Totally 50 participants from general education pre-service teachers were chosen as subjects. The results concluded that 37% of the general education pre-service teachers were aware about Assistive Technology for Persons with Disability and 63% of general education pre-service teachers were not much aware about the Assistive Technology for Persons with Disability.

Keywords: General Education Pre-Service Teachers, Assistive Technology, Persons with Disability

Introduction

Assistive technology (AT) refers to any device, software or equipment that helps people with disabilities or impairment to perform everyday tasks and activities. These technologies can be high-tech or low-tech, and they may help people with physical, sensory, or cognitive disabilities. When children with disabilities are included in general education, adaptations are needed to accommodate their physical, social learning needs. Adaptations can be any AT devices, this is “any item, piece of equipment or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with disability” (P.L. 108-446). AT can significantly improve the quality of life for person with disabilities by helping them to be more independent and engage more fully in daily activities. AT helps in improving communication by using device like text-to-speech

software, and screen readers can help people with communication disability to express themselves and participate in conversation. It also helps in enhancing mobility by using wheelchair, crutches, and prosthetics can help people with mobility impairment to move around and participate in a activity. Providing access to information by using assistive technology such as screen readers, braille displays, and magnifying device can help people with visual impairment to access information. Increasing more independency by using smart home device, medication remainder, and personal emergency response systems can help people with disabilities to live more independently. Radabaugh (2014) said for most of the people, technology makes things easier, but for people with disabilities technology makes things possible. Children with disabilities includes children who have long-term physical, mental, intellectual, or sensory impairment which in interaction with a variety of barriers may obstruct their full and effective participation in society on an equal basis with others and pulling down the inclusive growth of the society Convention on the Rights of Persons with Disabilities (CRPD 2006). So that the general education teacher trainees should be aware of AT because it can help them to support the students with disabilities in the classroom to access the curriculum and enable them to participate in classroom activities on an equal basis with their peers. General educators have a legal obligation to provide accommodations and modifications to students with disabilities under Individuals with Disabilities Education Act (IDEA). Knowledge of AT can help the Teacher Trainees to fulfil the obligation. AT can have positive and inspiring impact on self-image, self-esteem, and sense of self-worth Scherer and Glueckauf (2005). Teacher's Knowledge of AT and professional Training regarding this are identified as crucial to the successful implementation of AT in schools Smarkola, (2008). By providing proper knowledge about AT for general education pre-service teachers helps children with disabilities to participate more fully in society and promote inclusion and create more accessible and equitable classroom.

Background

Assistive Technology is vital in making inclusive education possible. Also plays a crucial role in improving teaching and learning process in the classroom and improves the quality of life. It enhances the independence of person with disabilities. It helps persons with disability to participate in the activities with their peers and create more accessible and equitable environment. So, the awareness level among pre-service teachers is very important to promote inclusion in the classroom and help the teachers to understand and meet the needs of the children.

Objective

To find out the awareness level among general education pre-service teachers about assistive technology for persons with disability.

Research Question

What is the awareness level among general education pre-service teachers about assistive technology for person with disability?

Methodology

Research Design

The study used descriptive survey as a research design to explain the awareness level among general education pre-service teachers about assistive technology for persons with disability.

Sample

Purposive sampling method under nonprobability sampling technique was used to select sample. In regard to participants of the study there were 50 respondents were selected among general education pre-service teachers in Coimbatore district.

Research tool

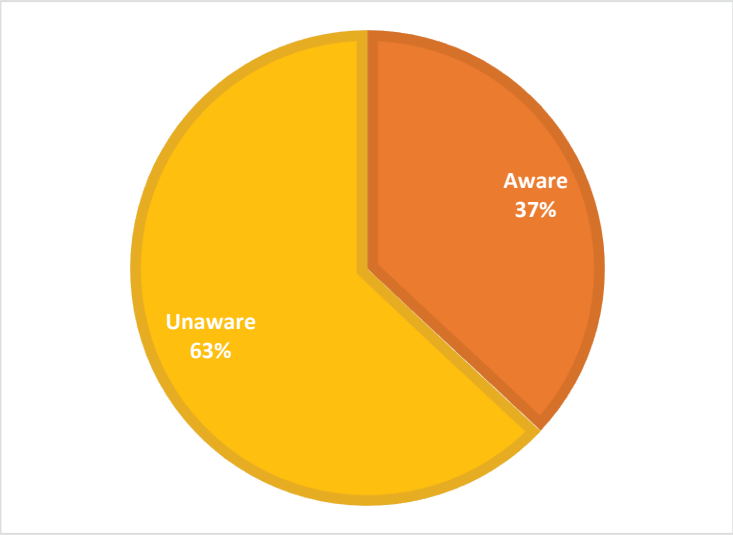
Closed ended questionnaire was prepared to collect the data from general education pre-service teachers to find out the awareness level about assistive technology for persons with disability.

Data Analysis

The collected data was analysed through pie chart and the awareness level among general education pre-service teachers about assistive technology were represented by simple percentage.

Table 1: Represents the level of awareness among pre-service general educators about assistive technology

Level of awareness about assistive technology for persons with disability among pre-service general educators



The pie chart (above mentioned) shows that only 37% of the general education pre-service teachers were aware about Assistive Technology for Persons with Disability and 63% of general education pre-service teachers were not much aware about the Assistive Technology for Persons with Disability.

Result and Conclusions

The result indicates that 37% of general education pre-service teachers only aware about the assistive technology for persons with disability. But majority of the population selected for the study was not aware about the assistive technology for persons with disability. Knowledge about assistive technology is crucial for general education pre-service teachers because it allows them to assess the needs of the students with disability and identify the assistive devices that would assist them in completing a task. also, they understand better about adaptation and accommodation for person with disabilities. Assistive technology enhances the teachers to provide a barrier free environment in the classroom for the students with disabilities and engage them in the classroom activities. The result indicates that the general education pre-service teachers should need an effective training about assistive technology and to apply it for students with disability in the classroom.

Limitations

The sample selected were limited to only 2 colleges in Coimbatore district.

The study focused on final year students only.

Recommendation

General Education Pre-Service teacher trainees are the future teachers. It is the responsibility of general educators, administrators, and parents to implement inclusive education by providing accessible environment. Assistive technology is one of the tools to achieve the same. Curriculum of general education comprises of this course assistive technology but there may be a lack of hands-on activities. This fall back could be focused to uplift the knowledge of future teachers. Consequently, the progression could be witnessed.

Reference

Smarkola, C. (2008). Efficacy of a planned behavior model: Beliefs that contribute to computer usage intentions of student teachers and experienced teachers. *Computers in Human Behavior*, *24*(3), 1196-1215.

Scherer, M. J., & Glueckauf, R. (2005). Assessing the benefits of assistive technologies for activities and participation. *Rehabilitation Psychology*, *50*(2), 132.

Apling, R. N., & Jones, N. L. (2005, January). Individuals with Disabilities Education Act (IDEA): Analysis of changes made by PL 108-446. Washington, DC: Congressional Research Service, Library of Congress.

Assembly, U. G. (2006). Convention on the Rights of Persons with Disabilities. *GA Res*, *61*, 106.

Ahmad, F. K. (2015). Use of assistive technology in inclusive education: making room for diverse learning needs. *Transcience*, *6*(2), 62-77.

Radabaugh, M. P. (2014). Assistive technology: independent living Centre Nsw.

Onivehu, A. O., Ohawuiro, O. E., & Oyeniran, B. J. (2017). Teachers' Attitude and Competence in the Use of Assistive Technologies in Special Needs Schools. *Acta Didactica Napocensia*, *10*(4), 21-32.

Ahmed, A. (2018). Perceptions of using assistive technology for students with disabilities in the classroom. *International Journal of Special Education*, *33*(1), 129-139.

Kundu, A., Bej, T., & Dey, K. N. (2020). Indian educators' awareness and attitude towards assistive technology. *Journal of Enabling Technologies*, *14*(4), 233-251

Rustioglu, O., Avcioglu, H., Karanfiller, T., & Adalier, A. (2021). Assistive Technologies Usage Skills Assessment Scale: Validity and Reliability Study. *Turkish Online Journal of Educational Technology-TOJET*, *20*(1), 10-18.

12.

Early Intervention- The Quality Of Life

Mrs. Kanchan Singh,
Occupational Therapist, Nagpur University, [M.S.]

ABSTRACT

Purpose: To discover the Effectiveness of Early Intervention for Improving Sensory Processing in children with Autism

Key Words: Early Intervention, Sensory Processing, Autism Spectrum Disorder, Sensory Integration

Introduction: Autism Spectrum Disorders are characterized by impairments in social interaction & behavioral functioning that can affect health related Quality of Life outcomes of the autistic child. Previous studies shows that,1 in 68 children had Autism. But recent studies shows that 13 in 48 children have Autism.The DSM-5 eliminated the separate diagnoses and created one continuum(Autism Spectrum Disorders = ASD).By this definition, the symptomatic manifestation was reduced and the criteria for diagnosis are fixed for the entire spectrum. The differences between individuals are expressed in the levels of severity rated.Various comorbidities can have a huge impact on assessment and management. Behavioral and medicinal strategies focusing on cluster symptoms of hyperactivity/ inattention, aggression, self-injurious behaviors and ritualistic behaviors. Sensory Screening & Sensory Integration therapies, Occupational Therapy assessment and intervention, Speech & Language assessment and intervention, Behavior Therapy, Parent education, Special Education are the integral parts of the management.

Case Study: The participants are 25 children of Autism , 8 girls &17 boys, of age group 3 to 6 years. These all children are diagnosed as Mild ID with Mild ASD.The symptoms were- sensory modulation disorders, hypersensitive to auditory stimulations and oral-stimulations, tactile defensiveness, dyspraxia, good receptive but poor expressive language, hypotonic muscle tone.

Methods: Use of different Assessment Tools -- Sensory Profile Checklist, Praxis test, ADL checklist, Gross- motor & Fine-motor checklist. According to Sensory Profile checklist, the children had low threshold with sensory sensitivity & sensory avoiding.

Thrapeutic Intervention: Sensory Integration therapy-vestibular and proprioceptice inputs with Gym ball/ Therapy ball,Swings, Tunnels for crawling, mattresses with differtent textures for tactile inputs,muscle relaxation with use of soft massage scubbers/ brushes, sensory material,Auditory stimulations with soft/soothing music,play dough/therputty,group- play therapy, reinforcement board, assistive devices/ assistive technology,visual pictures for training ADL Skills,Speech &Language intervention,Behavior modification,Special education,Family Education, GFCF Diet.Outcome measures were recorded before and after intereventions. This is with 100% involvements of parents in interventions with one on one basis and home based program, the theraputic period is almost 1 year.

Result: After the period of one year, the children shown in the improvement in stability and balance issues (vestibular & proprioceptive), attention,response to name call,eye contact, expressive language,concepts formation, ADL skills like brushing and eating by self with verbal prompts,toilet trained,ability to follow instructions by parents/others.Half of the children shown more improvement, half of them shown less improvement, depending on their comorbidities.But improvements in frequency of interaction were minnmal.

Discussion: Present study aimed to evaluate the the effectiveness of Sensory Integration Therapy for improving sensory processing.The results support discriptions in the literature regarding behavioral changes that children with autism can make when participating in intervention using a sensorry integration approach.

Suggestion: Therapies should be regular to these children to maintain their stability, to improve praxis and sensory processing to the next level,so in facilitating behavioral changes, helping to establish and maintain relationship , in promoting decision making process while facilitating the child's potential.Therapies should be goal directed.

References:

- Bundy AC, Shelly JL, Murray EA (2002) Sensory integration: theory and practice – second edition. Philadelphia: F A Davis.
- Cribbin V, Lynch H, Bagshawe B, Chadwick K (2003) Sensory Integration: Information booklet – a resource for parents and therapists. Sensory Integration Network, UK and Ireland.
- Kranowitz CS (2003) The Out-of-Sync Child Has Fun – Activities for kids with sensory integration dysfunction. ISBN 0-399-52843-1.
- Miller Lucy J, Doris A (2006) Fuller. Sensational Kids: Hope and Help for Children with Sensory Processing Disorder. New York: G. P. Putnam's Sons.
- Smith Myles, B., Tapscott Cook, K., Miller, N., Rinner, L & Robbins, L. (2000) Asperger Syndrome and Sensory Issues: Practical Solutions for Making Sense of the World. Kansas, USA: Autism Asperger Publishing Co.
- Torrance C A (2003) Applying sensory integration principles where children live, learn and play. Pediatrc Therapy Network.

- Williams, Mary Sue and Sherry Shellenberger (1996). “How Does Your Engine Run?” A Leader’s Guide to The Alert Program for Self-Regulation. Albuquerque, NM: TherapyWorks, Inc.
- Dunn, W. (1999). Sensory Profile. San Antonio, TX: Psychological Corporation.
- Dunn, W. (2006). Sensory profile school companion. Psychological Corporation: San Antonio

13.

The Effects of Precision Teaching Exercises on the Acquisition of Academic Skills for Classroom Integration of Two Children with Autism

Smita Awasthi, Papiya Mukherjee, Tejashree Gambhir
Behavior Momentum India

Abstract:

The benefits of teaching children with ASD to perform academic activities with accuracy and high speeds are enumerated by Kubina, Morrison and Lee (2002). Two children with ASD, MA and SL, both 8 years old, in Grade II, participated in this study. Feedback from MA's school teachers indicated that she had difficulties in essential skills such as copying sentences from the board, copying numbers and reading words with specific letters. SL similarly had difficulties with math skills such as saying even and odd numbers in sequence and performing simple additions. Frequency building procedures were used with 30s to 1 min timed exercises rewarding them to complete increasing number of responses within each activity. Their response rates in these activities improved by 1.6 to 3 times from initial levels with an average investment of 30 minutes per skill for MA and 11 minutes per skill for SL. Reports from school said that the students were better integrated in the classroom after the intervention.

Key Words: Autism, Academic Skills, Precision teaching

Introduction:

Teachers and parents of school-going children with autism often struggle with long latencies, slower rates of responses and learning, difficulties understanding concepts and retaining them. The problems reported around reading, writing and math concepts are common.

- Evans, A. L., Bulla, A. J., & Kieta, A. R. (2021) define Precision Teaching (PT) as- "…a system for precisely defining and continuously measuring dimensional features of behavior and analyzing behavioral data on the SCC to make timely and effective data-based decisions to accelerate behavioral repertoires."
- Scientific methods for educational needs of children with autism have seen gradual growth (Maurice, 1993;). Precision Teaching (PT) interventions are beneficial for children with disability. (Kubina, et al. 2002).
- Precision Teaching integrates with traditional educational systems to improve response latencies (Weiss, 2001).
- Programs utilizing PT focus on establishing key component skills and their underlying pre-requisite skills (Johnson, 1991).

Current study used precision teaching to improve identified reading, writing and math difficulty areas.

Participants

Participant 1: MA, 8-year-old school going girl with HFA with VBMAPP Score of 160
Participant 2: SL, 8-year-old school going boy with HFA with VBMAPP Score of 155

Settings and material:

- The exercises were carried out during Tele-health sessions via Zoom or Skype. Program was stared during COVID in 2020
- Participants were from Bangalore center, Behavior Momentum India
- Materials used were: Laptops, notebook, pencil, eraser, sharpener, celebration chart software.

Dependent variables and measurements:

DVs for participant 1: MA

1. Single digit addition- sums per minute
2. Copying numbers from board – numbers per minute
3. Copying sentences - numbers of letters were per minute
4. Taking dictation of 3-letter words – words per minute
5. Reading 3-4 letter words starting from same alphabet to build reading fluency – words per minute

DVs for participant 2: SL

1. Add 2 to a given number- correct responses per minute
2. Skip count by 2- number of responses per minute
3. Addition sums- number of sums completed per minute
4. Even numbers- number of responses per minute

4.1: Say even numbers from 2 (2,4,6,8…)

4.2: Say even numbers from any given number (18, 20, 22, 24….)

5. Odd numbers- number of responses per minute

5.1:Say even numbers from 1 (1,3, 5, 7…)

5.2 Say even numbers from any given number (21, 23, 25, 27….)

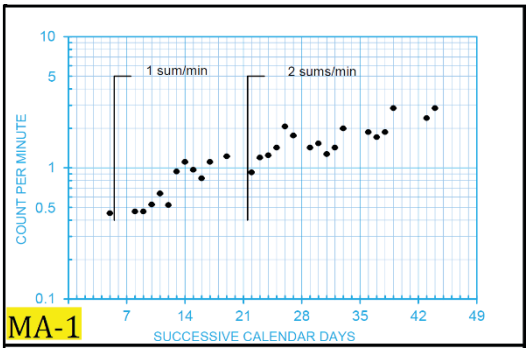
Procedure:

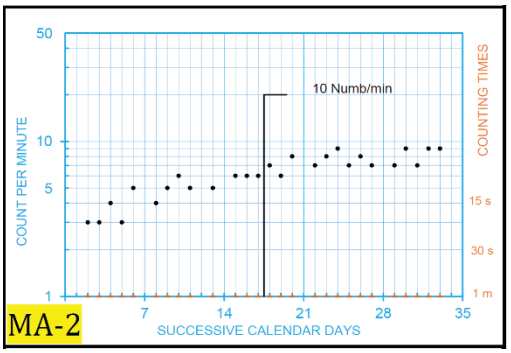
- Therapist orients the child and explains the target to be done, child confirms
- Therapist sets goal, gives instruction at fast pace and starts timer with noting down responses
- At the end, therapist gives feedback and reinforces accordingly

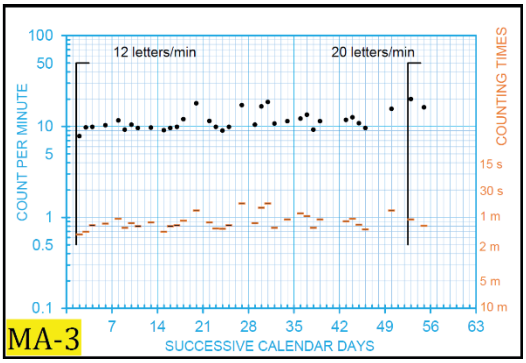
Results:

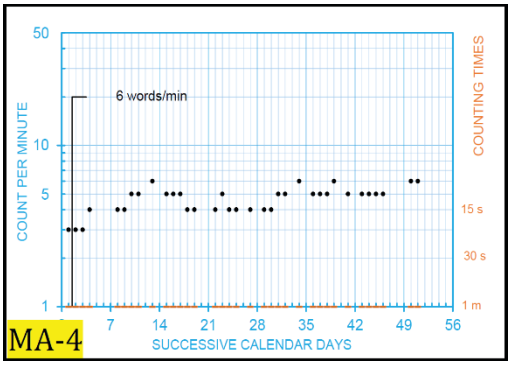
Target	Baseline (per min)	Achieved (per min)	Sessions
Participant 1: MA			
1: Complete 3 single-digit addition	0 sums	3 sums	28
2: Copy 3-digit no. from board	3 numbers	9 numbers	27
3: Copy sentences (count letters)	6 letters	20 letters	35
4: Taking Dictation 3-letter words	9 letters	18 letters	35
5: Read 3-4 letter words starting with same	9 words	25 words	22

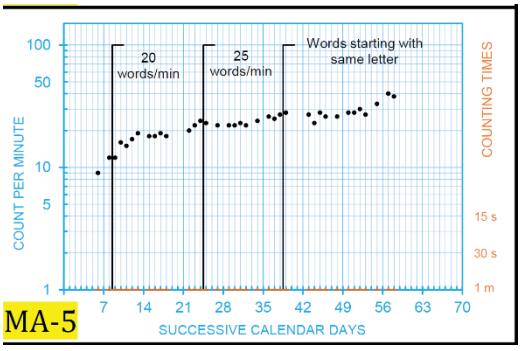
letter			
Participant 2: SL			
1: Add 2 to number	12	22	22
2: Hear-Say multiples of 2	18	30	26
3: Complete an addition problem	0	5	58
4A: Say even numbers from 1	56	140	10
4B: Say even numbers - from any number given	52	80	7
5A: Say odd numbers from 1	58	104	10
5B: Say odd numbers - from any number given	38	74	10

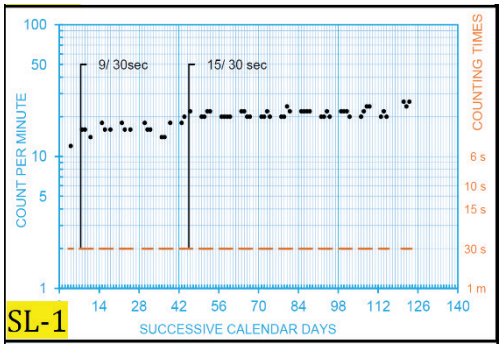


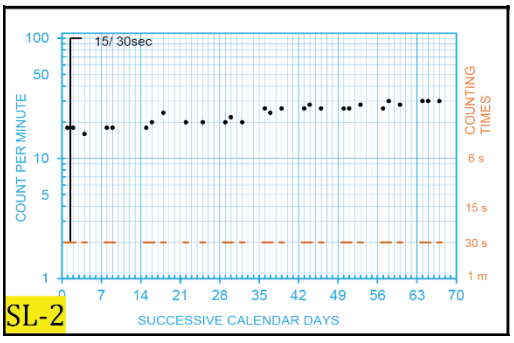


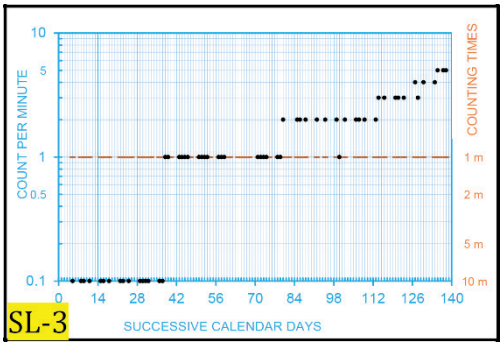


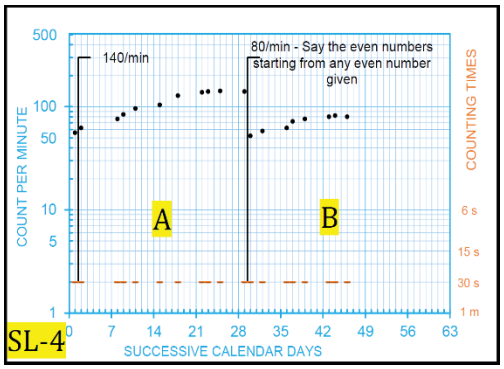


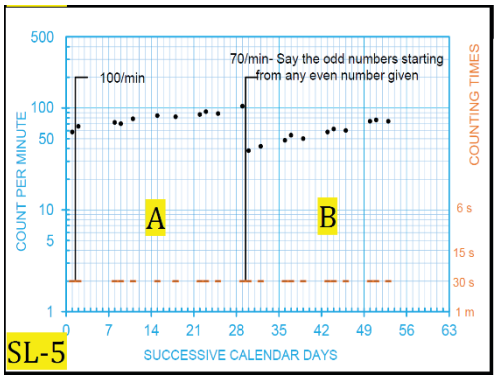












Discussion:

- With PT, it can be proven that children with autism can be taught to process AND respond faster with accuracy
- It is a very time-efficient and economical at the same time effective teaching method
- Multiple areas of application: Dyslexia, Sports, Education, Improving Staff Performance at industries, factories, institutions and offices, etc.
- In the field of autism and education this is a very innovative and effective technology that is coming up in India

Limitation: Requires specific training into understanding of concepts and application of rate building and fluency.

References:

Evans, A. L., Bulla, A. J., & Kieta, A. R. (2021). The Precision Teaching System: A Synthesized Definition, Concept Analysis, and Process. *Behavior analysis in practice*, *14*(3), 559–576. https://doi.org/10.1007/s40617-020-00502-2

Johnson, K. R., & Layng, T. V. J. (1991). Breaking the structuralist barrier: Literacy and numeracy with fluency. Seattle: Morningside Corporation

Jr, Richard & Morrison, Rebecca & Lee, David. (2002). Benefits of adding Precision Teaching to behavioral interventions for students with autism. *Behavioral Interventions*. 17. 233 - 246. 10.1002/bin.122.

Kubina, R. M., Morrison, R., & Lee, D. L. (2002). Benefits of adding precision teaching to behavioral interventions for students with autism. *Behavioral Interventions, 17*, 233–246. 10.1002/bin.122.

Weiss, Mary. (2001). Expanding ABA intervention in intensive programs for children with autism: The inclusion of natural environment training and fluency based instruction. *The Behavior Analyst Today*. 2. 10.1037/h0099946.

14

Teaching Answering Questions on Personal Information to a 24-year-old girl with ASD Using Proloquo2Go™ on iPad

Sridhar Aravamudhan, Smita Awasthi, Sushmita K.S., Behavior Momentum India

Abstract

Preliminary studies suggest that touch-based speech-generating devices (SGD) hold promise for teaching communication to minimally verbal or non-vocal children with ASD (Lorah, Parnell and Tincani, 2018). The current study replicates a study by Lorah, Karnes and Speight (2015) in which they taught two school-aged children with ASD to respond to questions regarding personal information using Proloquo2Go™. In the current study, we taught a 24-year-old minimally verbal girl with ASD with profound discrimination difficulties to respond to three questions, "what's your name?" ,"what's your address?", and "what is your mother's name" with discrimination. We used distinctive icons in the Proloquo2Go app, a blocked trials procedure where responses were trained to questions separately first and then questions were intermixed in a quasi-random fashion. With adjustments to the pictures used and their location, with the intervention, the student acquired accurate and discriminated responding to three questions , "your name?" "your Address" and mummy's name.

Keywords: Autism Spectrum Disorder, speech generating devices, Proloquo2go, Intraverbal behavior

Introduction

According to estimates, up to 50% of people with ASD are unable to produce speech in a functional manner (van der Meer & Rispoli, 2010). The use of an AAC system is now a requirement in school and clinical approach to give non-vocal people with ASD a mode of communication (Ganz et al., 2012; Mirenda, 2001, 2003). Unaided and aided AAC systems are often separated into two types. Systems for unaided AAC, like sign language, rely only on the user and do not require any other equipment. Aided AAC systems need external equipment such as picture based communication systems (Frost and Bondy, 2008) and speech generating devices (Mirenda 2001,2003).

Intraverbal behavior refers to the ability to verbally respond to questions or statements that do not involve a direct physical prompt or reinforcement. This is an important skill for children with autism spectrum disorder (ASD) because it allows them to engage in conversations, communicate their thoughts and feelings, and participate in social interactions. Children with ASD often struggle with communication and social skills and may have difficulty engaging in back-and-forth conversations. Intraverbal behavior helps children with ASD to bridge this gap by providing them with a way to respond to questions and statements in a meaningful way. It also helps them to understand the social context of conversations and to respond appropriately. However, given their limited vocalizations and poor speech intelligibility, speech generating devices (SGD) could assist them in intraverbal behavior. For example, a person with ASD may find it impossible to rattle out their entire home address or their carers

phone number. They could, instead, select the appropriate icon from a SGD that will speak the programmed text. iPAD with proloquo2go^{tm} is one such device.

Lorah, Karnes and Speight (2015) taught two school going children to respond to three different personal information questions using time delay and physical prompts and proloquo2go on iPad. As the use of such devices requires children to discriminate between different icons available on screen and respond based on the question. Since children on the spectrum are known to have discrimination challenges researchers have studied the use of blocked trials (where two responses are taught separately before being interspersed in a random order) and found it useful (DiSanti et al., 2019; Ingvarsson et al., 2016). The current study aims to expand the repertoire of answering personal information questions of a 24-year-old girl with autism using Proloquo2go on iPad and a blocked trials procedure.

Method

Participant

The participant was a 24-year-old girl with autism very profound articulation and speech difficulties. She would use syllables, some words and word approximations to communicate her needs (e.g., "paffa" for perfume, "dosa," "sewii" for swing) along with signs. She could use Proloquo2go on iPad to answer some questions such as her birthday and mother's mobile number but made mistakes in responding to other personal information questions.

Settings and materials

She was taught in a clinic where she was undergoing ABA based interventions. The materials used were iPAD with Proloquo2go with different picture icons programmed to speak responses (e.g., picture of a cake for birthday, a phoe for mobile number). We used google forms to record data during probes and training sessions.

Dependent variables

The dependent variable was responding to personal information questions by selecting a pre-defined icon which would generate a speech output. It was measured as percentage of independent and correct responses out of the total number of opportunities provided. The first and second pairs of questions targeted were:

First Pair: "What is your name?" "What is your address?"

Second pair: "What is your name?" "What is your mummy's name?"

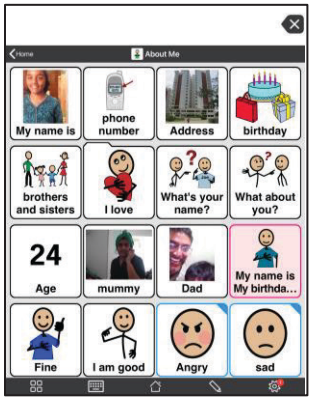
Procedures

Baseline

A therapist kept the iPad in front of the student. The 'about myself' section in Proloquo2go had 16 icons in the page, each of which corresponded to a particular personal information question (Figure 1). They presented 8 questions, some of them repeated multiple times and recorded the student's response as correct or incorrect.

Figure 1

The Icons in 'About Me' Section of the Child's Proloquo2go



Based on the results from the above assessment they then proceeded to conduct a second assessment with the first pair of targets and fewer icons icons (Figure 2). The correct and incorrect responses where recorded and percentage correct responses in baseline were determined.

Figure 2

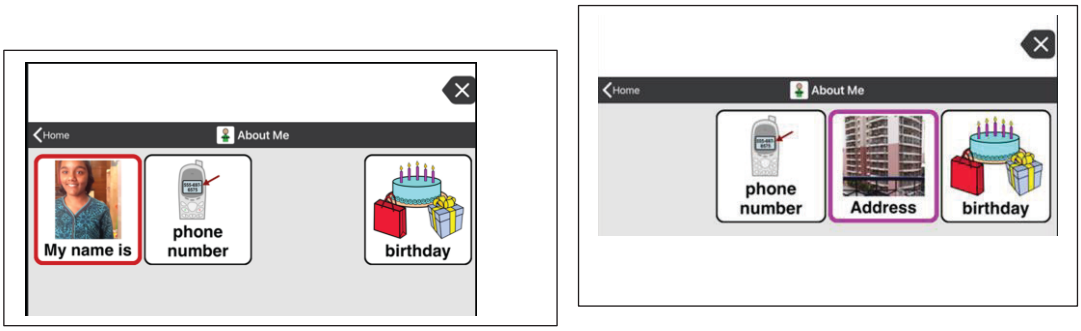
Icons for Assessing and Teaching Responses to Name and Address with Two Known

Blocked Trials Training

In this condition which constituted the intervention the Proloquo2go page had only 4 icons (Figure 3). The therapist, asked each question 10 times in separate sessions. The used a gesture prompt to point to the correct response in the first three trials of the first session and thereafter used a 3 sec time delay prompt. That is, after asking the child the question, the therapist paused. If the student did not answer the question in 3 seconds the therapist gestured to the correct icon. If the student selected the wrong response, the therapist provided a feedback by saying the correct answer is and gestured to the correct icon. The student then pressed the correct icon. While doing a session with "name" they hid the "address" icon and vice versa.They provided a play break at the end of each session.

Figure 3

The Icons for teaching responses to "your name" and " Address" in Blocked Trials



Note:Additional icon present refers to a known response , left for maintenanceof the response

Two questions Random Probe Condition

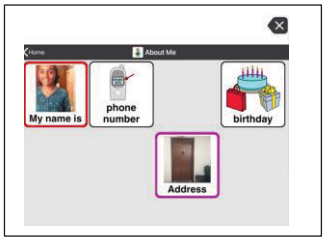
In this condition, unlike in the blocked trials training, in a session, the therapist presented the two questions in a quasi-random order while ensuring that no question was asked more than twice successively. The icons corresponding to both questions were present. In probes, the therapist did not correct any error responses or provide any prompts.

Icon, location change + tokens+ Blocked Trials

In this condition, the therapist changed the address icon to the childs home door (Figure 4) and moved it away from the 'cake' icon which was the answer to 'birthday' question.

Figure 4

Address Icon Changed and Moved Away from Cake – Blocked Trials Procedure

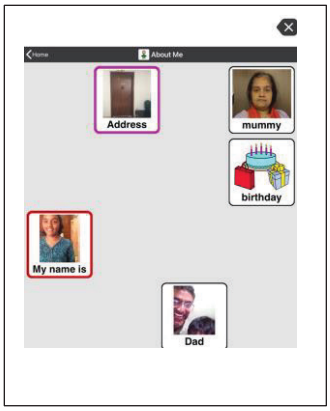


Five questions random Probe

In this condition, the screen had all the icons corresponding to 'your name,' 'address,' 'birthday,' 'father's name' and 'mother's name' present (Figure 5). The student was asked all these questions in a quasi-random order 7 times (Total 35 trials).

Figure 5

The Layout for Five Questions Probe



Results

The baseline assessment results are shown in table 1

Table 1

Initial Assessment of Responses to Personal Information Questions

	Question Asked	Correct	Errors	Assessment
1	Your Name	5	2	Weak
2	Address	1	3	Weak
3	Dad's name	5		Mastered

	Mummy's name	3	2	Weak
4	Phone number	3		Mastered
5	Age		3	Absent
6	brothers or sisters?	2		Mastered
	How old are you		2	Weak
		19	12	

Figure 6

Intervention results

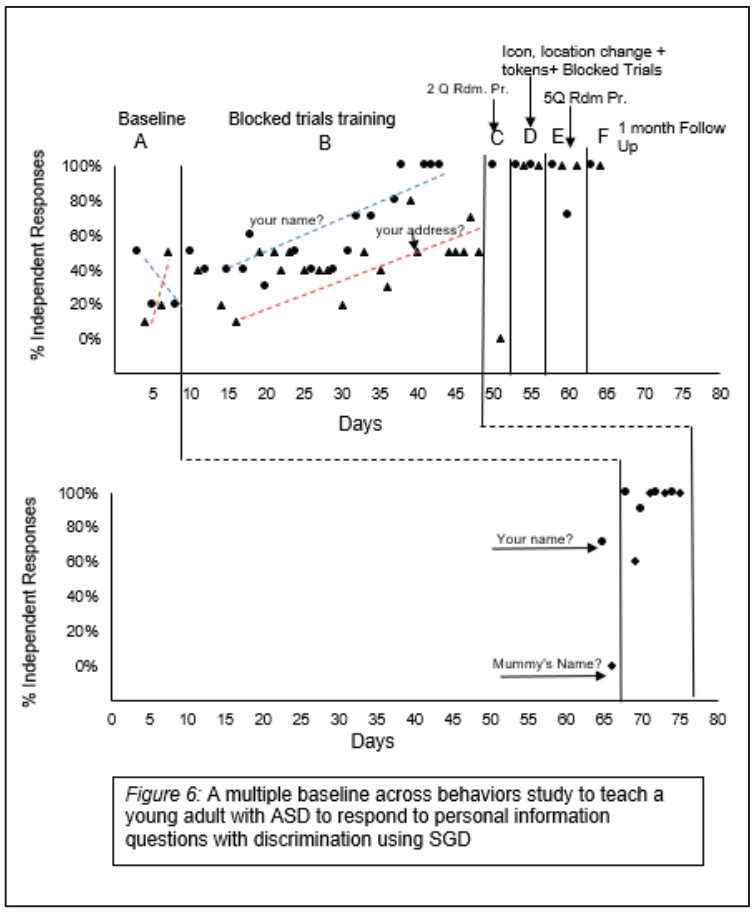


Figure 6: A multiple baseline across behaviors study to teach a young adult with ASD to respond to personal information questions with discrimination using SGD

Figure 6 shows the results of training. In baseline conditions, for the first pair of questions, the responses were below 50% to both the questions. Thereafter while the blocked trials procedure improved the performance to the question “whats your name?” to 100% and your address to between 40% and 60% the performance did not meet criteria. When the two questions were interspersed in a session, the response to “whats your address” dropped to Zero as the student kept selecting the ‘cake’ icon for this question.

A procedural modification was made with a more distinctive icon for address, which was the picture of the child’s home door. Further this icon was moved away from the ‘cake’ icon (Figure 4). When the blocked trials procedure was repeated, the student quickly achieved 100% correct and independent responses to both questions separately. Thereafter, a 5 question randomized probe was conducted to confirm the acquisition of responses to first pair and identify new targets.

In the five questions randomized probe condition, the student responded correctly to “address” but responding to “name” dropped as “what is your mummy’s name” was included. The results of this probe are presented in Table 2

Table 2

Probe of 5 questions including the first pair

	Correct	Error	% Correct
Name	5	2	71%
Address	7	0	100%
Mothers name	0	7	0%
Birthday	6	0	100%
Fathers name	7	0	100%

Based on these results, the next pair of questions targeted was “Your name” and “Mummy’s name.”

In the second tier of Figure 6, the results of blocked trials training on this pair are shown. After just 2 sessions of training, responses to both questios reached 100%

Discussion and recommendations

The study is still in progress with additional assessments and question pairs to be trained. It offers preliminary evidence for the effectiveness of use of SGDs for teaching children with ASD to respond to questions. This can be very valuable especially for children with speech difficulties. For children with discrimination challenges the study also demonstrates how changing an icon and changing its location can help with faster acquisition. The study's limitations the low number of exemplars taught, the extended blocked trials phase with the first question pair when making some changes could have facilitated faster acquisition and the lack of generalization assessments and data on practical use of these skills in social situations.

References

DiSanti, B. M., Eikeseth, S., Eldevik, S., Conrad, J. M., & Cotter-Fisher, K. L. (2019). Comparing structured mix and random rotation procedures to teach receptive labeling to children with autism. *Behavioral Interventions*, *35*(1), 38-56. https://doi.org/10.1002/bin.1694

Ganz, J. B., Earles-Vollrath, T. L., Heath, A. K., Parker, R. I., Rispoli, M. J., & Duran, J. B. (2011). A meta-analysis of single case research studies on aided augmentative and alternative communication systems with individuals with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *42*(1), 60-74. https://doi.org/10.1007/s10803-011-1212-2

Ingvarsson, E. T., Kramer, R. L., Carp, C. L., Pétursdóttir, A. I., & Macias, H. (2016). Evaluation of a blocked-trials procedure to establish complex stimulus control over Intraverbal responses in children with autism. *The Analysis of Verbal Behavior*, *32*(2), 205-224. https://doi.org/10.1007/s40616-016-0071-5

Lorah, E. R., Karnes, A., & Speight, D. R. (2015). The acquisition of Intraverbal responding using a speech generating device in school aged children with autism. *Journal of Developmental and Physical Disabilities*, *27*(4), 557-568. https://doi.org/10.1007/s10882-015-9436-2

Lorah, E. R., Tincani, M., & Parnell, A. (2018). Current trends in the use of handheld technology as a speech-generating device for children with autism. *Behavior Analysis: Research and Practice*, *18*(3), 317-327. https://doi.org/10.1037/bar0000125

15

Leave no one Behind: Disability Awareness and Community Involvement

Smriti Shankar*

Context-

The well-being and social inclusion of persons with intellectual disabilities is challenged by negative attitudes held among the general population and sub-sections of societies around the world Lack of proper knowledge and understanding of the intellectual and other developmental disabilities is the most important reason for the extremely impoverished and neglected life of the persons with these disabilities.

Objective: Reaching out to families having children or adults with intellectual disabilities. This would aim at:

- Knowledge building and removing attitudinal barriers. It would also aim at creating awareness about the need for development opportunities and capacity building through necessary interventions, training, education and removal of barriers.
- information about the concessions and benefits provided by the Govt. including National Trust.
- Awareness about the Rights of persons with disability and need for advocacy and building pressure on the Govt. for creating necessary services.

Method: Reach out to mass through different modes

- Awareness campaign/ events for mass: Door to door, market/ crowded place, school, colleges, institution, traffic signal, Metro, distribution of pamphlets.
- Through social media, print media, electronic media.
- Parent counselling & trainings
- Workshop/symposium (offline/online) Panel discussion: Doctor, clinical psychologist, psychologist, teachers, vocational trainer, employers, self-advocate
- Sensitization programs for all service provider, school, colleges
- Showcasing of capacities of persons with intellectual disabilities through their work/products
- Active advocacy for their rights & facilities ETC

Result: Inclusive Society

- Disability awareness & community involvement helps in subsiding the stereotypical mindset of the society, hence providing vast opportunities for everyone to get involved in creating a positive inclusive society for all.

- Working with diverse groups is not only a deeply humanizing experience but also expands horizons of our thinking.

Smriti Shankar*
E Mail: smriti.shankar@muskaan-paepid.org
Contact no: 9868464945
Designation: Program Manager (Area of work, Family support services and Awareness & Advocacy)
Organization: Muskaan-PAEPID
Address: Plot no-3, Sector-B, Pocket-2, Vasant Kunj, New Delhi, 110070

16.

Emotional Regulation and Mental Well-being among Indian Adolescents

Dr. Sunita Devi*

Adolescence is an important transitional period of life marked with curiosity and experimentation with risky behaviours and experience of emotional changes which may pose threat to their mental well-being. Hence, it becomes increasingly important for adolescents to develop positive emotion regulation (ER) strategies, which promotes mental well-being in youth. The objectives of the present study were to investigate the relationship between emotional regulation and mental well-being among Indian adolescents and to explore the areas of difficulties in the emotion regulation. The study used a correlational design. A total sample of 296 adolescents (174 males and 122 female; age range 12–15 years) were recruited from a private school in Delhi NCR through purposive sampling and administered the scales of Difficulty in Emotion Regulation (DERS-18) and Mental Health Continuum-Short Form (MHC-SF).

The obtained quantitative data were analysed using descriptive statistics and Pearson's correlation. A significant negative relationship between the variables, viz. difficulties in emotion regulation and mental health and well-being was found. The implications and limitations of the study are discussed.

Key words: Emotional Regulation, Mental Well-being, Adolescents

Email: sunitapourush@gmail.com

*Lecturer in Rehabilitation Psychology, NIEPID-Secunderabad-500009.

INTRODUCTION AND REVIEW OF LITERATURE

Adolescence is the period between 10–19 years of age (WHO, 2012; UNICEF, 2005). Human beings have different needs at different stages of life. They need to develop new skills in order to face the life's challenges and for individual growth. The period of adolescence is considered very crucial as it can be the period of opportunities and growth yet at the same time poses major

challenges and puts them to numerous vulnerabilities. It is a transitional period of various changes like biological, mental, emotional and social development apart from school transitions. They may face challenges related to academic, personal or social area. They have to learn to make a balance between freedom and responsibility; accountability that is expected from them due to their growing age; develop self-identity and also form peer relationships. This decisive developing phase sets the base for a healthy future life. They also have high level of curiosity and urge for experimenting with risky behaviours during their important transitional period of life. Not having the skills to regulate the emotional changes may pose threat to their mental well-being especially during any challenging times like COVID-19 pandemic or transitional times like making the transition from school to college life. If they are having good mental health and emotional regulation, they can deal any challenging or transitional time much more effectively than those who are having poor mental health and poor emotional regulation. India, having the largest adolescent population of approximate 250 million adolescents who contribute to 21% of the total population (Census of India, 2011), needs to focus on taking care of this important future resource.

Emotions have a very significant role in moving our lives, they can move in positive or negative direction. Emotions are affected internally by our cognitions and externally from situations (McRae, Misra, Prasad, Pereira, & Gross, 2012). Several mental health issues develops because of lack of skills in regulating overpowering effects of emotions. Therefore, it is crucial to understand how they affect our mental well-being and how we can learn to regulate these. Emotion regulation is defined as the "processes responsible for monitoring, evaluating and modifying emotional reactions" (Thompson, 1994 p.27) and this important skill of regulating emotions should be one of the major task during adolescence. Human beings have the capacity to learn different emotions and these can be conditioned by our environment as we interaction with others in our environment in life. Because of the evolving regulatory neural circuitry, emotion regulation skills can be improved significantly during adolescence.

Emotion regulation (ER) can be defined as "a goal-directed process which influence the intensity, duration, and type of emotion experienced" (Gross & Thompson, 2007). As adolescents get different exposure to emotional situations and encounters, their neural connections develop and their skills of emotion regulation develop considerably. The skill of

emotion regulation is an important socio-emotional skill which helps the individual to understand the emotionally stimulating situations and act effectively. The ability of emotion regulation influence different areas of functioning like physical, psychological, social and academic performance (Mikolajczak & Desseilles, 2012).

Several research studies explored the relation between the disturbances in emotion regulation and the vulnerability for developing and maintaining different psychopathologies like anxiety and depression and the majority of people have onset of depression during the transition from middle to late adolescence (Barlow, Allen & Choate, 2004; Campbell-Sills, et. al. 2006; Kashdan & Steger, 2006; & Mennin, 2006). Similarly, it was found that due to lack of emotional regulation skills, adolescents manifest increased internalizing symptoms (Ahmed, Bittencourt-Hewitt, & Sebastian, 2015) and the onset of internalized symptoms found to be at the age of 14–15 years during adolescence (Ge, Conger, & Elder 2001; Horowitz & Garber, 2006; Kessler et al., 2005). Evidently, emotion regulation is found to be associated with the onset and maintenance of adolescents' psychopathology (McLaughlin, et. al., 2011). Hence, the period of adolescence is significantly important to study in order to understand and develop emotion regulation.

Numerous research studies have highlighted the importance of effective emotion regulation in improved psychological health, recovering from psychological disorders or emotional problems (Aldao, et.al, 2014; DeSteno, Gross, & Kubzansky, 2013). Emotional intelligence play an important role in making individuals more resilient, improved their sense of self-efficacy and make them less anxious, less depressed, and less reactive which help them to cope and adjust to their environment more positively (Wapaño, 2021). Guerra-Bustamante, et. al. (2019) proposed by increasing the capacity of understanding and regulation of emotional intelligence, happiness can also be increased and adolescence period is to develop the emotional capacities that add greater happiness in life of the individuals. There are studies which indicate the relation between different emotional regulation strategies (such as reappraisal and suppression) and social adjustment that have important implications for social and psychological well-being. (Chervonsky & Hunt, 2019). Traits of emotional intelligence like self-awareness, social deftness, and the ability to delay gratification, to be optimistic in the face of adversity, to channelize strong emotions and be empathetic with others help adolescents to be more socially adjusted

(Sasikumar, 2018). It has been also reported that there is a significant relationship between emotional maturity and general well-being of adolescents (Joy & Mathew, 2018).

Hence, it becomes all the time more important to focus on developing positive emotion regulation (ER) strategies, which promotes mental well-being in adolescents and youth.

OBJECTIVES

- To study the emotional regulation and mental well-being of Indian adolescents.
- To find the relationship between emotional regulation and mental well-being among Indian adolescents.

HYPOTHESES

- There is no significant difference between the emotional regulation and mental well-being of Indian adolescents with respect to their gender.
- There is no significant relationship between emotional regulation and mental well-being among Indian adolescents.

METHODOLOGY

The study used a correlational design. A total sample of 296 adolescents (174 males and 122 females; age range 12–15 years) were recruited from a private school in Delhi NCR through purposive sampling.

Tools:

The Mental Health Continuum-Short Form (MHC-SF) (Keyes et al., 2009) contains 14 items use a Likert scale of 6-point (Never, once or twice a month, about once a week, two or three times a week, almost every day, and every day) used for 12-18 years old. The scale comprised of three subscales: Emotional well-being Social Well-Being and Psychological Well-Being. If the individuals rate their feelings ‘‘every day’ or ‘almost every day’ for at least one statement/item out of three given for hedonic well-being, and minimum six out of eleven signs of positive functioning for the past month, the individual is considered to have flourishing mental health. People who rate their feelings, ‘never’ or ‘once or twice’ in the last one month, on minimum one

statement/item of hedonic well-being and minimum six items of positive functioning are identified as languishing on mental health.

People who rate their feelings, 'about once a week', 'two or three times a week', are are identified as having moderate mental health. The short form of the MHC has shown excellent internal consistency (> .80) and discriminant validity in adolescents (age range l2-18) and adults in the U.S.

Difficulty in Emotion Regulation Scale-18 (DERS-18: Victor & Klonsky, 2016) uses a Likert-like scale ranging from 1 (Almost never) to 5 (Almost always) is used for 11-18 years old. It is a self-report questionnaire designed to measure various aspects of emotional dysregulation. Higher the individuals scores on the measure, more the difficulties they face with emotion regulation. The measure displayed excellent reliability at the total scale level (a = .91).

Procedure

The researcher sought permission from the school authorities to collect the research data. Then researcher met with the students and briefed about the purpose and assured the confidentiality. After their consent for the participation in the study, the mental health continuum-short form and difficulty in emotion regulation scale-18 were administered. The obtained data was scored and analysed quantitatively, using descriptive statistics, independent samples't' test, and pearson's correlation.

RESULTS AND DISCUSSION

This study is a correlational research which examined whether emotional intelligence is related to mental health or not. One of the main objective of the study was to find out the difficulty level of the emotional regulation and mental well-being of Indian adolescents. The total sample was 296 adolescents studying in class 8^{th} and 9^{th} in which 122 were female and 174 male.

Table 1: Showing the descriptive statistics (n=296)

	DER	*MHC*
Mean	46.58	42.91
Standard Error	0.59	0.61

Standard Deviation	10.18	10.43
Sample Variance	103.73	108.83
Confidence Level (95.0%)	1.17	1.19

Table 2: Level of difficulties of emotion regulation (in percentage)

Emotion Regulation	**Poor**	**Moderate**	**Good**
122 Female	25%	57%	19%
174 Male	23%	60%	17%
Total = 296	**24%**	**58%**	**18%**

Table 2 presents the level of difficulties of emotion regulation (in percentage). The data shows that only 18% adolescents are in emotion regulation where as a significant high number of adolescents are poor (24%) in regulating their emotions and 58% are moderate in emotion regulation. Various research studies have demonstrated the association between inappropriate or ineffective emotion regulation and depression and anxiety disorders and that lack of emotion regulation leads to the development and maintenance of these disorders (Barlow et al., 2004; Berking & Whitley, 2014; Campbell-Sills et al., 2006a; Campbell-Sills et al., 2006b; Kashdan & Steger, 2006; Kashdan et al. 2006; Mennin, 2006; Sumida, 2010). Several other research studies have supported the role of effective emotion regulation in enhancing psychological health and reducing psychological disorders or emotional problems (Aldao, et.al. 2014 and DeSteno, et. al. 2013).

Table 3: Level of mental well-being (in percentage)

Mental well-being	**Flourishing**	**Moderate**	**Languishing**
122 Female	39.3%	53.3%	7.4%
174 Male	32%	62.1%	5.7%

Total = 296	**35.1%**	**58.5%**	**6.4%**

Table 3 shows that overall 6.4% of adolescents are languishing, 58.5 % are having moderate level of mental well-being and only 35.1 % adolescents are flourishing which is quite an alarming figure. On gender wise comparison, female adolescents found to be languishing more (7.4%) than their counterparts (5.7%). This difference was also visible in level of flourishing where female adolescents found to have better flourishing mental health (39.3%) than the male adolescents (32%). Several previous studies have recognised the role of age and sex in the dimensions of psychological well-being (Keyes & Ryff, 1998; Marmot et al., 1998; Ryff & Singer, 1996). According to Ryff and Singer (1996) women valued themselves higher on positive relations with others and personal growth irrespective of their age whereas boys valued themselves higher on environmental mastery and self-acceptance than girls (Sagone and De Caroli (in press).

Table 4. Showing the Pearson's correlation coefficient (r) between Emotion Regulation and Mental well-being.

Variables	
Difficulties in Emotion Regulation	
Mental Health Continuum	-0.22

*Significant at 0.01 level

	A	C	G	I	N-A	S	DER	EWB	SWB	PWB	MHC
Awareness	1										
Clarity	0.14	1									
Goals	-0.09	0.22	1								
Impulse	0.00	0.30	0.41	1							
Non-Acceptance	-0.15	0.21	0.31	0.17	1						

Strategies	-0.10	0.24	0.46	0.43	0.21	1					
Total DER Score	0.15	0.57	0.70	0.72	0.54	0.67	1				
Emotional Well Being	-0.12	-0.16	-0.17	-0.16	-0.06	-0.15	-0.24	1			
Social Well Being	-0.02	-0.14	-0.08	-0.12	0.03	-0.07	-0.12	0.35	1		
Psychological Well Being	-0.14	-0.12	-0.14	-0.12	-0.03	-0.12	-0.20	0.51	0.36	1	
Total MHC Score	-0.12	-0.17	-0.16	-0.16	-0.01	-0.14	-0.22	0.73	0.75	0.83	1

Table 4 above reveals that there is a significant negative correlation between emotion regulation and mental well-being (r = -0.28), indicating "more the difficulty in emotion regulation less is the mental well-being". *Thus the null hypothesis Ho2 which states that, "there is no significant relationship between emotion regulation and mental well-being among Indian Adolescents" stands rejected.* Many investigators have supports the result findings (Mulkey, 1999; Adewuyi, 2010; Nelson, 2010 & Yildirim, 2012). One of the study by Martinez-Pons (1997) reveals that individuals who have higher level of emotional intelligence experience better mental health; Gohm and Clore (2002) also reported in their study the positive correlation between self-reported emotional intelligence is related to self-reported well-being. Research also shows that individuals with high emotional intelligence report fewer clinical symptoms, such as anxiety and depression (O'Connor and Little, 2003) and Bar-On (2000) reported various measures of mental health are related with emotional intelligence. Gupta and Shusil (2010) have also found the positive correlation between emotional intelligence and mental health among college students in their study. Evidence from the previous research is consistent with these results.

DISCUSSION

The current study was designed to see the relationship between emotion regulation and mental wellbeing among adolescents. The findings from this study, as hypothesized, revealed that

adolescents who experiences low level of difficulties in emotion regulation have higher level of mental health and well-being and more the difficulty in emotion regulation less is the mental well-being.

The Result findings supported previous researches where results show that emotion regulation strategy use, mental health, and social outcomes all play important and interrelated roles in adolescent wellbeing (Chervonsky, & Hunt, 2019). There is a consistent body of evidence from self-report studies that disruptions to emotion regulation capacities are associated with greater likelihood of experiencing anxiety and depression in adolescence. There is also evidence suggesting that these disruptions to emotion regulation are predictive, rather than sequelae, of future psychopathology ((Aldao, et.al, 2014; Chervonsky, & Hunt, 2019; DeSteno, Gross, & Kubzansky, 2013).

Understanding difficulties faced by emotion regulation in adolescents is critical for developing and improving the existing programs for emotional regulation or developing emotional intelligence or competence interventions for adolescents' mental health and wellbeing.

RECOMMENDATIONS

The findings of this study are relevant in that they reveal the high level of difficulties in regulating their emotions faced by adolescents and as a result negatively impact their mental health. It is very important to focus on building the emotional competence and emotion regulation of the adolescents as it can cost very high in terms of their mental health, academics success, relationships with significant people in their life and later in adult life their overall adjustment and happiness. Hence it is important that parents and schools start focusing on building the emotional intelligence and regulation as an urgent need of the hour. It is crucial to understand that to implement an emotional competency/intellgence program in schools, it should be based on solid theoretical framework. It should specify the program goals and strategies for the chosen emotional competency/intellgence program framework. Salovey et al. (1999) suggested that EI programs should be integrated in the academic program, and should not just be an extra, separate ―seminar-workshop, or additional course. The idea is to complement regular academic subjects with lessons and practice on emotional competencies, such as how to handle stress, anxiety, and frustration in a statistics class.

References

Ahmed, S. P., Bittencourt-Hewitt, A., & Sebastian, C. L. (2015). Neurocognitive bases of emotion regulation development in adolescence. *Developmental cognitive neuroscience*, *15*, 11–25. https://doi.org/10.1016/j.dcn.2015.07.006

Aldao, A., Jazaieri, H., Goldin, P.R. & Gross, J.J. (2014). Adaptive and maladaptive emotion regulation strategies: Interactive effects during CBT for social and anxiety disorder. *Journal of Anxiety Disorders*; 28:382-389.

Barlow, D. H., Allen, L. B. & Choate, M. L. (2004). "Toward a unified treatment for emotional disorders." *Behavior Therapy,* vol. 35, no. 2, pp. 205–230.

Campbell-Sills, L., Barlow, D. H., Brown, T. A. & Hofmann S. G. (2006). "Acceptability and suppression of negative emotion in anxiety and mood disorders." *Emotion*, vol. 6, no. 4, pp. 587– 595.

Chervonsky, E. & Hunt, C. (2019). Emotion regulation, mental health, and social wellbeing in a young adolescent sample: A concurrent and longitudinal investigation. *Emotion*, 19 (2), 270-282.

DeSteno, D., Gross, J.J. & Kubzansky, L. (2013). Affective science and health: The importance of emotion and emotion regulation. *Health Psychology*; 32:474-86.

Horowitz, J. L., & Garber, J. (2006). The prevention of depressive symptoms in children and adolescents: A meta-analytic review. *Journal of consulting and clinical psychology*, *74* (3), 401–415. https://doi.org/10.1037/0022-006X.74.3.401

Ge, X., Conger, R. & Elder, G. (2001). Pubertal transition, stressful life events, and the emergence of gender differences in adolescent depressive symptoms. *Developmental Psychology*, 37, 404–417.

Guerra-Bustamante, J., León-Del-Barco, B., Yuste-Tosina, R., López-Ramos, V. M., & Mendo-Lázaro, S. (2019). Emotional Intelligence and Psychological Well-Being in Adolescents. *International journal of environmental research and public health*, 16(10), 1720. https://doi.org/10.3390/ijerph16101720.

Joy, M. & Mathew, A. (2018). Emotional Maturity and General Well-Being of Adolescents. *IOSR Journal of Pharmacy* www.iosrphr.org, Volume 8, Issue 5 Version. I (01-06). (e)-ISSN: 2250-3013, (p)-ISSN: 2319-4219.

Kashdan, T. B., Barrios, V., Forsyth, J. P. & Steger, M. F. (2006). "Experiential avoidance as a generalized psychological vulnerability: comparisons with coping and emotion regulation strategies." *Behaviour Research and Therapy*, vol. 44, no. 9, pp. 1301–1320.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of general psychiatry*, *62*(6), 593–602. https://doi.org/10.1001/archpsyc.62.6.593

Keyes, C. L. M., & Ryff, C. D. (1998). *Generativity in adult lives: Social structural contours and quality of life consequences.* In D. P. McAdams & E. de St. Aubin (Eds.), Generativity and adult development: How and why we care for the next generation (pp. 227-263). Washington, D.C.: American Psychological Association

Marmot, M. G., Fuhrer, R., Ettner, S. L., Marks, N. F., Bumpass, L. L., & Ryff, C. D. (1998). Contribution of psychosocial factors to socioeconomic differences in health. *Milbank Quarterly,* 76 (3), 403-448

McLaughlin, K. A., Hatzenbuehler, M. L., Mennin, D. S., & Nolen-Hoeksema, S. (2011). Emotion dysregulation and adolescent psychopathology: a prospective study. *Behaviour research and therapy*, *49*(9), 544–554. https://doi.org/10.1016/j.brat.2011.06.003

McRae, K., Misra, S., Prasad, A. K., Pereira, S. C., & Gross, J. J. (2012). Bottom-up and top-down emotion generation: Implications for emotion regulation. *Social Cognitive and Affective Neuroscience*, 7(3), 253-262.

Mennin, D. S. (2006). "Emotion regulation therapy: an integrative approach to treatment-resistant anxiety disorders." *Journal of Contemporary Psychotherapy*, vol. 36, no. 2, pp. 95–105, 2006.

Mikolajczak, M., & Desseilles, M. (2012). *Traité de régulation des émotions*. De Boeck Supérieur.

Ryff, C.D., & Singer, B. (1996). Psychological well-being: Meaning, measurement, and implications for psychotherapy research. *Psychotherapy and Psychosomatics*, 65, 14-23.

Sasikumar, J. (2018). Emotional Intelligence and Social Adjustment among Adolescent Students. *American Journal of Social Science Research*, Vol. 4, No. 1, 2018, pp. 16-21 http://www.aiscience.org/journal/ajssr ISSN: 2381-7712 (Print); ISSN: 2381-7720 (Online)

Singh, S., Roy, D., Sinha, K. , Parveen, S., Sharma, G. & Joshi, G. (2020). Impact of COVID-19 and lockdown on mental health of children and adolescents: A narrative review with recommendations. *Psychiatry Research,* Volume 293, 2020, ISSN 0165-1781, https://doi.org/10.1016/j.psychres.2020.113429.

Theurel, A. & Gentaz, E. (2018).The regulation of emotions in adolescents: Age differences and emotion-specific patterns. *PLoS ONE*, 13, e0195501.

Wapaño, M. R. R. (2021). Emotional Intelligence and Mental Health among Adolescents. *International Journal of Research and Innovation in Social Science (IJRISS),* V (V). ISSN 2454-6186.

17.

Software assisted Vocal Response Analysis and Assessment and Management of Autism using AI-ML models

Authors: *Soma Khan[1], Tulika Basu[1], Madhab Pal[1], Rajib Roy[1], Joyanta Basu[1], Babita Saxena[2], Sunia Arora[2], Karunesh Kumar Arora[2], Keertisudha Rajput[3], Hemant Singh Keshwal[3]*

CDAC Kolkata[1], CDAC Noida[2], NIEPID[3]

Abstract

Present work focuses on design and development of an Artificial Intelligence and Machine Learning (AI-ML) based framework for software assisted assessment of Autism in children, using automated analysis and recognition of vocal responses following Speech-Language and Communication criteria under Indian Scale for Assessment of Autism (ISAA). Human acted and flashcard based audio-visual digital stimuli have been designed (in Hindi, Bengali and English languages) to interact with the children and capture appropriate verbal (or non-verbal) responses. A software based data collection framework has been designed in consultation with experts to present the stimuli and record audio-visual responses from children. Sequence and number of presented stimuli can be changed as per child's responses or assessment requirement. Recorded interactions are then manually diarized, labelled and classified within seven different response classes (like, Child Speech, Clapping, Echolalia, Non-speech, Repetitive Speech, Unusual Noises and Pronoun Reversal) along with Stimuli prompts and Instructor's prompts to train respective ML models for automated detection of similar events (as system's observation) during assessment time.

Assessor can accept or rectify system's observations to provide criteria specific gradings, by comparing with pre-defined thresholds (of occurrences) in ISAA. Final assessment score is generated by consolidating such gradations from all the ISAA criteria.

Keywords

Autism assessment, Vocal response analysis, ISAA, Speech-Language and Communication

1. Introduction

Autism is the world's third most common developmental disability, a neurological illness that usually manifests by the age of three. In India, prevalence rate of autism is approx. 1 in 500 or 0.20% or more than 2,160,000 people [1] and incidence rate is approx. 1 in 90,666 or in around 11,914 people. As per experts, a quarter of children with autism spectrum condition have a regression in language or social abilities, most commonly between the ages of 18 and 24 months. With these alarming figures and incidence rate of autism in India, diagnosis and intervention of the same at the right time becomes very much necessary. Hence, dependency on the autism assessor side is much increasing following any of the standard assessment protocols with the traditional and existing pen-paper based assessment procedure. This scenario sets for the basic background to work out for ICT based automation framework for the autism assessment process and generating Artificial Intelligence and Machine Learning (AI-ML) guided decisions that can

be accepted or modified under supervision of an expert psychiatrist. Moreover, often during enormous patients load, in national level autism diagnostic centres and private clinics, machine generated second opinion may help in unbiased diagnose by psychiatrists within limited timeframe and generating correct assessment results.

We particularly focus here in our work, on the Language, more specifically the Spoken Language, one of the core areas, which is particularly affected and exhibits an undeniable feature in autism diagnosis. Behaviourally, children with autism do not orient naturally to vocal stimuli as their age matched typically developing (TD) children do, as per [2], [3]. They usually produce some peculiar vocal or nonspeech sounds and sharp vocal noises, often repetitive in nature, which are very typical to children with autism or having autism features. However, all these speaking behaviours, though spotted by parents or care givers in regular observations of the child while the early growth years, but can only be meaningfully marked, quantified and specifically noted during autism assessment by an experienced psychiatrist, special educator or autism therapist under the Speech-Language communication and Social behaviour related assessment criteria. All the well-known standard autism measures or assessment scales like CARS (Childhood Autism Rating Scale) [4], INCLEN [5], ADOS (Autism Diagnostic Observation Schedule) [6] etc. and more recently ISAA (Indian Scale for Assessment of Autism) [7] in Indian scenario, includes specific assessment criteria for analysing the vocal (or speech) response features to diagnose autism in young children.

2. Objective

This paper describes a process of software assisted autism assessment using ICT based framework and an indigenously developed system to capture and analyse vocal responses of children using AI-ML based methods. Vocal response capture and analysis is done as per some of the ISAA based assessment criteria related to Speech-Language and Communication difficulties as seen in autistic children. Software generated feedback will assist psychiatrists or autism therapists during autism assessment sessions.

At first, a criterion based specially designed audio-visual stimulus is presented before the child (at risk of autism) and then vocal (or speech) response of the child is captured by the software. Therapist can change the type of stimuli as per response level or assessment requirements. The captured vocal responses are then diarised (to extract child only response parts), analysed, labelled and trained using ML methods. These trained ML models are afterwards used to classify and recognise future vocal responses and auto-generate feedbacks on the observed type of child responses (like unusual noises, speech, silence, repetitive speech etc.) that the human assessor can accept or modify to consolidate and calculate final assessment scores using ISAA. Thus the entire framework assists an expert or novice psychiatrist in a meaningful way for correct diagnosis of autism, helps in reducing the workload and sole dependency on the human assessor, and also at the same time serves a substantial number of children for timely diagnosis and initiation of intervention mechanism. We have followed ISAA based autism assessment criteria throughout all the steps of our study and software framework development.

3. Vocal Response based Autism assessment criteria

ISAA includes mainly six sub domains, like, Social Relationship and Reciprocity, Emotional Responsiveness, Speech-Language and communication, Behaviour patterns, Sensory Aspects and

Cognitive component, constituting a total forty numbers of assessment criteria. We mainly focused on the following ten criteria under Speech Language and Communication and Cognitive component:

- Acquired speech and lost it (criteria number 15 in ISAA)
- Has difficulty in using non-verbal language or gestures to communicate (criteria 16 in ISAA)
- Engages in stereotyped and repetitive use of language (criteria 17 in ISAA)
- Engages in echolalic speech (criteria 18 in ISAA)
- Produces infantile squeals/ unusual noises (criteria 19 in ISAA)
- Unable to initiate or sustain conversation with others (criteria 20 in ISAA)
- Uses jargon or meaningless words (criteria 21 in ISAA)
- Uses pronoun reversals (criteria 22 in ISAA)
- Unable to grasp pragmatics of communication (real meaning) (criteria 23 in ISAA)

- Shows delay in responding (criteria 38 in ISAA under cognitive component)

All the above mentioned ISAA criteria are included in our study for audio-visual stimulus design, whereas items of number 17, 18, 19, 20, 21 and 38 is included for vocal response analysis and AI-ML based processing for feedback generation while autism assessment.

4. Methodology

The methodology consists of a number of steps starting from criteria specific approach planning, stimuli design, vocal response capture software development, response statistics based processing of the captured responses and finally ML based model training for feedback generation while assessment from vocal (speech) responses.

4.1. Criteria grouping and approach planning

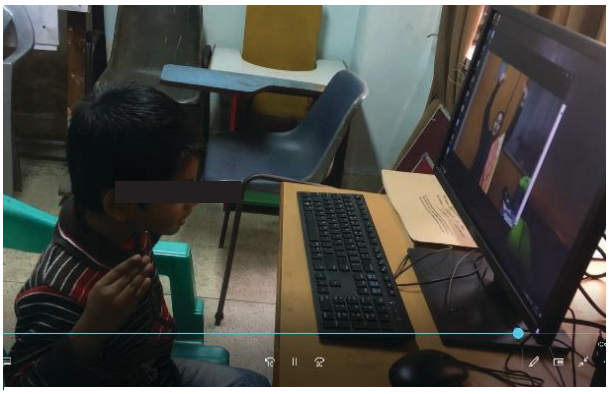
As per type of the response to be adjudged by the above mentioned ISAA criteria and later analysis by ML models, these are tied together into some small number of sub-groups, for which, same audio-visual stimuli to be used for response capture, analysis and training of ML models. Criteria number 15 is mostly ascertained from parental interview, so no stimuli are planned for this. Such different sub-groups are created with criteria 16, criteria 17 & 18 merged, criteria 19 & 21 merged, criteria 20 and criteria 22 & 23 merged for response capture. Criteria 38 is fulfilled seeing the observations of the other sub-groups, hence no specific stimulus is planned for this. As repetitive speech, echolalia, unusual noises are inherent in autism and are found naturally, no specific stimulus are also planned for criteria 17 & 18 merged and criteria 19 & 21 merged sub-groups, and responses are captured from entire session recordings.

4.2. Design of Stimulus

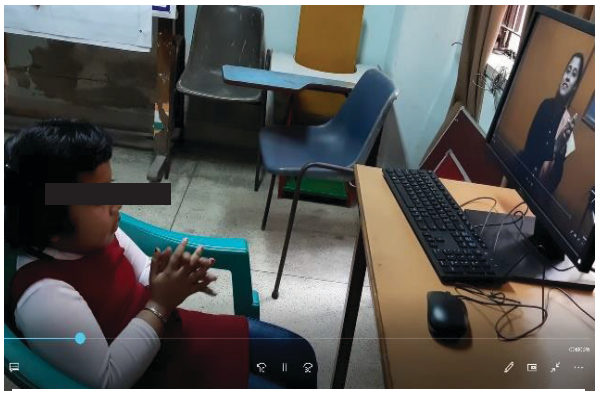
Thus after criteria specific approach planning, next step at our end was to design the sets of Stimulus with close interaction of autism experts and practitioners. Two types of audio-visual stimuli is designed and developed to invoke and capture audio response from children with autism for training of AI/ML based models. Those are, Human acted stimuli videos and 2D avatar based flash card stimuli videos.

4.2.1. Human acted Stimuli videos

Human acted stimulus is important to start initial interactions with the child (at risk of autism) and to make them easy with the computer based data collection setup, where they would feel the urge to speak and not simply watch silently, like they usually do while watching mobile or television at home. For ISAA criteria specific response analysis, a total of 12 human acted stimuli videos in each of the Hindi and Bengali languages are created initially by a lab member and then the same followed by 2 special educators working in this field as instructors. Some snapshots of such stimuli videos with children activity are shown below in figure 1.



Child following stimuli, Raise your hands!..

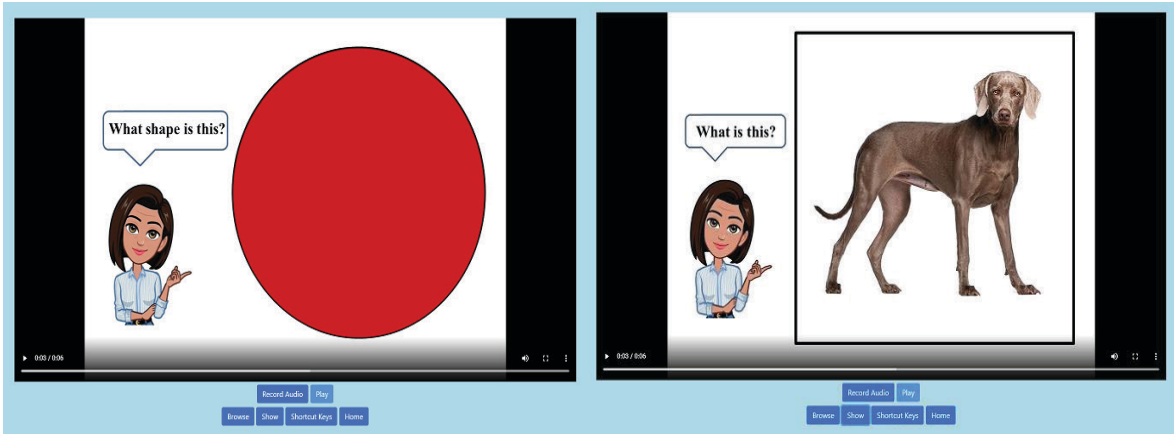


Child following stimuli, Clap your

Figure 1. Children are trying to follow human acted stimuli videos at NIEPID, Kolkata

4.2.2. Avatar based Flash cards Stimuli videos

Being shown at first to initiate interactions, responses from the child are quite uncertain from showing human acted stimuli videos and most of the criteria are to be adjudged from entire session recordings. While the amount of vocal/speech response data needs to be enhanced for AI-ML based model training. Hence the other type, Flash card based stimuli videos are designed to capture short word specific speech responses in a state forward way. Samples of such videos are presented in figure 2 below.



What shape is THIS?

What is THIS?

Figure 2. Samples of Flash card based animated Stimuli videos

- Flash Card based digital stimuli are designed in Bengali, Hindi & English languages (with all kinds of vowel-consonant combinations) to capture quick responses from verbal children and to enhance data amount for AI-ML based model training.
- Animated avatar videos are designed in these stimuli sets to attract the children.
- Total 9 categories of object images are shown as digital Flash cards, like Fruits, Vegetables, Food items, Colours, Shapes Animals, Household things, Activity and Vehicles. Each category includes 5 videos; hence total 45 numbers of videos are designed for each of the Bengali, Hindi and English languages.

Thus, a total ((12*2)*2 + (9*5)*3 =) 183 videos were designed by the practitioners (special educator, autism assessor) from NIEPID RC, Kolkata and all the stimulus contents, stimuli duration, sequences etc. were validated as per advice and discussion with eminent autism experts in India.

4.3. Vocal response capture Framework

Three types of audio data collection processes are planned and a web based software framework is developed to include all these three types of processes.

*4.3.1. **Stimuli Based response collection from child***

- Suitable for both verbal & non-verbal children, who are having ***medium to high sitting tolerance level*** and showing less self stimulating behaviour
- Child needs to be seated in front of the data collection set-up and give responses on seeing the played audio-visual stimuli
- Helpful in getting audio responses more prominently and directly, less human efforts required for diarization before AI/ML model training
- Data collection for ISAA criteria no. 16, 17, 20, 22, 23 are being facilitated

*4.3.2. **Entire Session Audio/Video Recording***

- Essential for Non-verbal children. Suitable specifically for ***children with less sitting tolerance level*** or showing more self stimulating behaviour
- No stimuli are shown as per ISAA criteria, so process doesn't expect child to sit in-front of the data collection setup and respond accordingly
- More efforts are required on the diarization before AI/ML model training
- Data collection for ISAA. 17, 18, 19, 21 & 38 are being facilitated

*4.3.3. **Offline upload of pre-recorded response audio files***

- Data collection using other than the lab based data collection set-up like using mobile phone, voice recorder etc. whenever child response is found to be good.
- No stimuli needed, only natural data to be recorded by parents, caregiver etc. at home or other surroundings
- Later those files can be uploaded into the data collection system for processing

4.3.4. ***Response Data collection software***

A software based universal framework has been designed mainly for response capture and storage for post processing of the same. The software includes some unique features like, child wise enrolment with unique registration ID, basic metadata information and parent's consent, browsing, loading and playing of child specific audio-visual digital stimuli, stimulus based audio and also entire session audio-visual child's response capture, date wise, session wise structured storage of captured data and also modular integrity for easy integration with speaker diarization, speech analysis and backend training of AI-ML modules. Some screen shots of the data collection software is given below in figure 3 and figure 4.

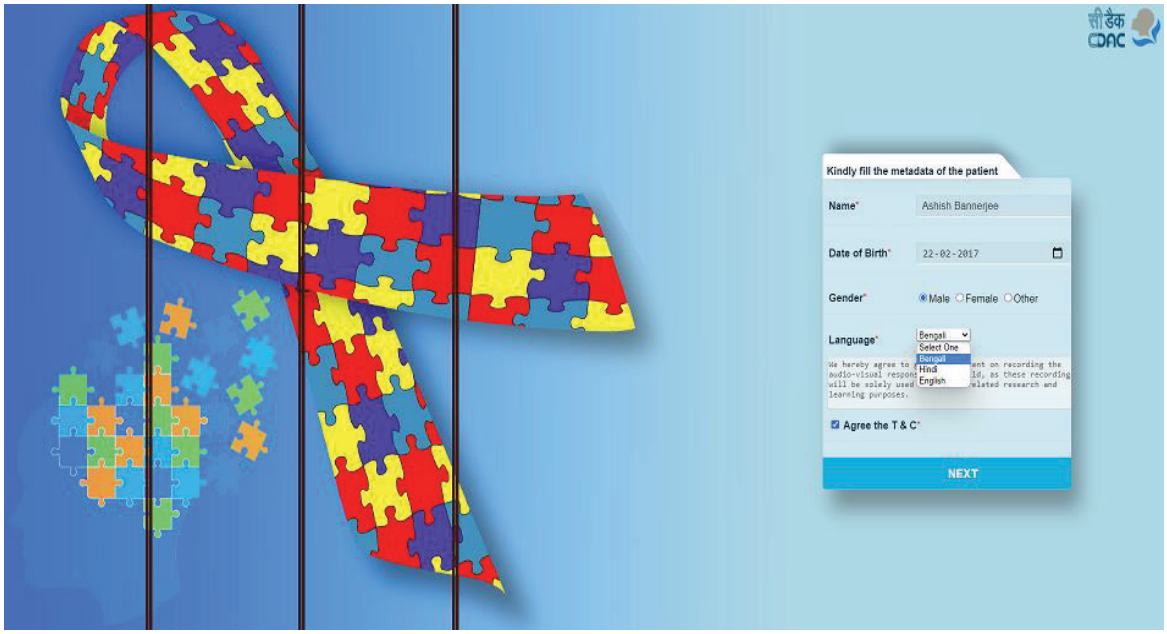


Figure 3. Screenshot of the developed audio & video data collection software

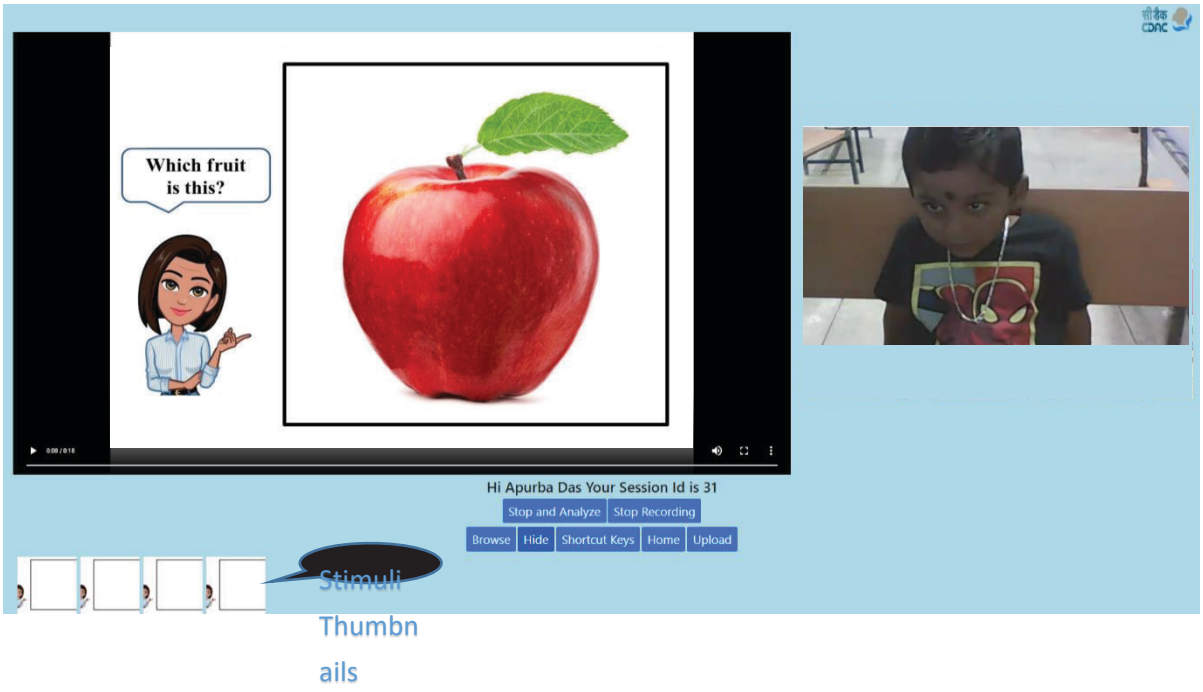


Figure 4. Screenshot of software showing Flash card based animated stimuli and response capture from children

4.4. Response Annotation, Analysis and Statistics

4.4.1. Child Response annotation

Before AI-ML based training, preparing an annotated and labelled corpus of different types of vocal responses is necessary. So for that, Audio recordings were collected from the software and were analyzed in audio data editing softwares (like cool edit pro, praat etc.) for marking criteria specific child responses and annotating with proper labels under 7 categories of response folders as shown in the below table 1.

Table 1: criteria specific child response category

ISAA criteria of Speech Language assessment	Related child response in audio recordings
16. Has difficulty in using non-verbal language or gestures to communicate	Child Clapping
17. Engages in stereotyped and repetitive use of language	Repetitive speech
18. Engages in Echolalic Speech (may repeat or echo questions or statements made by other people)	Echolalic speech
19. Produces infantile squeals /unusual noises	Unusual Noise
20. Unable to initiate or sustain conversation with others	Child Speech
21. Uses Jargon or meaningless words	Non Speech
22. Uses Pronoun Reversal (reversed pronouns like "I" for You".)	Pronoun Reversal

4.4.2. Response statistics

Total number of audio data collected from children (during autism assessment) at NIEPID, RC, Kolkata and Noida centres is, (82 +70) = 152 children. Among these, the checked audio data taken for annotation at CDAC Kolkata and Noida centres are, from (76 + 68) = 144 children; i.e. no response achieved in total 8 children among the 152 children. Data collection in Hindi language is done for 4 children at NIEPID, Regional Centre, Kolkata and for all the children at NIEPID, RC, Noida centre. Responses were also collected from 4 children having autistic Features (with borderline ISAA scores like 68 or 69 etc.). Amount of data in different response classes and distribution of different responses as per source number of children is shown below in figure 5 and figure 6 respectively.

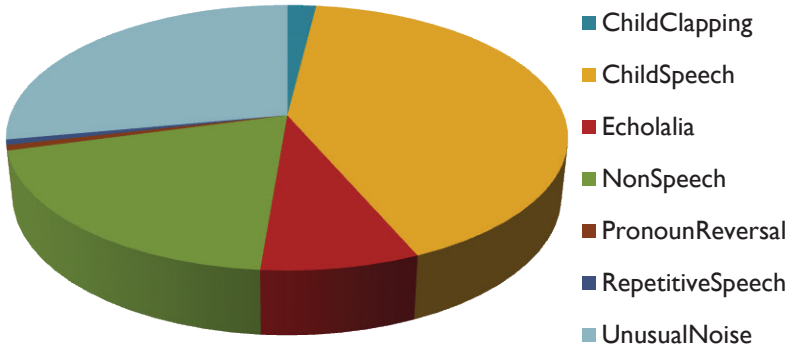


Figure 5. Amount of response data in different types of response classes

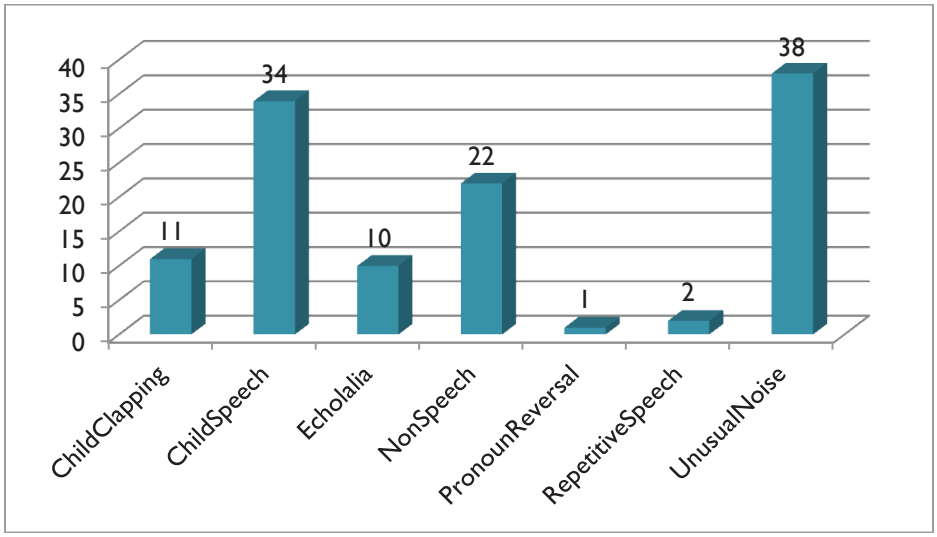


Figure 6. Distribution of different responses in number of children

4.4.3. Response analysis and observations

Some interesting observations are sighted from the response annotation, analysis and response statistics generation. All the children shown interest to the computer based data collection software and most of them were attentive during their respective sessions. Pronoun reversal and Repetitive speech are found to be very rare (at least within the checked audio data of presently collected sample data). While, unusual noises, nonspeech and Echolalia are the most common responses found in all the children audio data. Much amount of the meaningful and complete child speech response data is contributed from children having autistic features. Children with autism sometimes produced incomplete speech data, like “ah” for Apple, “bah” for bottle etc. or mispronounced speech data like “onange” for Orange for inherent difficulties due to Autism, but in a meaningful way within the expected time frame given for child response capture.

4.5. AI-ML based response modelling

In our work, the field collected and annotated audio (vocal, speech or non-speech) responses from the children (at risk of autism) are used to build AI-ML based models for the following tasks:

- Voice Activity Detection (VAD) (for calculating speaker sound and silence timings and response delays)
- Speech vs. Non-speech detection (like, jargon or meaningless words, random combinations of vowel consonants not defined as valid words in that language)
- Speaker noise identification (like, infantile squeals, humming, hissing, whistling, screaming, yelling, clapping etc.)
- Recognition of emotions like Anger, Fear, Surprise, Happiness from vocal, speech or non-speech responses from emotion specific labelled data (validated by instructor and experts)

Substantial amount (at least response from 200 children) of annotated and labelled data is then used to train the above mentioned AI-ML based models (using ML algorithms like, K Nearest Neighbourhood, Decision tree, Random forest etc.) to classify and automatically detect initially the silence regions, Child clapping, child's speech and unusual noises. Later more precise classification models are built among the speech part of labelled data to identify non-speech, repetitive speech and Echolalia along with application of small vocabulary ASR. After training part these models are used to detect similar events from live responses of children in further interactions and generate results in terms of Frequency and Duration of similar events and thus assist the psychiatrists or assessor while autism assessment process following ISAA.

5. Conclusion

The present work broadly discussed on an indigenous effort for ICT based software assisted assessment and management of Autism with a focus on the Speech–Language and communication related assessment criteria. However, a large number of variations are found within each response types (intra-response category) annotated from different children, that clearly dictates the immense variability of child responses. We foresee to collect more amounts of data from children at different parts of our country for having better ML models and also accurately detecting different types of audio responses using the computer based data collection setup. This is a unique and first of its kind experiment and exploration type study with real time collected field audio data from autistic children using in-house developed data collection software framework and also having some interesting observations that could be followed in future developments with the similar aim of assisting human assessor for assessment of autism.

References

[1] http://www.wrongdiagnosis.com/a/autism prevalence.htm

[2] Dawson, G., Toth, K., Abbott, R., Osterling, J., Munson, J., Estes, A., etal. (2004). Early social attention impairments in autism: social orienting, joint attention, and attention to distress. *Dev. Psychol.* 40, 271–283. doi:10.1037/0012- 1649.40.2.271

[3] Kuhl, P.K., Coffey-Corina, S., Padden, D., and Dawson, G. (2005). Links between social and linguistic processing of speech in preschool children with autism: behavioural and electrophysiological measures. Dev. Sci. 8, F1–F12. doi:10.1111/j.1467-7687.2004.00384.x

[4] Chlebowski, C., Green, J.A., Barton, M.L., Fein, D. Using the childhood autism rating scale to diagnose autism spectrum disorders. Autism Dev Disorder. 2010 Jul; 40 (7): 787-99. doi: 10.1007/s10803-009-0926-x. PMID: 20054630; PMCID: PMC3612531.

[5] Juneja, M., Mishra, D., Russell, P., Gulati, S., Deshmukh, V., T, Poma, Sagar, R., Silberberg, D., Bhutani, V., Pinto, J., Durkin, M., Pandey, R., Nair, M., and Arora, N. (2014). INCLEN diagnostic tool for autism spectrum disorder (INDT-ASD): Development and validation. Indian paediatrics. 51. 359-65. 10.1007/s13312-014-0417-9.

[6] Akshoomoff, N., Corsello C, Schmidt H. (2006). The Role of the Autism Diagnostic Observation Schedule in the Assessment of Autism Spectrum Disorders in School and Community Settings. Calif School Psychol. 2006; 11:7-19. doi: 10.1007/BF03341111. PMID: 17502922; PMCID: PMC1868476.

[7] https://thenationaltrust.gov.in/upload/uploadfiles/files/ISAA%20TEST%20MANNUAL(2).pdf

18.

Automatic Assessment of Autism using Eye gaze, Visual Attention and Facial Expression as an Assistive Technology Tool

Mr Kunal Chanda, Mr Souvik Banik, Mr Washef Ahmed

Advanced Signal Processing Group, Image Processing Section
Centre for Development of Advanced Computing (C-DAC)

kunal.chanda@cdac.in,souvikbanik92@gmail.com,washef.ahmed@cdac.in

Abstract

Present study aims to develop an automatic assessment tool for children with Autism. For this purpose, fifteen ISAA parameters are considered. A pilot study was conducted on 131 participants, (mean age- 6.4 years; range 3- 8 years) both male and female students from specially abled and normal schools, to assess based on response captured. Out of the 131 participants, 80 participants were from special schools (assessed based on 40 ISAA parameters by expert psychologists) and 51 participants were from normal schools. Also out of 131 individuals, 94 - males (mean age 6.6, SD 1.9) and 37 - female (mean age 5.9, SD 1.8) participated in the study from different institutes of Kolkata covering significant developmental age. Participants were instructed to visualize the stimuli presented in front of them. The stimuli were designed to capture responses based on ISAA parameters grouped together addressing different traits of Autism. Natural invocation of the responses was captured and evaluated generating a score using eye tracker and webcam. The computer generated score was compared with their initial findings. Out of the 51 TD students, all were correctly identified as TD while out of 80 ASD students, true positive was 67 giving an accuracy of 84%.

Keywords—Human Computer Interaction, Facial Expression Analysis, Visual Attention, quantification of score, human psycho-visual judgment, social interactions, autism.

1. Introduction

People suffering from autism have difficulty regarding eye gaze, attention and recognizing other people's emotions and are therefore unable to react to it. Although there have been attempts aimed at developing system for analyzing eye gaze, visual attention and facial expressions, very little has been explored for capturing for autism assessment. This is essential as psychotherapeutic tool for analysis during counseling. Recent psychological studies suggests that to understand human emotion only classifying attention state and expression into six basic categories is insufficient while the detection of intensity of attentive state and expression is important in the practical application of assistive tool.

This paper presents the idea of capturing responses based on eye gaze, visual attention and facial expression. In the proposed framework we developed a method to extract flow of moving facial muscles or organs based on gradient based optical flow from video sequences

and analyze it with some specific parameters to recognize facial expressions. For this we have ensured adequate region of interests based on aspect ratio of face and head tilt within ±15º, to enhance quality of features, most suitable, for estimation of expression intensity. After the generation of optical flow feature vector we used Decision Tree based classifier which is used to recognize one or more expressions for a given frame in a video sequence. This coupled with the computation of Manhattan distance function gave us the measurement of the intensity of expressions.

Likewise for eye gaze and visual attention, eye movements have been captured based on the stimuli designed and displayed. Each stimuli had specific regions of interest based on which intensity of eye gaze and attention state has been determined. The stimuli has been designed keeping in view to capture responses for fifteen Indian Scale for Autism Assessment (ISAA) parameters. Performance of the system is validated by human psycho-visual judgment. Out of the 131 participants, 80 participants were from special schools (assessed based on 40 ISAA parameters by expert psychologists) and 51 participants were from normal schools. The system finds use in the treatment of mental and emotional disorders (like patients suffering from autism with low IQ) through the use of psychological techniques designed to encourage communication of conflicts and insight into problems, with the goal being relief of symptoms, changes in behavior leading to improved social and vocational functioning and personality growth. For usage as a psychotherapeutic tool it is essential to capture accurately proper eye movement, eye gaze, attention state and one or more expressions from mixed expressions and also to keep records of intensity of expression so as to find quantification of score for fifteen ISAA parameters leading to finding presence of autistic traits if any within a child.

2. Background

Faces are an important communication vector. Through facial expressions, gaze behaviors and head movements, faces convey information on not only a person's emotional state and attitudes, but also discursive, pragmatic and syntactic elements. A facial expression is indeed an important signature of human behavior caused due to change in the facial muscles arrangement in response to a person's internal emotional states. For psychologists and behavioral scientists, facial expression analysis and their quantification has been an active research topic since the seminal work of (Darwin, 1965). (Ekman et. al, 1993) reported their result on categorization of human facial expressions as happiness, surprise, fear, disgust, sadness and anger. He further proposed that facial expressions are results of certain Facial Actions and they introduced the facial action coding system (Ekman & Friesen, 1978) designed for human observers to detect subtle changes in facial appearance.

Recent psychological studies (Ambadar, Schooler & Cohn, 2005) suggests that to understand human emotion only classifying expression into six basic categories is insufficient while detection of intensity of expression and percentage of each expression in case of mixed mode expression is important in practical application of human computer interaction.

Also eye movement, gaze and visual attention has been an active research area for behavioral analysis. However much research has not been observed in recognizing accurately

facial expressions and eye movement attention states for quantification and drawing inference of presence of autistic traits.

CDAC, Kolkata interacted with experts from NIEPID who expressed the need for development of an Automatic Assessment tool for Autism. A second opinion against existing human centric assessment. Presently an assessment criterion based on ISAA is followed.vBut the process involves full manual intervention by Therapist and Psychologists. The present work proposes to provide such an assistive tool to Psychologists.

3. Objective

The objectives are outlined as follows:

- Development of Automatic Assessment Tool for Autism based on Visual Attention (both Attention Analysis and Eye Gaze) and Facial Expression Recognition using Artificial Intelligence (AI).
- Development of Machine Learning based algorithms for accurate quantification of intensity (degree) of attention, expression and emotion for basic prototypic expressions.
- Development of training module (material and system) to improve cognitive, communication and emotion recognition skills of children with Autism.

4. Methodology

Sample and Participant Selection

Participants (N= 131, male= 94, female=37) from different parts of Kolkata and both from special schools and normal school took part in the study. Participants were categorized into two groups, from ASD schools 80 participants and from TD schools 51 participants. Data were collected from different schools and NIEPID centres. Incidental sampling technique was followed.

Criteria for Selection

Inclusion criteria

- Individuals above the age of 3 years and under the age of 8 years

Exclusion criteria

- Individuals above 8 years of age

Tools used

Information schedule:

The information schedule was prepared for this work with an aim to elicit the following information that is based on 15 Indian scale for Autism Assessment parameters, namely

- Inability to relate to people
- Difficulty in using non-verbal language to communicate

- Difficulty in tracking objects
- Has unusual vision
- Delayed response time
- Inconsistent attention and concentration
- Poor Eye Contact
- Lacks Social Smile
- Does not reach out to other persons
- Inability to respond to social and environmental cues
- Inappropriate emotional response
- Shows exaggerated emotion
- Lack fear of danger
- Excited or agitated for no apparent reason
- Stares into space for long period of time

Videos

For perceiving the intensity of emotional expression, eye movement, gaze and visual attention, standardized videos based on storyline and task based were selected. The duration of each video was on an average of 60 seconds. The stimulus videos based on storyline were designed to invoke emotions and addressed for certain ISAA parameters designed to capture while task based stimuli were designed to invoke eye movement and addressed for certain ISAA parameters responsible for capturing eye gaze and visual attention.

Procedure

A total of 6 stimuli video streams consisting of storylines and task based were selected to be presented as stimuli. Data collection was done one at a time in a calm and quiet setup. Sound of the laptop was kept audible for the narration to be heard clearly. Stimulus videos were presented to both the male and female participants across the two groups through monitor screen. The sequence of administering stimulus videos was kept constant. At first participants caregivers were asked to fill up the identification details and go through the printed instruction. Participants were instructed to observe the stimuli for natural invocation of the responses to be captured through eye tracker and web camera.

5. Discussion

In order to investigate the indigenous system developed, we have conducted a pilot study on 131 participants, (mean age- 6.4 years; range 3- 8 years) both male and female students from specially abled and normal schools, to assess based on response captured. Out of the 131 participants, 80 participants were from special schools (assessed based on 40 ISAA parameters by expert psychologists) and 51 participants were from normal schools. Also out of 131 individuals, 94 - males (mean age 6.6, SD 1.9) and 37 - female (mean age 5.9, SD 1.8) participated in the study from different institutes of Kolkata covering significant developmental age. Participants were instructed to visualize the stimuli presented in front of them. The stimuli were designed to capture responses based on ISAA parameters grouped together addressing

different traits of Autism. Natural invocation of the responses was captured and evaluated generating a score using eye tracker and webcam. The computer generated score was compared with their initial findings. Out of the 51 TD students, all were correctly identified as TD while out of 80 ASD students, true positive was 67 giving an accuracy of 84%.

For this a joint experiment has been conducted at special, normal schools and two NIEPID centres, Kolkata and Noida. The standardization of our system based on human validation technique would assist psychologists employ a range of techniques based on experimental relationship building, dialogue, communication and behavior change that are designed to improve the mental health of a child. It has been found that such children were unable to recognize and express normal human expressions. Psychologists can use the system as psychological techniques to encourage communication by proper expressions so as to help changes in behavior leading to improved social and vocational functioning and personality growth.

Our pilot study around 131 participants about the stimuli exhibited in each of the videos. Six sample videos (consists of one clip each based on storyline and task based) were shown to hundred thirty one participants and were instructed to observe the stimuli for natural invocations of their responses.

6. Analysis

For analysis of data Bayesian ANOVA among different groups consisting of ASD and TD was computed to see the difference.

Bayesian ANOVA

Output Created		16-JAN-2023 16:46:00
Comments		
Input	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	131
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.

	Cases Used	Only cases with valid data for all analysis variables are used in computing any statistics.
Weight Handling		not applicable
Syntax		BAYES ANOVA Total BY DataType /CRITERIA CILEVEL=95 /INFERENCE ANALYSIS=POSTERIOR /PRIOR TYPE=REFERENCE /PLOT ERRORVAR=FALSE.
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.03

7. Findings

As score based on 15 parameters were generated for both the groups of ASD and TD, total score generated was within 15 for each of the participants.

Bayesian Estimates of Coefficients[a,b,c]

	Posterior			95% Credible Interval	
Parameter	Mode	Mean	Variance	Lower Bound	Upper Bound
Data Type = TD	5.220	5.220	.066	4.718	5.722
Data Type = ASD	10.513	10.513	.043	10.106	10.921

a. Dependent Variable: Total

b. Model: Data Type

c. Assume standard reference priors.

The Bayesian estimates of coefficients clearly indicated the mean score to be around 5 for TD participants while 10 for ASD participants. This significant findings helps us to provide a strong threshold of 8 to distinguish between TD and ASD participants.

8. Conclusion

The system works as an assistive aid tool for psychotherapeutic analysis in the treatment of persons suffering from autism. It helps keep records of intensity of expressions and attention for a particular session of study or therapy. The system has two options, a response capture option in which live video stream is captured and analyzed on frame by frame basis and the other an analytics version for later analysis on the saved video stream followed by generation of scores. During the session the person suffering from autism is exhibited certain stimulus image sequences that are developed by expert psychologists. The individual stimuli so exhibited are chosen to be most scientifically suitable, based on consultations by psychologists. The responses in the form of intensity of expression, eye gaze and attention states are captured and stored. These contribute for classification by an Artificial Intelligence based model for classification into ASD and TD. These records help psychologists to analyze session wise progress of the affected person with presence of autistic traits present if any and ultimately contribute to the goal of improvement as an assistive tool.

9. Limitations

The present study has limitation regarding demographic variables. Participants only from different parts of Kolkata and Noida metropolis and surrounding were included. Thus, inclusion of other communities, languages and cultures could not be possible.

10. Recommendations

The study is performed with NIEPID Kolkata and Noida members and sincere contribution is acknowledged in this regard.

11. References

Darwin, C. (1965). The expression of Emotions in Man and Animals. Univ. Chicago Press. ISBN: 9780226136561.

Ekman, P. (1993). Facial expressions and emotion. American Psychologist, 48, 384-392.

Ekman, P. and Friesen, W.V. (1978). Facial Action Coding System (FACS). Manual. Pal Alto, Calf: Consulting Psychologists Press.

Ambadar, Z. ,Schooler, J and Cohn, J.F. (2005). Deciphering the enigmatic face, the importance of facial dynamics in interpreting subtle facial expression. Psychological Science. 16(5), 403-10.

Horn, B.K.P. and Schunck, B.G. (1981). Determing optical flow. Artificial Intelligence. Artificial Intelligence, 17, 185-203

Dunn, J.C. (1973). A Fuzzy Relative of the ISODATA Process and Its Use in Detecting Compact Well-Separated Clusters, Journal of Cybernetics, 3, 32-57, DOI:10.1080/01969727308546046

Viola, P. and Jones, M.J. (2004). Robust real-time face detection. International Journal of Computer Vision. 57(2), 137–154

Gupta, G.K. (2006). Introduction to data mining with case studies. Prentice Hall of India Private Limited.

Reilly, J., Ghent. J and McDonald, J. (2006). Investigating the dynamics of facial expression. Advances in Visual Computing, Lecture Notes in Computer Science 4292, 334-343

Bezdak, J.C. (1981) Pattern Recognition with Fuzzy Objective Function Algorithms. Advanced Applications in Pattern Recognition. Plenum Press, New York. ISBN: 978-1-4757-0452-5

19

Exploring the Scope and Efficacy of AI-Based Approaches for Children with Autism, Cerebral Palsy, Intellectual Disability, and Down Syndrome

Praveen Varghese Thomas

Introduction

Neurodevelopmental disorders (NDDs) are a heterogeneous group of ailments with early-onset cognitive, physical, social, and emotional deficits. ome of the most common NDDs include autism spectrum disorder (ASD), cerebral palsy (CP), intellectual disability (ID), and Down syndrome (DS).. These illnesses generally require complicated and long-term interventions to optimize outcomes and quality of life, which presents problems for afflicted children, their families, and healthcare professionals.

Due to its capacity to analyze enormous volumes of data, spot trends, and base choices on these patterns, artificial intelligence (AI) has recently attracted much interest in the healthcare industry. AI-driven treatments can completely change how we approach diagnosing, treating, and managing NDDs. These treatments use machine learning, AI algorithms, and other cutting-edge technology to create customized interventions that may change to meet each child's unique requirements.

This article aims to comprehensively examine the literature regarding AI-driven treatments for Children with certain NDDs. Study also aims to discover the most promising AI-driven solutions for improving outcomes and boosting the quality of life for children with ASD, CP, ID, and DS by evaluating the efficacy of various interventions. Additionally, this study will go through the difficulties and ethical concerns associated with NDDs, highlighting the requirement for a more thorough investigation and the creation of customized interventions.

Methodology

PRISMA criteria guided this systematic review. The process included formulating a research topic, eligibility criteria, a literature search, choosing studies, retrieving data, and analyzing bias.

Research Questions: "What is the effectiveness of AI-driven therapies for improving outcomes and quality of life in children with neurodevelopmental disorders, specifically ASD, CP, ID, and DS?"

Eligibility criteria: Studies were to focus on children with ASD, CP, ID, or DS, investigate AI-driven therapy, use a randomized controlled trial, cohort study, or case report design, and be published in English between 2015 and 2021. Studies that did not fit these criteria or focused on AI-driven diagnostic or assessment tools rather than therapeutic interventions were eliminated.

Study selection: After deleting duplicates, the authors assessed article titles and abstracts for eligibility. Full-text papers were retrieved for further evaluation if an abstract was unclear about eligibility. A third reviewer resolved disagreements.

Data extraction: Each study was extracted using a standard form. Study design, participant characteristics, AI-driven therapy description, outcome measures, and major findings were extracted. A third reviewer rectified any differences between the two data extractors.

After data extraction and bias evaluation, a narrative synthesis was done. Due to the variability of AI-driven therapy, outcome measures, and participant characteristics, a meta-analysis was not appropriate.

Results

This review included 12 papers after a literature search and study selection. These research included AI-driven therapy for children with ASD, CP, ID, and DS. The findings are summarised by neurodevelopmental condition below.

1.Autism Spectrum Disorder: Four research examined AI-driven therapy for Children with **ASD**. These research focused on social robots and VR therapies to promote social communication and interaction. Bekele et al. (2018) found that a personalized robotic system improved social engagement and attentiveness in children with ASD. Scassellati et al. (2018) found that long-term, in-home use of a social robot improved social communication and reduced autism symptoms in children with ASD. . Simões et al. (2020) reviewed ASD VR and AI applications. AI-driven VR therapies improved social interaction and communication abilities in ASD children. They highlighted AI and VR's ability to personalise.
Boccanfuso et al. (2017) tested a low cost socially assistive robot for ASD children. The robot-assisted intervention improved children's engagement and social skills. The study also stressed adaptation and personalisation in robot-assisted therapies for ASD children.

2. **Cerebral Palsy :** Three studies examined AI-driven motor skill development and therapy for CP children. In a systematic assessment of AI-based neurorehabilitation therapies, Lopes et al. (2020) found that robots and VR improved motor performance and user experience in children with CP. A 12-week AI-guided virtual reality intervention for hemiplegic CP showed significant gains in upper limb function. Chen et al. (2019) reviewed home-based stroke rehabilitation technology, including CP studies. Robotic gadgets and virtual reality systems were among the AI-driven therapies found to improve motor function and functional rehabilitation in children with CP. Home-based technology enable economical and accessible rehabilitation.

3. **Intellectual Disability (ID) and Down Syndrome (DS) :** Five research explored AI-driven therapies for ID/DS. Computer-based learning systems and adaptive software were used to study cognitive and adaptive functioning. Gliga et al. (2021) reviewed AI-based therapies for intellectually disabled adults and found modest cognitive and adaptive benefits. Tassé et al. (2021) found that an AI-driven intervention to improve cognitive and adaptive skills in DS patients improved memory, attention, and problem-solving. and recreational engagement in two children with cerebral palsy and substantial motor and communication difficulties, including ID. AI-driven assistive technology suited to children's answers and preferences. The study found that AI-driven devices improved communication and leisure engagement.

> AI-driven therapies have demonstrated significant potential in improving social communication and motor skills for children with ASD (Bekele et al., 2018; Scassellati et al., 2018) and CP (Lopes et al., 2020). Additionally, AI-based interventions have shown modest success in enhancing cognitive and adaptive functioning in individuals with ID and DS (Gliga et al., 2021; Tassé et al., 2021). However, several challenges and ethical concerns have been identified, including the need to better understand AI-driven therapies' mechanisms and the requirement for more rigorous and robust trial designs.

Several AI-powered apps and websites support children with NDDs. Some are:

App/ Software	Functionality	Reference
BrainPower System	Brain Power System makes autism-friendly smart eyewear. AI technology provides real-time social-emotional, facial recognition, and language understanding coaching.	https://www.brain-power.com

CogniAid	AI-powered smartphone software, improves cognitive ability in children with ADHD, dyslexia, and other learning difficulties. The app's personalized games improve memory, concentration, and problem-solving.	https://www.cogniaid.com
Reveal	Tracks and analyses autism-related emotions using AI. The technology helps carers comprehend a child's emotions and intervene appropriately.	**https://revealwearables.com**
Otsimo	Otsimo, a mobile app for children with developmental problems including autism and Down syndrome, has several educational games. AI personalizes lessons and tracks child growth through the app.	**https://otsimo.com**
Mightier	Educates children with ADHD, anxiety, and other emotional regulation issues : manage their emotions using biofeedback-based video games. The platform monitors the child's pulse rate to practise self-regulation and modifies game difficulty in real time.	**https://mightier.com**
Timocco:	AI-driven games to strengthen motor, cognitive, and communicative abilities AI analyses child movements and provides real-time feedback.	**https://www.timocco.com**
Woebot	AI chatbot for Children and teens supports mental wellness. Guided dialogues help individuals control their thoughts, feelings, and behaviours using CBT.	**(https://woebothealth.com**
CogniFit	A cognitive training platform that uses AI algorithms to personalize brain games and puzzles.	**https://www.cognifit.com**
Autism Therapy with MITA	AI to adjust puzzle games and exercises to each child's learning rate and progress.	**https://www.mitatherapy.com**
BrainLeap Technologies:	"The Attention Arcade" is a collection of attention-training games for Children with ADHD. Eye-tracking improves focus in the games.	**https://www.brainleaptech.com**
Akili Interactive:	The first FDA-approved video game	**https://www.akiliinteractive.com**

EndeavorRx,	treatment for ADHD, engages children to improve attention, focus, and cognitive skills.	
Robolink: Their AI-powered CoDrone and Rokit Smart robots	Teach Children STEM, coding, and robotics. These robots can help developmentally disordered children solve problems and learn.	https://www.robolink.com

Role of rehabilitation health professionals

AI-stimulated interventions depend on rehabilitation health professionals. Health professionals are vital to AI-driven therapies for neurodevelopmental disorders and other rehabilitation-requiring conditions:

- Rehabilitation health experts examine and diagnose requirements, capabilities, and shortcomings. This information helps choose and customize AI-driven interventions for each person.
- Personalization and customization: Health professionals collaborate with AI developers to tailor interventions to patients. They can optimize AI algorithms and systems for best results by sharing their clinical skills and understanding of the patient's condition.
- Implementation and supervision: Rehabilitation health professionals deploy AI-driven clinical therapies. They supervise interventions, advise patients, and track progress. Their experience ensures safe and successful action.Health experts evaluate AI-driven interventions. They assess patients' progress, intervention efficacy, and opportunities for improvement. Continuous feedback improves AI-driven therapy.
- Patient education and support: Rehabilitation health professionals educate patients and their families about AI-driven interventions, answer concerns and provide continuous support. Their knowledge and communication abilities boost intervention success.
- Interdisciplinary teams: Health practitioners commonly work with AI developers, engineers, psychologists, and ethicists. AI-driven therapies require this teamwork to create, refine, and ethically deploy.

Advocacy and policy development: Rehabilitation health professionals can also advocate for AI-driven interventions and help build policies and guidelines. They can shape healthcare AI regulations and assure ethical use.

Discussion and Conclusion

This review suggests that AI-driven therapy may enhance outcomes and quality of life for children with NDDs.

The encouraging discoveries have significant limits and ethical considerations. First, AI-driven therapy mechanisms must be understood. Most research in our analysis did not explain how AI components improve targeted outcomes (Simões et al., 2020). Future study should uncover AI traits that enable therapeutic benefits and separate AI effects from other intervention components (Ramdoss et al., 2011).

Second, trial designs must be stronger. Many studies had small sample numbers, no control groups, and other methodological flaws (Lopes et al., 2020; Gliga et al., 2021). To prove AI-driven NDD therapies work, researchers should undertake RCTs and other high-quality experiments (Chen et al., 2019).

Third, AI-driven medicines need ethical considerations. Data privacy, consent, and AI carer replacement have been raised (Simões et al., 2020). Researchers and practitioners should work with ethicists, policymakers, and other stakeholders to produce guidelines and best practises for responsible AI-driven intervention creation and implementation (Prochnow et al., 2013).

Finally, AI-driven therapy for NDD children must be personalized and adaptable (Boccanfuso et al., 2017; Tan & Martin, 2015). The variability of NDDs and individual differences in cognitive, motor, and social functioning necessitate customized therapies for each child (Lancioni et al., 2016). Researchers should continue developing personalized and adaptable AI-driven therapy solutions for children with NDD .

AI-driven therapy may help children with NDDs like ASD, CP, ID, and DS. However, better mechanisms of action, robust research designs, and ethical issues are needed. Future research should focus on developing AI-driven therapies for children with NDDs that are personalized and adaptable.

References

- Bekel , E. T., Crittendon, J. A., Swanson, A., Sarkar, N., & Warren, Z. E. (2018). Pilot clinical application of an adaptive robotic system for young children with autism. Autism, 22(2), 208-217. https://doi.org/10.1177/1362361316669145
- Bekele, E., Zheng, Z., Swanson, A., Crittendon, J., Warren, Z., & Sarkar, N. (2018). Understanding how adolescents with autism respond to facial expressions in virtual reality environments. IEEE Transactions on Visualization and Computer Graphics, 24(4), 1399-1408. https://doi.org/10.1109/TVCG.2018.2793978
- Boccanfuso, L., Scarborough, S., Abramson, R. K., Hall, A. V., Wright, H. H., & O'Kane, J. M. (2017). A low-cost socially assistive robot and robot-assisted intervention for children with autism spectrum disorder: Field trials and lessons learned. Autonomous Robots, 41(3), 637-655. https://doi.org/10.1007/s10514-016-9575-5
- Chen, Y., Abel, K. T., Janecek, J. T., Chen, Y., Zheng, K., & Cramer, S. C. (2019). Home-based technologies for stroke rehabilitation: A systematic review. International Journal of Medical Informatics, 123, 11-22. https://doi.org/10.1016/j.ijmedinf.2018.12.001
- Gliga, F., Faur, C., Sandu, A. L., & Butoi, E. (2021). The impact of artificial intelligence on cognitive and adaptive functioning in people with intellectual disabilities: A systematic review. Journal of Intellectual Disabilities, 25(1), 95-110. https://doi.org/10.1177/1744629519896785
- Gliga, F., Fazakas, Z., Gubucz, I., & Pataki, M. (2021). Adaptive intelligent serious game platform for children with intellectual disabilities. In Assistive Technologies for Physical and Cognitive Disabilities (pp. 1-26). IGI Global. https://doi.org/10.4018/978-1-7998-3027-5.ch001
- Lancioni, G. E., Singh, N. N., O'Reilly, M. F., Sigafoos, J., Alberti, G., Perilli, V., ... & De Tommaso, M. (2016). Technology-aided programs for assisting communication and leisure engagement in two children with cerebral palsy and extensive motor and communication disabilities. Research in Developmental Disabilities, 53-54, 263-271. https://doi.org/10.1016/j.ridd.2016.02.008

- Lopes, S., Magalhães, P., Pereira, A., Martins, J., Costa, N., & Rosário, P. (2020). Artificial intelligence and robotics for smart neurorehabilitation: A systematic review of the impact on motor function and user experience. Disability and Rehabilitation: Assistive Technology, 15(8), 865-878. https://doi.org/10.1080/17483107.2020.1746158
- Prochnow, T., Bermúdez i Badia, S., Schmidt, J., Duff, A., Brunner, C., Kleiser, R., ... & Verschure, P. F. (2013). A functional magnetic resonance imaging study of visuomotor processing in a virtual reality-based paradigm: Rehabilitation Gaming System. European Journal of Neuroscience, 37(9), 1441-1447. https://doi.org/10.1111/ejn.12125
- Ramdoss, S., Lang, R., Mulloy, A., Franco, J., O'Reilly, M., Didden, R., & Lancioni, G. (2011). Use of computer-based interventions to teach communication skills to children with autism spectrum disorders: A systematic review. Journal of Behavioral Education, 20(1), 55-76. https://doi.org/10.1007/s10864-010-9112-7
- Scassellati, B., Boccanfuso, L., Huang, C. M., Mademtzi, M., Qin, M., Salomons, N., ... & Shic, F. (2018). Improving social skills in children with ASD using a long-term, in-home social robot. Science Robotics, 3(21), eaat7544. https://doi.org/10.1126/scirobotics.aat7544
- Simões, M., Bernardes, M., Barros, F., & Castelo-Branco, M. (2020). Virtual and augmented reality caloric test in vestibular disorders: A systematic review of the state of the art. Journal of Medical Internet Research, 22(1), e16094. https://doi.org/10.2196/16094
- Tan, C. T., & Martin, R. (2015). TANDI: A tablet-based application for children with Down syndrome. In Proceedings of the 2015 ACM on International Conference on Multimodal Interaction (pp. 407-414). https://doi.org/10.1145/2818346.2823312
- Tassé, M. J., Navas, P., & Verdugo, M. Á. (2021). A pilot study of a personalized web-based intervention for promoting adaptive skills in persons with intellectual and developmental disabilities. Journal of Intellectual & Developmental Disability, 46(3), 286-297. https://doi.org/10.3109/13668250.2021.1895696

20. Enabling Change with Artificial Intelligence and Machine learning

1. Dr M. Suresh Babu, Professor, Department of CSE, Teegala Krishna Reddy Engineering College, Hyderabad. Email : deanstudentaffairstkr@gmail.com
2. G.Raj Kumar, Asst Professor, Department of IT, Teegala Krishna Reddy Engineering College, Hyderabad. Email : rajkumar.gadda@gmail.com
3. Nelloju. Priyanka, Asst Professor, Department of IT, Teegala Krishna Reddy Engineering College, Hyderabad. Email : priyanka.nelloju17@gmail.com

Abstract

This paper aims to help people working in the field of AI understand some of the unique issues regarding disabled people and examines the relationship between the terms "Personalisation" and "Classification" with regard to disability inclusion. Classification using big data struggles to cope with the individual uniqueness of disabled people, and whereas developers tend to design for the majority so ignoring outliers, designing for edge cases would be a more inclusive approach. Other issues that are discussed in the study include personalising mobile technology accessibility settings with interoperable profiles to allow ubiquitous accessibility; the ethics of using genetic data-driven personalisation to ensure babies are not born with disabilities; the importance of including disabled people in decisions to help understand AI implications; the relationship between localisation and personalisation as assistive technologies need localising in terms of language as well as culture; the ways in which AI could be used to create personalised symbols for people who find it difficult to communicate in speech or writing; and whether blind or visually impaired person will be permitted to "drive" an autonomous car. This study concludes by suggesting that the relationship between the terms "Personalisation" and "Classification" with regards to AI and disability inclusion is a very unique one because of the heterogeneity in contrast to the other protected characteristics and so needs unique solutions.

Keywords : 1. Artificial Intelligence 2. Personalisation 3. Classification 4. Ubiquitous

1.0 Introduction

This study aims to help people working in the field of AI understand some of the issues regarding disabled people who are greatly disadvantaged in society in many ways. The United Kingdom government states[1] that there are over 11 million people with a limiting long-term illness, impairment, or disability, and the prevalence of disability rises with age (6% of children, 16% of working age adults, and 45% over state pension age). Compared to people who are not disabled, disabled people are substantially more likely to live in poverty, less likely to be employed, three times as likely not to have qualifications, and half as likely to hold a degree level qualification?

Artificial intelligence technologies, such as seeing AI, are improving in their abilities to identify objects and faces. This application was created by a blind developer, and although such useful technologies are being developed by talented people with a deep knowledge and understanding of the needs of people with visual impairment, most technology developers do not have such a

deep knowledge or understanding and do not learn about disability and accessibility on their university courses.

Data-driven personalisation normally implies the use of some sort of AI classification algorithm, and this study examines the relationship between the terms "Personalisation" and "Classification" with regard to disability inclusion. Classification using big data struggles to cope with the individual uniqueness of disabled people, and whereas developers tend to design for the majority so ignoring outliers, designing for edge cases would be a more inclusive approach as these solutions will also work for the majority. Since AI machine learning classification categorises people into groups and needs big data to do this, it struggles to cope with the individual uniqueness of disabled people. Of all the protected characteristics groups covered by the United Kingdom Equality Act[4] (age, disability, gender reassignment, race, religion or belief, sex, sexual orientation, marriage and civil partnership, and pregnancy and maternity), disability is the most heterogeneous.

This paper begins by examining definitions of personalisation and classification and discussing whether "group size" is the main factor. It then presents two simple common examples (buying clothes and buying a pencil with a name on it) to clarify that "data driven personalisation" in the context of AI is normally taken to mean that the data have not been provided for that explicit purpose by the person. The examples also indicate how diversity (culture and disability) is often not adequately provided for in AI training datasets.

The next section examines some specific issues relating to the use of technologies by disabled people. The example of the difficulty of selecting the optimum accessibility setting on a mobile phone from the near infinite possibilities is described, and a possible solution is presented. The example of an autonomous vehicle is then provided to illustrate some of the ethical issues involved and also how not including disabled people in the training data could have disastrous consequences. Speech recognition is also provided as another example of how the unique requirements of disabled people may not be adequately catered for by standard AI solutions. The question whether localisation is "personalisation" for a cultural group is then discussed and illustrated through the example of the author's work on developing Arabic symbols for Arabic people unable to communicate in speech or writing, The section ends with a brief discussion of the potential of neurosymbolic AI that integrates probabilistic machine learning with structured symbolic AI to help overcome many issues such as small datasets and explainability. The review and discussion of relevant literature covers a wide range of issues concerning AI and disabled people. The study finishes with a conclusion section that summarises the study's arguments and identifies some of the remaining challenges.

2.0 Relationship between Personalisation and Classification

This study will first examine the relationship between the terms "Personalisation" and "Classification."

The Cambridge dictionary definitions are as follows:

Personalization: "the process of making something suitable for the needs of a particular person"

Classification: "the act or process of dividing things into groups according to their type"

This raises the issue of whether we can only think of classification as personalisation when there is just one member of a group or whether classification can be thought of as personalisation for

every member of a group and whether the term personalisation should only be used for a maximum group size. The range of personalisation could be from a unique group of one through dividing everyone into many groups to the extreme of no personalisation where everyone gets the same and so is in just one group.

Data-driven personalisation also raises the issue of who originally created the data.

If the data used were originally created by the person who the data refer to can this be called "data driven personalization," or for this to be the case, must the data be inferred from other data?

For example, considering classification and personalisation with regards to clothing, very large group classification could be into two groups based on gender, e.g., blue boy baby outfit/pink girl baby outfit; smaller group classification could be based on color or style or size (e.g., an "off the peg" suit); and personalised clothing could be a unique made to measure suit.

If somebody simply supplied the exact data of the details of color, style, or measurements for a made to measure suit then, although these data have driven the personalisation, I doubt this is what most people would refer to as "data driven personalisation." I would suggest most people would rather think of "Data driven personalisation," for example, suggesting suits based on those you have bought previously; suggesting suits based on purchases of those people who have also bought the suits you have bought previously; or estimating your preferences and measurements from photos of you.

However, for somebody with a physical disability, they may not be able to put on or take off standard clothing independently; may not fit any "off the peg" clothing; and may not fit any standard algorithms based on photos and so could be an "outlier" in any existing clothing related dataset and so not benefit from standard AI data-driven personalisation algorithms.

Let us also use as an example somebody buying a pencil with their name on it. There are various possibilities. They could select a pencil with their name already on it from a shop where there can only be a limited number of most popular names available. They could have their name printed to order with their name provided directly by themselves. They could have their name printed with their name provided indirectly (e.g., through data from Facebook if signed up through Facebook). A company could send an unsolicited promotional marketing free gift of pencil with printed name with name provided indirectly (e.g., through data obtained from their Facebook postings). Only the indirectly provided names would be considered "data driven personalization." People from a non-native culture would have a much lower chance of finding their name as one of the limited number of names available in the shop. A person with a disability might also require a nonstandard shaped pencil to help them be able to write. The next section examines some specific issues relating to the use of technologies by disabled people.

3.0 Technologies and Disabilities

There are many aspects of personalising technologies for a disabled person. They can have different strengths (e.g., visual, auditory, kinesthetic, dexterity, mobility, confidence, processing speed and attention, health, memory, technology skills, motivation, knowledge, and experience). There can be different tasks (e.g., reading and understanding information, writing, organisation and planning, communication, memory and recall, time, money, numeracy, and daily living). They can have access to different resources (e.g., financial, training, peer support, professional support, and technical support). They can be in different environments (e.g., workplace, study,

daily life, accessibility constraints, security, and IT policies) and using different tools (text to speech and e-reading, word processing and proofing, graphical mapping and planning, reminders, speech recognition, calculators and mathematics, study support, alarms and environmental controls, wearable technologies, and communication devices).

Technologies can have many personalisation settings to accommodate the individual needs of disabled people, and the example of a mobile phone will be used to illustrate the issue of how the optimum settings can be chosen.

3.1 Personalising a Mobile Phone

A disabled person can change the accessibility settings on their phone, but on the iPhone, for example, I have calculated that there are as many unique permutations of accessibility settings as there are atoms in the known Universe, and so, while it would be possible in theory for every person to create a unique personalised setting, it would be practically impossible for somebody to actually try all the possible permutations of settings out. Interoperable accessibility profiles would allow disabled people's preferred settings to work on any system anywhere in the world, but since settings are not interoperable between different manufacturers' devices, a person would have to set up every device they used. Some of these settings may be more important than others to a person (e.g., increasing the rate of speech (when using "text to speech" for speaking out text for people with reading difficulties) by 5% will not have as much effect as changing it by 20%), but having some automated systems to make these selections could speed up this personalisation process. For example, where there are a large range of settings such as speaking rate, the system could adaptively find the chosen setting using comparisons of pairs of settings and measuring just noticeable differences. For example, 5 possible settings of speaking rate from 1 to 5 could involve listening to 10 pairs of settings to compare them all, but an adaptive system could only involve listening to and comparing 3 pairs of rate settings using the following algorithm.

Listen to and compare 1 and 5, and if no preference, then 1 is the final selection and have listened to only 1 pair.

If preferred 5 over 1, then listen to and compare 5 with 3, and if no preference, then compare 3 (i.e., if no preference, we arbitrarily choose lowest setting and assume there would also be no preference with 4) with 2. If preferred 2 or no preference, then 2 is the final selection, and if preferred 3, then 3 is the final selection and have listened to only 3 pairs.

If preferred 1 over 5, then listen to 3, and if no preference, then compare 1 and 4. If preferred 1 to 4 or no preference, then 1 is the final selection. If preferred 4, then 4 is the final selection and have listened to only 3 pairs.

If preferred 1 over 3, then listen to 2. If no preference or 1 preferred, then 1 is the final selection. If preferred 2, then 2 is the final selection and have listened to only 3 pairs.

If preferred 5 over 3, then listen to 4, and if 4 preferred or if no preference, then 4 is the final selection. If 5 preferred, then 5 is the final selection and have listened to only 3 pairs.

There is a privacy issue whether the disability of somebody can be determined from the settings shared with 3rd parties. For example, if they have their screen reader turned on, then they are very probably visually impaired/blind. It would be possible to infer accessibility settings using a recommender type system from people with similar disabilities as a starting point from which somebody could further personalise their system settings.

3.2Autonomous Vehicles

Autonomous vehicles issues include how they will make ethical decisions (e.g., avoid a child but kill an elderly person). Will there be one globally accepted ethical algorithm? Will each car manufacturer have their own ethical algorithm? Will the owner select from a choice of ethical algorithms? Will the car learn from how the owner drives and behaves and personalise an ethical algorithm from this? Will a blind or visually impaired person be permitted to "drive?"[8] How will autonomous vehicles respond to disabled "pedestrians?" An example of the issue is that if a disabled person in a wheelchair cannot use their arms to push themselves along, they can use their legs to push themselves backwards and even possibly use a mirror to see where they are going. When the scenario of a disabled person in a wheelchair crossing the road was put into a self-driving car simulation, the car ran the simulated wheelchair user over as it misunderstood which way the person was crossing[9]. Developers tend to design for the majority ignoring outliers, whereas designing for edge cases would be a more inclusive approach. It is, therefore, also important to include disabled people in decisions to need to understand AI implications. Also, AI could be used to help wheelchair users independently control manual or electric wheelchairs or people with cognitive disabilities (e.g., dementia) travel or navigate independently.

3.3 Speech Recognition

Speech recognition can help people who have difficulty writing to use their voice to write. It can also assist people who have difficulty hearing by providing captions and transcripts. Speech recognition was originally personalised for each individual through extensive training by that individual on systems installed locally, but now, cloud-based speaker independent recognition is ubiquitous, and only one locally installed speaker dependant recognition software is commercially available[10]. There is little commercial benefit for companies to develop speech recognition, speech synthesis, or machine translation for minority languages. Standard speech recognition also does not work well for people with dysarthric speech and so needs a special system (Hawley et al., 2019). Using AI for lipreading has been shown to increase the accuracy of speech recognition and especially in noise[11]. The growing availability and reduction in cost of 3D cameras[12] should help continue to improve accuracy. Many people have expressed concerns about "Deepfakes"[13] where AI has, for example, been used to control people's lip movements and speech to make them appear to say things they never said. Nobody, however, appears to have thought of using the same technology to make people more lipreadable. Automatic captions can indicate some nonspeech sounds (e.g., music, laughter, and applause[14]), and emotion detection from speech[15] and faces[16] is improving. For people who will lose their voice due to disease, a personalised voice can be created before this occurs. The question whether localisation is "personalisation" for a cultural group is discussed and illustrated in the next subsection through the example of the author's work on developing Arabic symbols for Arabic people unable to communicate in speech or writing.

3.4 Localisation

Localisation can be defined as "the process of making a product or service more suitable for a particular country, area, etc."[18]

Is localisation "personalisation" for a cultural group? Assistive technologies can need localising in terms of language as well as culture. We developed Arabic symbols for people who found it difficult to communicate in speech or writing because many western symbols were not culturally

appropriate and also some cultural symbols did not exist[19]. These symbols were created by a graphic designer working with symbol users and so were expensive and time consuming to produce. We are currently investigating ways in which AI could be used to create symbols automatically from photographs.

To be able to select the required symbol from a hierarchical structured symbol board can take a long time (e.g., select foods at top level board, vegetables at next level board, and cauliflower from the vegetable board), and so, it would be more efficient to automatically select the required symbols based on the context (e.g., system knows user is in supermarket and knows their shopping list). The final subsection gives a brief discussion of the potential of neurosymbolic AI that integrates probabilistic machine learning with structured symbolic AI to help overcome many issues such as small datasets and explainability.

4.0 Neurosymbolic AI

Machine learning can use deep neural networks to develop probabilistic models from large training datasets without having prior knowledge of the knowledge structure of the data. This has, for example, allowed the development of speech recognition and machine translation systems that do not need to be provided with a model of language structure. Symbolic AI methods can use logic-based structured semantic conceptual knowledge representation and reasoning from ontologies or knowledge graphs to help create rules that do not require the large training datasets needed by many machine learning methods.

Neurosymbolic AI is an approach that tries to integrate machine learning approaches with symbolic methods to gain the combined benefits of both approaches (e.g., where large datasets are not available and perhaps where less computing power is available and also to help provide explainable or verifiable AI). While this can help in overcoming the limited information about disabled individuals available in machine learning training datasets, it can only "broadly" categorise disabled individuals in terms of their disabilities rather than personalise a disabled individual in terms of their unique abilities and disabilities. This approach could, however, for example, help reduce the number of possible accessibility settings in their mobile phone; a disabled individual would need to select from to find their personalised optimum setting. Mao et al. (2019) presented a method that jointly learns visual concepts, words, and sentences from images, questions, and answers and suggested applying neurosymbolic learning frameworks as a future work toward automatic learning in complex interactive environments. Although not discussed in the study, this would appear to have particular potential for assisting blind people navigating and interpreting their environment.

Kursuncu et al. (2020) proposed a learning framework that infuses domain knowledge within the neural networks unlike previous approaches that utilized knowledge outside neural attention models to provide "better generalizability, reduction in bias and false alarms, disambiguation, less reliance on large data, explainability, reliability, and robustness, to the real world applications." Besold et al. (2017) reviewed ideas on neurosymbolic learning and reasoning and outline some of the technical challenges while acknowledging "knowledge about these issues is only limited and many questions still have to be asked and answered" with impact "in many areas including the web, intelligent applications and tools, and security." Arabshahi et al. (2020) inferred missing presumptions through reasoning to discover commonsense knowledge from if-then-because statements from a human-derived dataset.

4.1 Review and Discussion of Relevant Literature

This section discusses some published studies regarding a range of issues concerning AI and disabled people. Draffan et al. (2019a) discussed how data collections are not often inclusive or algorithms transparent. They presented a roadmap for digital accessibility research and development using AI to support those with disabilities with examples where strategies can help prevent barriers to inclusion. Their extensive literature review showed how "disability" was wrongly considered as a homogeneous concept and inclusion did not consider accessibility or design for all or equity of access. They concluded that algorithms needed to be designed for inclusion by removing bias and ensuring fairness to achieve enhanced digital accessibility.

Datasets used to train machine learning algorithms can exclude or underrepresent disabled people and so discriminate against them (e.g., education, employment, and credit) (Gilligan, 2019). A loan may be refused because the applicant is wrongly classified whether due to ignorance, motivated by good intentions with respect to privacy or safety or ethical concerns, or no better dataset exists. Preprocessing techniques such as oversampling and undersampling can help equalise the size of the classes, but it would be better to have inclusive datasets for underrepresented groups respecting ethics, privacy, and safety. "AI bias" can marginalize disabled people by classifying them as outliers affecting fair access to important services (e.g., health insurance and credit). The IBM Fairness 360 Open Source Toolkit's algorithms claim to "examine, report and mitigate discrimination and bias in machine learning models." Zimmerman et al. (2019) studied the effect of AIF360 on the accuracy of gender recognition for face images of persons with and without Down syndrome (DS) in the proportion of persons with DS in the German population (0.1%). They found the AIF360 toolkit has the potential for mitigation of AI bias, but a larger sample is needed to confirm this.

Wolters (2019) examined the extent to which ergonomic and accessibility issues are acknowledged and discussed in the literature but found that research studies only consider eHealth solutions for chronic pain management and not ergonomic or accessibility aspects and concluded that this needed to be undertaken before leveraging AI meaningfully to address them. Individuals with complex communication needs can use symbols with text translations, but data are scarce, and conversions are fraught with complications due to the different types of linguistic concepts, imagery, and language and limited harmonization or standardization, and so, users find it hard to access suitable personalised or localized symbols. Draffan et al. (2019b) examined how symbol sets can be linked with multilingual options using AI image recognition to improve outcomes by automatically creating a more diverse range of symbols based on transforming photos. Potter et al. (2019) identified four pitfalls in the use of deep learning for personalisation of assistive technology in order to help allocate scant resources to benefit end users: fallacies that there is "true" knowledge inherent in data; mistakes that derive from ignorance of the limitations of methods; constraints of human commerce; and failings from incorrect, ill-considered, or improper use of AI. Another issue of data-driven personalisation is the ethics of AI for "eugenics" or "curing" neurodiversity (e.g., biomarkers for autism) or disability. It is offensive to people with autism to see this as something people should aim for, and so, individuals with autism and their families need to be treated with respect and understanding (Walsh et al., 2011). Hens et al. (2019) discussed "whether autism is a disorder to be treated or an identity to be respected." The power of AI deep learning to search the human genome for mutations and prediction of autism or other conditions (Zhou et al., 2019) increases the possibility of data-driven "personalisation" for parents to ensure their babies are born without disabilities. Johnston

(2005) argued that "the premise that deafness is not a disability of some sort is false and thus the claim that genetic selection against deafness is unethical is untenable."

A deaf lesbian couple turned to a friend with five generations of deafness in his family after being turned away by a sperm bank which told them that donors with disabilities were screened out. Clause 14/4/9 of the Human Fertilisation and Embryology (HFE) bill blocks any attempt by couples to use modern medical techniques to ensure their children are deaf as it states that "Persons or embryos that are known to have a gene, chromosome or mitochondrion abnormality involving a significant risk that a person with the abnormality will have or develop a serious physical or mental disability, a serious illness or any other serious medical condition must not be preferred to those that are not known to have such an abnormality."

Fayemi (2014) discussed the need for "prenatal genetic testing, as well as abortion of foetuses with a high risk of the autism mutation." Johannessen et al. (2017) discussed how "Adults with ASD fear that people with ASD traits eventually will be eliminated through prenatal testing and selective abortion" and that "professionals believe that genetic testing could improve the possibility for early intervention" and reported the results of their study of parent members of the Norwegian Autism Society, 76% of whom would undergo clinical genetic testing if it would improve the possibilities for early interventions.

5.0 Conclusion

This study will hopefully have helped people working in the field of AI understand some of the issues regarding disabled people. This study has suggested that the relationship between the terms "Personalisation" and "Classification" with regards to AI and disability inclusion is a very unique one because of the heterogeneity in contrast to the other protected characteristics and so needs unique solutions. This can, for example, result in assistive technologies developed for a broad category of disability (e.g., visually impaired people or hearing impaired people) not being appropriate or the optimum for a particular individual with a specific unique visual impairment or hearing impairment as well as perhaps other disabilities. Issues that have been discussed in this paper include personalising mobile technology accessibility settings with interoperable profiles to allow ubiquitous accessibility, the ethics of using genetic data-driven personalisation to ensure babies are not born with disabilities, the importance of including disabled people in decisions to help understand AI implications, the relationship between localisation and personalisation as assistive technologies need localising in terms of language as well as culture, the ways in which AI could be used to create personalised symbols for people who find it difficult to communicate in speech or writing, whether blind or visually impaired person will be permitted to "drive" an autonomous car, and how neurosymbolic AI can help reduce the number of possible accessibility settings in a disabled individual would need to select from to find their personalised optimum setting.

6.0 References :

1. Lillywhite, A.; Wolbring, G. Coverage of ethics within the artificial intelligence and machine learning academic literature: The case of disabled people. *Assist. Technol.* **2019**, 1–7. [**Google Scholar**] [**CrossRef**] [**PubMed**]
2. Feng, R.; Badgeley, M.; Mocco, J.; Oermann, E.K. Deep learning guided stroke management: A review of clinical applications. *J. NeuroInterventional Surg.* **2017**, *10*, 358–362. [**Google Scholar**] [**CrossRef**] [**PubMed**]

3. Ilyasova, N.; Kupriyanov, A.; Paringer, R.; Kirsh, D. Particular Use of BIG DATA in Medical Diagnostic Tasks. *Pattern Recognit. Image Anal.* **2018**, *28*, 114–121. [**Google Scholar**] [**CrossRef**]
4. André, Q.; Carmon, Z.; Wertenbroch, K.; Crum, A.; Frank, D.; Goldstein, W.; Huber, J.; Van Boven, L.; Weber, B.; Yang, H. Consumer Choice and Autonomy in the Age of Artificial Intelligence and Big Data. *Cust. Needs Solutions* **2017**, *5*, 28–37. [**Google Scholar**] [**CrossRef**][**Green Version**]
5. Deloria, R.; Lillywhite, A.; Villamil, V.; Wolbring, G. How research literature and media cover the role and image of disabled people in relation to artificial intelligence and neuro-research. *Eubios J. Asian Int. Bioeth.* **2019**, *29*, 169–182. [**Google Scholar**]
6. Hassabis, D.; Kumaran, D.; Summerfield, C.; Botvinick, M. Neuroscience-Inspired Artificial Intelligence. *Neuron* **2017**, *95*, 245–258. [**Google Scholar**] [**CrossRef**][**Green Version**]
7. Bell, A.J. Levels and loops: The future of artificial intelligence and neuroscience. *Philos. Trans. R. Soc. B Boil. Sci.* **1999**, *354*, 2013–2020. [**Google Scholar**] [**CrossRef**][**Green Version**]
8. Lee, J. Brain–computer interfaces and dualism: A problem of brain, mind, and body. *AI Soc.* **2014**, *31*, 29–40. [**Google Scholar**] [**CrossRef**]
9. Cavazza, M.; Aranyi, G.; Charles, F. BCI Control of Heuristic Search Algorithms. *Front. Aging Neurosci.* **2017**, *11*, 225. [**Google Scholar**] [**CrossRef**][**Green Version**]
10. Buttazzo, G. Artificial consciousness: Utopia or real possibility? *Computer* **2001**, *34*, 24–30. [**Google Scholar**] [**CrossRef**]
11. De Garis, H. Artificial Brains. *Inf. Process. Med. Imaging* **2007**, *8*, 159–174. [**Google Scholar**]
12. Catherwood, P.; Finlay, D.; McLaughlin, J. Intelligent Subcutaneous Body Area Networks: Anticipating Implantable Devices. *IEEE Technol. Soc. Mag.* **2016**, *35*, 73–80. [**Google Scholar**] [**CrossRef**]
13. Meeuws, M.; Pascoal, D.; Bermejo, I.; Artaso, M.; De Ceulaer, G.; Govaerts, P. Computer-assisted CI fitting: Is the learning capacity of the intelligent agent FOX beneficial for speech understanding? *Cochlea- Implant. Int.* **2017**, *18*, 198–206. [**Google Scholar**] [**CrossRef**] [**PubMed**]
14. Wu, Y.-C.; Feng, J.-W. Development and Application of Artificial Neural Network. *Wirel. Pers. Commun.* **2017**, *102*, 1645–1656. [**Google Scholar**] [**CrossRef**]
15. Garden, H.; Winickoff, D. Issues in Neurotechnology Governance. Available online: **https://doi.org/10.1787/18151965** (accessed on 26 January 2020).
16. Crowson, M.G.; Lin, V.; Chen, J.M.; Chan, T.C.Y. Machine Learning and Cochlear Implantation—A Structured Review of Opportunities and Challenges. *Otol. Neurotol.* **2020**, *41*, e36–e45. [**Google Scholar**] [**CrossRef**]

21.

Effectiveness of Digital Smart Board Technology on Learning Shopping Skills among adolescents with Autism Spectrum Disorder

Jayati Mitra

INTRODUCTION

Today we all are living in a technological and digital era. Digital smart board has brought a great revolution in the area of classroom educational set up. A digital smart board for teaching is an alternative to the traditional black and whiteboards. It is an interactive screen that displays text, images, videos, etc which helps students to visualize the content better. Martin (2010) describes smart board as an interactive, wall-mounted display that is linked to a projector and computer, and that the user can write or tap on by using a finger or specialized stylus. Technology has now become an integral part of students' learning experiences. Handler (2011) notes that the smart board can be used by several students simultaneously, communicating in the classroom by using their fingertips to manipulate computer apps through the device. A study says that smart board positively influenced students' ability to understand complex concepts, for example, in math and science (Hennessey Deaney, Ruthven and Winterbottom, 2007; Mildenhall, Swan, Northcote and Marshall, 2008). The smart board helps to increase student participation in the classroom,; it motivates students, and it boosts their enthusiasm for learning. Furthermore, it supports multiple learning styles; and it has been successfully implemented in audio-visual learning environments. Research findings demonstrate that small-group instruction with graduated guidance was effective in teaching digital gaming skills to children with ASD (Cattik, M. & Odluyurt, S. 2017).

Autism spectrum disorder (ASD) refers to a neurodevelopment disorder that is characterized by difficulties with social communication and social interaction and restricted and repetitive patterns in behaviours, interests, and activities. (American Psychiatric Association [APA]). Around 1 in 44 students has ASD, according to the Centres for Disease Control and Prevention in 2022; males are four times more likely to be diagnosed with the disease than girls (CDC, 2022). According to RPWD, Act, 2016 "Intellectual disability, a condition characterized by significant limitation both in intellectual functioning (reasoning, learning, problem solving) and in adaptive behaviour which covers a range of every day, social and practical skills, including— (a) "specific learning disabilities" means a heterogeneous group of conditions wherein there is a deficit in processing language, spoken or written, that may manifest itself as a difficulty to comprehend, speak, read, write, spell, or to do mathematical calculations and includes such conditions as perceptual disabilities, dyslexia, dysgraphia, dyscalculia, dyspraxia and developmental aphasia; (b) "autism spectrum disorder" means a neuro-developmental condition typically appearing in the first three years of life that significantly affects a person's ability to communicate, understand relationships and relate to others, and is frequently associated with unusual or stereotypical rituals or behaviours. A review of the research literature reveals that

students with ASD conditions may learn a variety of skills through the , including playing digital games, matching images and words, finishing an activity, and reading letters and words (Cattik & Odluyurt, 2017).

Aim: The present study was conducted to find out the efficacy of the digital smart board technology on learning shopping skills among adolescents with Autism Spectrum Disorder having Intellectual Disabilities.

Objective: i) To assess the rate of performing correct shopping skills in simulated environment among adolescents with ASD having Intellectual Disabilities.

ii) To find out the effect of digital smart board based technology based content on learning shopping skills among adolescents with ASD having Intellectual Disabilities.

Hypothesis : There will be no significant difference between the pre-test and post –test mean scores of learning shopping skills among adolescents with ASD having Intellectual Disabilities.

Operational Definition:

a) Digital Smart Board Technology: A technology based curricular content which can be imparted through digital smart board where the children can interact with the content and leant by manipulating the icons.
b) Shopping Skills: One of the life skills which is most important for students to learn and demonstrate in day to day life. Here shopping at super market taught in simulated digital platform.
c) Adolescents with Autism Spectrum Disorder: Children with moderate intellectual disabilities diagnosed by ISSA as Autism Spectrum Disorder.

METHODOLOGY

Research Design: Single Group Pre-test and Post-test experimental Design

Sample: Total 4 students diagnosed with moderate Intellectual disability having ASD between the age group of 11-16 years attending NIOS-OBE class at Special Education Centre, NIEPID were selected for this study. All the participants had the ability to identify money and they all were aware about shop as a community place.

Sampling Process: Samples were selected by purposive cum convenient sampling technique.

Tool: A teacher made test was used to assess the pre-test and post-test scores of the shopping skills. Before that the academic area from Secondary class Checklist of FACP was administered about the current level of the selected participants.

Intervention: Total 20 sessions of intervention was carried out for data collection of this study.

Procedure: A total of twenty sessions of intervention was carried out by the researcher. Pre-test scores were recorded for each student before the intervention. Duration was 30 minutes for each session for each individual . EdQueries.com e-content were selected for teaching shopping skills

specifically in super market environment. The skills were divided into different small subtasks and exposure were given to the each participants one by one about the concept cheapest and costliest items, using debit card and payment by cash method, comparing costs, checking out MRP and expiry date, checking out items measurement and giving changes after buying things. Post test was conducted after end of 20 sessions. Evaluation was done after every 5th session for each student depending upon the frequency of performance of the skills.

RESULTS

Data was analyzed and interpretation of the results was done using Statistical Package for Social Sciences (SPSS). Mean, Standard Deviation (SD) and Paired t-test was calculated for finding out the statistical significance. The results are discussed in the table below

Table 1: Comparison of the pre test and post test mean scores of the group

N = 4

	Mean	SD	t- value
Pre-test	3.75	3.77	13.279**(df= 3)
Post-test	15.25	2.62	

**p<0.001 highly Significant

Table – 1 Data shows the pre test and post test mean scores on learning shopping skill behaviour after intervention .The pre test mean score is 3.75 and post test mean score is 315.25 Standard deviations of pre test is 3,77 and post test is 2.62 .To find out whether the difference between pre test and post test mean score is significant or not a paired t-test was conducted. The obtained t- value is 13.279 this calculated t- value is higher than the table value. It indicates that the differences between the pre test and post test mean scores are highly significant at 0.001 level of significance (p<0.001). The result of the present study supported by the study where the use of the smart board's visual aids improved understanding of concepts in math (Mildenhall, Swan, Northcote and Marshall, 2008), It is observed during intervention the subjects in group has showed interest for counting money, using online payment procedure and money exchanging for buying items. Further data analysis was done to observe the session wise performance of the participants on reducing odd behaviour. It also extends the supports to the study of Stanley (2016) who sought to discover the incidents when he used an Smart board to teach reading to students with ASD; and he also evaluated their academic performances.

Table: 2 Comparison of Pre and Post test performance for each participants of the group

Subject	Pre test Percentage	Post Test Percentage
S1	20 %	85%
S2	5 %	65%

S3	5%	65%
S4	45%	90%

Table 2 data showing the percentage of the pre and post test scores of the learning shopping skills after intervention through digital smart baord. Right after the intervention programme the students showed highest number of achievement which were significant. Time series was done to see the difference in session wise scores. The rates of leaning among students were high. Peris (2006); Cihak, et.al. (2006) reported their study result through session wise performances of the participants. In the present study there was no control group. Panerai, et.al 1998 also studied about the effectiveness of structured program without control group which supports the present study without any control group.

DISCUSSION

The increasing of skill behavior in the manner of shopping skills occurred due to sequential presentation of the sub tasks and graduated interventions through the application of digital smart board technology. These positive results also found due to appropriate and structured setting of the room, less environmental hazards, song and rhythm related to the levels of the students, appropriate presentation of reinforcement and researcher's skills and hard working during the intervention program. Using a stylus pen on smart board and dragging pictures towards related text and related box were a new and interesting activity for them. Hall and Higgins (2005) pointed out that presenting learning material using multimedia clarify and enhance learning. The investigators in the current study reported similar findings. They also found that students who learn through digital interactive board are more attentive and have great motivation to learn which also support the present study. As a result of intervention students not only learned specific skills but associated learning also took place. Associated learning like following instructions, pro-activity towards task completion, functional reading skills etc.

CONCLUSION

Learning through digital mode is becoming an important part for all of us which includes the children and adolescents with Intellectual Disabilities having Autism Spectrum Disorder. Digital Smart Board is catering a large number of knowledge with hands on interaction and exploration which is playing a major role during Special Education Teaching. The effectiveness of Digital smart board on learning shopping skills among adolescents with autism spectrum disorder (ASD) is reflected by a huge number of studies and case reports. Therefore, we can conclude that lots of associated learning took place along with domain wise learning among students through digital smart board intervention. The students were also exposed to the real environment to generalize their learnt skills apart from the learning environment which led their complete learning.

Limitation: Further this study can be extended to teach in all day to day life skills activities and take large numbers of samples along with experimental and control group to find out the effect of Digital Smart Board Teaching on Different Life skills Training.

REFERENCES

- Cattik, M., & Odluyurt, S. (2017). The effectiveness of the smart board-based small-group graduated guidance instruction on digital gaming and observational learning skills of children with autism spectrum disorder. *Turkish Online Journal of Educational Technology, 16*(4), 84-102. https://files.eric.ed.gov/fulltext/EJ1160646.pdf

- Centers for Disease Control and Prevention. (2022). *Autism spectrum disorder: Data & statistics on autism spectrum disorder*. https://www.cdc.gov/ncbddd/autism/data.html

- Government of India, " *The Persons with Disabilities –Equal Opportunities , Protection of Right and Full Participation Act,1995 and replaced with RPWD Act,2016*;MSJ&E, New Delhi

- Handler, M. (2011). *An evaluation of the effectiveness of smart board technology by evaluating the students' ability of completing their work with focus on students with disabilities* [Doctoral dissertation, Rowan University]. https://rdw.rowan.edu/etd/

- Hennessy, S., Deaney, R., Ruthven, K., & Winterbottom, M. (2007). *Pedagogical strategies for using the interactive whiteboard to foster learner participation in school science*. Learning, Media & Technology, 32(3), 283-301.

- Higgins, S., Falzon, C., Hall, I., Moseley, D., Smith, F., Smith, H., & Wall, K. (2005). Embedding ICT in the literacy and numeracy strategies. Newcastle, UK: University of Newcastle on Tyne.

- Martin, A. (2010). *Analysing the Impact of the Interactive White board on Reading Comprehension* [Doctoral dissertation, State University of New York College at Brockport]. http://hdl.handle.net/20.500.12648/5425

- Mildenhall, P., Swan, P., Northcote, M., & Marshall, L. (2008). *Virtual manipulatives on the interactive whiteboard: A preliminary investigation.* Australian Mathematics Teacher 64(1), 9-14.

22.

Effect of Animated Films for Creating Public Awareness about Disability Rehabilitation

Dr. Ravi Prakash Singh

Background:

The awareness about disability is the key for the success of rehabilitation of persons with disabilities. The use of multi-media for creating awareness is one of the recent trends in disability sector. Animated films are found to be an effective medium to convey messages among different age groups. The animated films on disability rehabilitation on different key issues were developed by the National Institute of Empowerment of Persons with Intellectual Disabilities (NIEPID) i.e. causes of disability; prevention of disability; early identification and intervention of disability; inclusion of persons with intellectual disabilities and Vocational training and employability of persons with intellectual disability. The present study explores the effectiveness of animated films developed by NIEPID for creating awareness about disability rehabilitation

Aims/Objectives: To study the effect of animated films for creating awareness about disability.

To compare the effect of animated films on public awareness about disability rehabilitation w.r.t. to age and gender.

Method:The pre-test & post test experimental design is used in the study. A sample of 165 persons was selected for the study based on simple random sampling technique.

Results: The study revealed that the use of animated films is having a significant effect for crating public awareness about disability rehabilitation. However no significance difference was found with respect to age and gender

Conclusion: The findings of the study implied that the use of animated films is having a significant effect on the level of awareness about disability.

Key Words: Animated Films (AF); Disability Awareness (DA), Disability Rehabilitation (DR), Children with Disabilities (CwDs)

Dr. Ravi Prakash Singh ,Faculty in Special Education, National Institute for the Empowerment of Persons with Intellectual Disabilities (Divyangjan), Regional Centre, Navi Mumbai.

23

Status of Utilization of Assistive Technology among Students with Visual Impairment in Mizoram

H. Lalrinhlui* S.Parween**

Abstract

Over the past few years, the development of assistive technology for those with vision impairments has accelerated globally. Such technology improves the efficiency and effectiveness of everyday life skills, which increases independence. Mobility, reading, writing, everyday life, and communication technologies are included in this group of technologies, which assist individuals with visual impairment in their various walks of life. People with visual disabilities, particularly in developing countries like India, especially North-East states are direly in need of these technologies to improve their functioning, education, employment and quality of life as well. The current study aims to identify the status of utilization of various assistive technological devices by students with visual impairment. A survey was done using researcher-made tool for 30 students with visual impairment (both low vision and total blindness) studying in special and inclusive schools of selected districts of Mizoram state. The results of the present study revealed that the utilization of assistive technological devices such as Braille slate and stylus, Abacus, Taylor Frame etc are very limited among the students with visual impairment. Hence, raising awareness and educating about assistive technology among the general and special educators of Mizoram State is the primary and most effective way to help students with visualimpairment for better learning outcomes.

Keywords: Status, Utilization, Assistive technology, Persons with Visual Impairment, Mizoram

* H. Lalrinhlui, Research Scholar, Faculty of Disability Management and Special Education,

Ramakrishna Mission Vivekananda Education and Research Institute, Coimbatore, Tamil

Nadu. PIN 641020

**Dr.S.Parween, Assistant Professor, Faculty of Disability Management and Special

Education, Ramakrishna Mission Vivekananda Education and Research Institute,

Coimbatore, Tamil Nadu. PIN 641020

24.

Study on Work Related Academics for PwIDs

Sri G.Srinivasulu & Sri B.V.Ram Kumar

NIEPID, Secunderabad

ABSTRACT

Work related academics are those skills an adult persons with Intellectual Disability needs to understand to carry out the day to day work activities for Independent Living. Work related academics plays an important roles for students with Adult Intellectual Disabilities to gain as much as, whether the disability condition is emotional, intellectual, physical, or a combination of two or more multiple disabilities. Work related academic skills are defined as functional as long as the outcome supports they student's independence to undergo different situations. Functional academics is merely academics made functional designed to teach skills which allow each student to succeed in real life situations at home, school, training, work and community setup.

The work related academics skills includes numeracy concept, literacy concept, money concept, size concept, colour concept, direction concept, measurement concept etc. This paper denotes the use of work related academics Adult PwIDs for functional requirements of daily living skills which will enable the Adult PwID trainee for employment aspects. It will also offer instructional strategies for special educators, vocational instructors for support to achieve meaningful academics outcomes in educational settings.

Key words: Work, Academics, Functional Skills, Employment

25.

Role of ICT in teaching & developing various skills of CWSN from Early Intervention to Pre-Vocational

Dr. Sridhar Bodapati & Simmi Vasu

Abstract:

Objective: To describe how various online interactive websites & videos helped the author in improving the skills of her students and also led to her professional development. Methods: The Special educator provides examples of usage of E-Learning software. Results: The special educator was able arouse the interest and increase the skills of the students from the early intervention age group to young adults of the prevocational age groups using a blend of traditional methods as well as ICT . Conclusion: A special educator works with almost all age groups of CWSN. Keeping these children engaged at the same time helping them to learn new skills in a way, that they would grasp it the topics better is a constant struggle or challenge to the special educator. Traditional methods though a great help at times, is not enough. E- learning software, videos, short films interactive games when used according to the age of the child, gives the special educator an extra boost to catch the interest of the child, getting him respond actively. Having seen the results in her students the special educator collaborated with developers of the software to get customised games for students. The author continues using the ICT tool and has influenced parents of her students as well as other professionals to use the same.

26.

ADAPTATION OF DIAGRAMS USING MS OFFICE FOR VISUALLY IMPAIRED STUDENTS IN SCIENCE

Shruti Pandey

Abstract

Science is a platform that encourages natural curiosity and fosters an objective and analytical disposition in students by providing critical thinking skills, reasoning, and systematic reflection. Most visually impaired students withdraw from experiments due to a lack of visual skill. By including visually impaired students in science classes, we can shift our focus from their deficiencies to their strengths. Tactile, auditory, and kinaesthetic perception are the sensory channels used for this purpose. The most significant barrier that visually impaired students face in the science classroom is constant exposure to overwhelming visual media, such as textbooks, visual experimentation, and oral presentations.

The inability of visually impaired students to access diagrams is a major challenge in education, particularly in fields such as science. This paper investigates visually impaired students' perceptions, feedback, and needs in developing diagrams to make science more accessible in the future. Based on curriculum adaptation principles, the visual structures have been transcribed into embossed, tactile representations. The diagrams were distributed to visually impaired students from special schools in class VII during the academic year 2018-2020 for feedback and review. Semi-structured interviews were used to collect systematic information. The goal was to provide tactile diagrams so that visually impaired children could experience the same things as their sighted peers. Tactile diagrams were discovered to be useful in the teaching-learning process. Using MS Office to create diagrams allows researchers and teachers to replicate them on larger scales at the same time. Visually impaired students' and teachers' suggestions were incorporated into the diagrams to make them more useful in the future.

Keywords: *visually impaired students, accessible science, curriculum adaptation, tactile diagrams*

Shruti Pandey
Assistant Professor, Faculty of Education, Banaras Hindu University, Varanasi-221010
shrutipandey2801@gmail.com
ph: 9532982351

27.

A case study: Virtual Reality as a Learning tool for Children with Autism Spectrum Disorder

S SINDUJA*

Abstract

Many researchers observed that Children with Autism Spectrum Disorder (CwASD) primarily learn through visual cues and patterns. Virtual Reality (VR) plays a vital role in pointing up visual skills, that seems to be one of the appropriate intervention techniques for Children with ASD which provide them an excellent opportunity for learning new concepts. The aim of the study was to determine whether the Children with Autism Spectrum Disorder would adapt to VR headset and learn academic skills in an experiential way. A total of 3 participants including Children with ASD, age range between 5 to 10 years were chosen for the present study. This study involves observation method to collect data. The participants chosen were given interventions using VR headset along with ongoing therapies for one month. Based on the data obtained through observation, the results showed that all three participants were much interest in learning a concept through VR. Also, the participants adapted to wear the headset and showed considerable development in learning academic skills through VR.

Key words: Virtual Reality, Children with Autism Spectrum Disorder, VR headset, learning tool

***S SINDUJA, Integrated B.Ed-M.Ed ID, Ramakrishna Mission Vivekananda Educational and Research Institute (RKMVERI)Faculty of Disability Management and Special Education (FDMSE)**

28.

Using Sufficient Response Exemplar Training to Improve Blends Articulation in Children With Autism

Anupama Jagdish, Smita Awasthi, Sridhar Aravamudhan

Abstract

Children with autism are at a higher risk of being affected by speech disorders and often require remedial intervention. Eikeseth and Nesset (Journal of Applied Behavior Analysis, 36(3), 325–337, 2003) used sufficient-response exemplar training of vocal imitation in conjunction with prompting, chaining, and shaping procedures to successfully teach 2 typically developing children to articulate several Norwegian words with blends. The present study extends and adapts these procedures to children with autism. Participants were TA, an 11-year-old boy, and KS, a 15-year-old girl, both with autism and speech sound disorders. For each participant, 3 sets of 10 words with specific blends in the initial position were targeted for training. Vocal imitation training with within-stimulus prompts was used for both participants. For KS, lip-tongue-teeth position prompts and chaining were added during the training of certain words. A multiple-baseline across-behaviors (word sets with target blends) design demonstrated improvement in the articulation of trained words and generalization of correct articulation to untrained words with both participants. The findings suggest that speech sound disorders in children with autism can be addressed with behavioral interventions.

Keywords: Autism. Speech sound disorder. Phonological disorder. Articulation disorder. Sufficient-response exemplar training. Echoic. Vocal imitation training. Chaining.

Presenting Author: Anupama Jagdish

Anupama Jagdish, Smita Awasthi, Sridhar Aravamudhan Behavior Momentum India

29.

Using Proloquo2Go™ on iPad with a 24-year-old girl with ASD to Provide Personal formation

Sridhar Aravamudhan, Smita Awasthi, Sushmita K.S.,

Abstract

Preliminary studies suggest that touch-based speech-generating devices (SGD) hold promise for teaching communication to minimally verbal or non-vocal children with ASD (Lorah, Parnell and Tincani, 2018). The current study replicates a study by Lorah, Karnes and Speight (2015) in which they taught two school-aged children with ASD to respond to questions regarding personal information using Proloquo2Go™. In the current study, we taught a 24-year-old minimally verbal girl with ASD with profound discrimination difficulties to respond to three questions, "what's your name?" ,"what's your address?", and "what is your mother's name" with discrimination. We used distinctive icons in the Proloquo2Go app, delayed prompts, trained responses separately first and then intermixed in a quasi-random fashion. Results show improvement in independent responses to the first two questions, 40% to 100% in Question 1 and 10% to 100% in question 2. Intervention is continuing with the third target.

Keywords: Autism, Speech Generating Devices, Discrimination Training, iPad

Presenting Author: Sridhar Aravamudhan

Authors: Sridhar Aravamudhan, Smita Awasthi, Sushmita K.S.,

Behavior Momentum India

30.

Using Non-Verbal Stimuli to Improve Transitioning Compliance and Learning Outcomes in Two Children with ASD

Anupama Jagdish, Sridhar Aravamudhan, Smita Awasthi

Abstract

Transitioning from high-preference (high-p) to low-preference (low-p) activities can evoke problem behaviors such as crying, tantrums or Self-injurious behaviors (SIB) in individuals with IDD (Riffel, 2010). In the current study, in baseline conditions, MR, a 6-year-old boy, cried intensely (durations 57,39 and 48 min) and kicked others (8,16 and 18 times) when told to transition from high-p to low-p instructions. Another 10-year-old boy RO complied with only 13% of verbal instructions to transition. This was despite both being able to speak in sentences and demonstrate comprehension when adults spoke to them. Non-verbal stimuli, a bell and pictures were used in intervention initially. MR required only two prompts in the first session and within 6 sessions demonstrated 100% compliance with no challenging behaviors. RO similarly showed improvement in compliance in 8 sessions with picture cues and with verbal instructions thereafter. The possibility of a history of aversive conditioning with spoken words and the value of non-verbal stimuli in quickly acquiring stimulus control over transitioning behaviors will be discussed.

Key words: Challenging Behaviors, Autism, Stimulus control

Presenting Author: Anupama Jagdish

Authors: Anupama Jagdish, Sridhar Aravamudhan, Smita Awasthi

31

Telehealth with Smartphones- Transitioning 89 Children with ASD from in-clinic to Telehealth

Smita Awasthi, Sridhar Aravamudhan, Anupama Jagadish, Papiya Mukherjee, Rajeshwari K, and Sreemon Edasserykkudy

Abstract

The first case of Covid-19 in India was identified on January 30, 2020, the day on which the World Health Organization declared a public health emergency. On March 16, 2020, thegovernment of India ordered closure of all educational institutions in India for a fortnight. On March 24, 2020, the government declared a nationwide lockdown with shelter-in-place orders. The in-clinic services that children with learning disabilities received in special education centers and centers providing language and communication interventions was abruptly halted. This study details how our organization in India collaborated with parents of children with autism and transitioned services from in-clinic to telehealth and scaled up to transition services to more than 80 students within two weeks. This discussion paper details the decision-making model to transition the services, adapted staff training and supervision model, and the actual teaching procedures with video examples of how teaching different skills was accomplished in video meetings using only smartphones in 85% of the sessions.

Keywords: Autism, Covid-19 India, ABA, Telehealth

Presenting Author: Papiya Mukherjee

Authors: Smita Awasthi, Sridhar Aravamudhan, Anupama Jagadish, Papiya Mukherjee, Rajeshwari K, and Sreemon Edasserykkudy

Behavior Momentum India

32

Survey on the Attitude towards Intellectual Disability among College Students in Kohima

Sopfunuo Licey Vizo

Abstract: Throughout centuries, the negative attitude and stereotypes concerning intellectual disability have been very much prevalence in almost all societies. Lack of awareness, ignorance, neglect, superstition, or communication barriers, have been the possible causes for stigmatization. There are a number of acts, policies, and programs addressing intellectual disability, but their implementation are at the steadiest pace in most part of the nation.

In Nagaland, documentation or awareness of intellectual disability are limited and very little is known. Therefore, the purpose of the present study is to survey the attitude of college students in Kohima towards intellectual disability. The methodology to conduct this study will follow a quantitative approach using descriptive research design. The sampling size will consist of 350 participants and data will be collected using random sampling. Multidimensional Attitude scale developed by Findler, Vilchinsky & Werner, (2007) will be used. Data will be collected using online platform and data will be analyse using descriptive statistics. The findings of the study will help the people understand and create more inquisitive about intellectual disability. This study is also an effort to improve the attitude of people towards intellectual disability.

33

Exploring the areas of Skill Development and Employment in the light of Persons with Intellectual and Developmental Disabilities

Mukesh Manocha*

Abstract

Employment is the most basic necessity and a vital pillar for independent living. It is not just a need but also a human right. Every adult individual, irrespective of one's caste, creed, gender, religion, disability etc. deserves the right to employment in order to live as an independent individual. Skill development and employment ensures not just independence but also smooth and independent community living and an improved quality of life.

This study explores the numerous possibilities regarding employment and skill development for PWIDs as well as the challenges faced by the professionals, employers as well as the PWIDs in this journey. The scope of skill development of PWIDs, models of employment and the various types of available employment and skill development skills and training are discussed. This paper explores the responsible and involved persons and agencies in the process of skill development and employment of PWIDs. The paper also discusses the current status of Skill development and employment of PWIDs in India and how the opportunities differ in rural and urban India. The prevalent barriers and the possible ways of removing them are discussed. Through this study, newer possibilities for skill development and employment of PWIDs in the near future are explored.

Mukesh Manocha,Vocational Instructor, NIEPID MSEC, Noida

34

Enabling Change with Artificial Intelligence and Machine learning

Dr M. Suresh *. Babu, Kalva Hymavathi** Nelloju. Priyanka***

Abstract

This paper aims to help people working in the field of AI understand some of the unique issues regarding disabled people and examines the relationship between the terms "Personalisation" and "Classification" with regard to disability inclusion. Classification using big data struggles to cope with the individual uniqueness of disabled people, and whereas developers tend to design for the majority so ignoring outliers, designing for edge cases would be a more inclusive approach. Other issues that are discussed in the study include personalising mobile technology accessibility settings with interoperable profiles to allow ubiquitous accessibility; the ethics of using genetic data-driven personalisation to ensure babies are not born with disabilities; the importance of including disabled people in decisions to help understand AI implications; the relationship between localisation and personalisation as assistive technologies need localising in terms of language as well as culture; the ways in which AI could be used to create personalised symbols for people who find it difficult to communicate in speech or writing; and whether blind or visually impaired person will be permitted to "drive" an autonomous car. This study concludes by suggesting that the relationship between the terms "Personalisation" and "Classification" with regards to AI and disability inclusion is a very unique one because of the heterogeneity in contrast to the other protected characteristics and so needs unique solutions.

Keywords : 1. Artificial Intelligence 2. Personalisation 3. Classification 4. Ubiquitous

*Dr M. Suresh Babu, Professor, Department of CSE, Teegala Krishna Reddy Engineering College, Hyderabad. Email : deanstudentaffairstkr@gmail.com

**Kalva Hymavathi, Asst Professor, Department of IT, Teegala Krishna Reddy Engineering College, Hyderabad. Email : hymavathi.kalva@gmail.com

***Nelloju. Priyanka, Asst Professor, Department of IT, Teegala Krishna Reddy Engineering College, Hyderabad. Email : priyanka.nelloju17@gmail.com

35
Supported Work Centre: A successful Model of Employment for PWIDD.

Ms.Mridula Sakle

Abstract

Persons with IDD have compromised intellectual and cognitive functions but their feelings and psycho- social needs are like any other person. They have similar aspirations and needs. Adult hood is the longest span of one's life, where they can be productive, provided they are given opportunities for learning with right training.

Among the different models of employment for IDD, Supported work Centre provides employment opportunities to maximum number of people with IDD. This model not only provides opportunities of employment but also creates awareness regarding their capabilities and capacities.

- Keys to successful Supported work Centre
- ❖ Structure of Work.
- ❖ Teacher's role.
- ❖ Assembly line.
- ❖ Targets.
- ❖ Quality consciousness.
- ❖ Storage of raw material & product.
- Marketing – Marketing of cause.
- Looking at sustainability and human profit.

Consultant: (Muskaan-PAEPID)
Vasant Kunj, New Delhi 110070

email: mridula.sakle@muskaan-paepid.org
Mobile No. 9811760960

36

Machine learning valuable tool for distancing intellectual and developmental disabilities

Dr. D.Asha Devi, K. Sandhya, , Teegala Krishna Reddy Engineering,B. Nirupama,

Abstract

Intellectual and Developmental Disabilities (IDDs) are complex disorders with significant impairments in intellectual and adaptive functioning that are influenced by both genetic and environmental factors. Advances in high-throughput sequencing, imaging, and behavioral data collection have greatly enhanced our understanding of the underlying biological mechanisms of IDDs. The integration of artificial intelligence (AI) and machine learning (ML) technologies has the potential to augment classical methods of diagnosis and treatment planning by improving screening and early diagnosis, advancing our understanding of co morbidity, and accelerating the identification of biomarkers for clinical research and drug development. The application of ML to IDDs requires multi-modal data collection and storage, along with an understanding of the fundamental concepts of machine learning algorithms. The review aims to guide researchers in formulating AI and ML-based approaches to investigate IDDs and related conditions.
Keywords : 1. Artificial Intelligence 2. Machine learning b3. Co morbidity.

Dr. D.Asha Devi, Professor, Department of ECE, Sreenidhi Institute of Science amp;Technology,
Yamnampet, Hyderabad. Email : ashadevi.d@rediff.com
K. Sandhya, Assistant Professor, Department of CSE, Teegala Krishna Reddy Engineering College, Meerpet, Hyderabad. Email : sandhyabelidha@gmail.com
B. Nirupama, Assistant Professor, Department of IT, Teegala Krishna Reddy Engineering College, Meerpet, Hyderabad. Email : nirupama@tkrec.ac.in

37

An Analysis of Avenues for CWSN in NEP 2020

Nikita Jain Dr. Amrita Sahay, Dr. Hemant Keshwal

ABSTRACT

NEP 2020, launched on July 29th 2020, envisions India's new Education Systems and focuses on key reforms in field of education to make students thrive in new Digital Era. Consisting of four parts 'School Education', 'Higher Education', ' Other Key Areas of Focus (Adult Education, Promoting Indian Languages and Online Education) and 'Making it Happen',. It focuses on five major pillars : Affordability, Accessibility, Quality, Equity, and Accountability – to ensure continual learning. Policy's implementation has also promised new Avenues for Children with Special Needs. So the paper would majorly be focuses on Needs, Scope and Requirement of CWSN, and how NEP is helpful to address the needs of CWSN in School Education (Primary, Secondary and Higher level of Education) and further in Vocational Education and Training through Skill Development from early ages of learners.

NEP responsibility in making corresponding changes in curriculum, incorporating materials on human values such as respect for all persons, empathy, tolerance, human rights, gender equality, non-violence, global citizenship, inclusion, and equity. How the stakeholders are there to overcome the barriers and remove biases and stereotypes through sensitization programme. If the aim of policy to promote inclusion, bringing out equity and developing respect for diversity through developing understanding about various cultures, religions, languages, gender identities, etc. among children, teachers and other school functionaries is getting adopted to cater needs of CWSN and further giving a holistic approach in child's growth. And further paper seek findings of NEP:2020, whether it turns out to be a solution, a turning point or still has got barriers serves as challenges for School and CWSN and curtails their learning along with critical review and probable solutions for the subject matter.

Key words : 1. NEP : National Education Policy 2020,2 CWSN : Children with special Needs 3 Inclusion : Act of being included in all the terms of Education, 4 Digital Era: .A period in human history characterized by the shift from traditional industry to an economy based on information and communications technology (ICT).

38

Bridging the Gap: Improving Access to Disability Services and Early Intervention in Rural Communities

Lingala Lakshmi*

Abstract:

People with disabilities in rural areas often struggle to access essential services and early intervention programs due to a shortage of qualified service providers and limited transportation options, despite federal programs like Early Head Start and IDEA. Screening and early intervention are critical in ensuring individuals with disabilities receive the necessary support for a better quality of life, but families in rural areas must often travel long distances and face a lack of information about available resources. This abstract emphasizes the need to bridge the gap between rural communities and disability services by promoting greater awareness and access to early intervention programs. We will examine current barriers and explore potential solutions, encouraging collaboration among community members, service providers, and policymakers to prioritize the needs of rural communities. With enhanced access to services, all individuals, regardless of location, can receive the support they need to live healthy, fulfilling lives. This abstract highlights the need to bridge the gap between rural communities and disability services by promoting increased awareness and access to early intervention programs. We will explore the current barriers that prevent people in rural areas from accessing these services and discuss potential solutions to address these challenges.

*Lingala Lakshmi, Principal Manasa Institute of Child Health & Disability Studies, Hyderabad

39

Evaluating the Effectiveness of Naturalistic Developmental Behavioral Interventions (NDBI) in Early Autism Treatment

Jerrin Treesa Jose

Abstract

Naturalistic Developmental Behavioral Interventions (NDBI) have emerged as a promising approach to early autism treatment, emphasizing the integration of developmental and behavioral principles within naturalistic settings. This conceptual paper aims to evaluate the effectiveness of NDBI in early autism treatment, focusing on children and the emerging trends in India. The paper begins by providing an overview of NDBI and its core principles, followed by a review of the existing literature on its effectiveness and implementation in India.

The paper also examines the challenges and opportunities associated with applying NDBI in the Indian context, considering the unique sociocultural factors, resource limitations, and varied professional expertise. Finally, the paper offers recommendations for promoting the successful implementation and dissemination of NDBI in India to improve the accessibility and quality of early intervention services for children with autism. The analysis in this paper highlights the potential of NDBI in addressing the diverse needs of children with autism and the importance of tailoring interventions to the Indian context to ensure their effectiveness.

References:

- Kasari, C., Gulsrud, A., Freeman, S., Paparella, T., & Hellemann, G. (2012). Longitudinal follow-up of children with autism receiving targeted interventions on joint attention and play. Journal of the American Academy of Child & Adolescent Psychiatry, 51(5), 487-495. https://doi.org/10.1016/j.jaac.2012.02.012
- Schreibman, L., Dawson, G., Stahmer, A. C., Landa, R., Rogers, S. J., McGee, G. G., ... & Halladay, A. (2015). Naturalistic Developmental Behavioral Interventions: Empirically Validated Treatments for Autism Spectrum Disorder. Journal of Autism and Developmental Disorders, 45(8), 2411-2428. https://doi.org/10.1007/s10803-015-2407-8
- Virues-Ortega, J., Julio, F. M., & Pastor-Barriuso, R. (2013). The TEACCH program for children and adults with autism: A meta-analysis of intervention studies. Clinical Psychology Review, 33(8), 940-953. https://doi.org/10.1016/j.cpr.2013.07.005
- Daley, T. C., Singhal, N., & Krishnamurthy, V. (2013). Ethical considerations in conducting research on autism spectrum disorders in low and middle income countries. Journal of Autism and Developmental Disorders, 43(9), 2002-2014. https://doi.org/10.1007/s10803-012-1750-2

Thomas, R., & Zimmer-Gembeck, M. J. (2007). Behavioral outcomes of parent-child interaction therapy and Triple P—Positive Parenting Program: A review and meta-analysis. Journal of Abnormal Child Psychology, 35(3), 475-495. https://doi.org/10.1007/s10802-007-9104-9

40

Using Sufficient Response Exemplar Training to Improve Blends Articulation in Children With Autism

Anupama Jagdish, Smita Awasthi, Sridhar Aravamudhan

Behavior Momentum India

Abstract

Children with autism are at a higher risk of being affected by speech disorders and often require remedial intervention. Eikeseth and Nesset (Journal of Applied Behavior Analysis, 36(3), 325–337, 2003) used sufficient-response exemplar training of vocal imitation in conjunction with prompting, chaining, and shaping procedures to successfully teach 2 typically developing children to articulate several Norwegian words with blends. The present study extends and adapts these procedures to children with autism. Participants were TA, an 11-year-old boy, and KS, a 15-year-old girl, both with autism and speech sound disorders. For each participant, 3 sets of 10 words with specific blends in the initial position were targeted for training. Vocal imitation training with within-stimulus prompts was used for both participants. For KS, lip-tongue-teeth position prompts and chaining were added during the training of certain words. A multiple-baseline across-behaviors (word sets with target blends) design demonstrated improvement in the articulation of trained words and generalization of correct articulation to untrained words with both participants. The findings suggest that speech sound disorders in children with autism can be addressed with behavioral interventions.

Keywords: Autism. Speech sound disorder. Phonological disorder. Articulation disorder. Sufficient-response exemplar training. Echoic. Vocal imitation training. Chaining.

41.

The Effect of Daily living skills training in children aged 3 to 5 yearshaving moderate developmental delay with mild Autism Spectrum Disorder

Dr Ghousia farheen,

Lecturer in Rehabilition Psychology(G.F)

ABSTRACT

The study aimed to see the Effect of Daily Living Skills training of 3 to 5 year old children having mild developmental delay with mild autism spectrum disorder. The data has been assessed by using DST (Developmental Screening Test), VSMS (Vineland Social Maturity Scale),VABS II (Vineland Adaptive Behaviour Scales) and ISAA (Indian Scale for assessment of autism). The study has been examined on 4 children having moderate developmental delay with mild autism spectrum disorder. To compute the effectiveness of daily living skills training on toileting, dressing and grooming of all children, paired t test has been used. The findings indicate that there is a significant effect of Daily Living Skills training on children, t (3) = 19.23, p < 0.001.

KEYWORDS

Developmental delay, Autism Spectrum Disorder.

42.

Efficacy of Orton-Gillingham approach on Phonological Awareness and reading fluency among students with Dyslexia.

Ms. Buelah Susan K, Lecturer, NIEPID, Secunderabad
Mr. Satish, M.Ed SE (ID) Trainee, NIEPID, Secunderabad

Abstract

Reading difficulties are the most common cause of academic failure and underachievement. The Orton-Gillingham approach has been an influential intervention designed explicitly for remediating the language processing problems of children and adolescents with dyslexia. The main objective of the research was to determine the effectiveness of an Orton-Gillingham (O-G) based multisensory reading intervention on students (5) who were diagnosed with a dyslexic reading disability. This study investigated instruction delivered weekly thrice for thirty minutes, one on one, through the Orton Gillingham approach using multisensory techniques. The study measured the effectiveness of this type of instruction. The findings of the study confirmed a constructive relationship between the Orton-Gillingham method of reading intervention and student learning outcomes in word identification, word attack, spelling, word reading fluency, and phonological awareness.

Keywords: Reading difficulties, Orton Gillingham Approach, Multisensory technique, word identification, word attack, reading fluency and phonological Awareness

43

Use of Artificial Intelligence to Improve Self-Efficacy in Individuals with Intellectual Disabilities

Rashmi v. Aakode, and Srihari Swamy

Abstract

Artificial intelligence (AI)-powered assistive technologies can help persons with intellectual disabilities (PWIDs) write and express their ideas. These technologies can create tailored training programs of varying complexity levels, including social stories, for PWIDs. AI can analyse a person's patterns of behaviour, helping PWIDs understand and regulate their behaviour. It can also help monitor health and exercise, thus improving the overall quality of life of PWIDs.

44

Present Pedagogy of imparting education through Flash card is not effective besides being monotonous and not interactive.

Mr. Uday Mehta,
Founding Director Siddh Divyang

Abstract

He set up Siddh Divyang foundation in the memory of his special son "Siddh" who left his mortal body after 34 years on 17th July 2021.

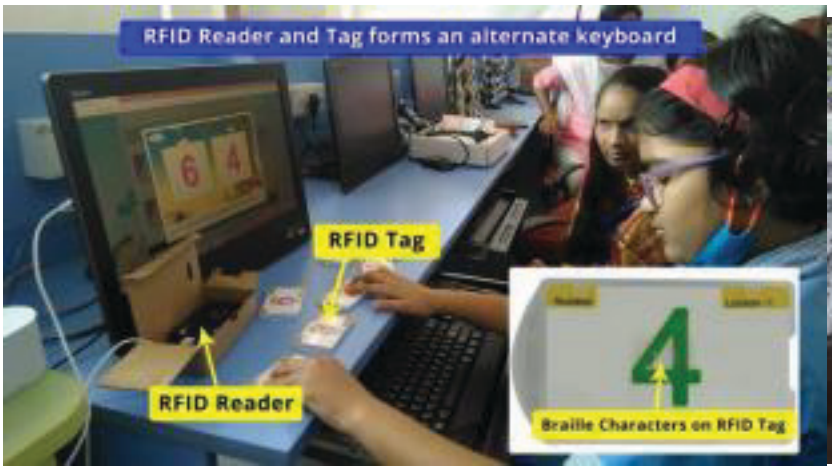
Having visited several Divyang Schools over this period they have noted the present Pedagogy of imparting education through Flash card is not effective besides being monotonous and trainer driven. To make this Process System driven, scalable, replicable and Interactive with Multimedia content in different Indian regional languages SDF has designed, developed and now Implementing the Project "Knowledge Vision" driven by Siddh Divyang Platform in several Divyang Schools in Maharashtra, Gujarat, Uttarakhand and Telangana at "NO COST" to the schools.

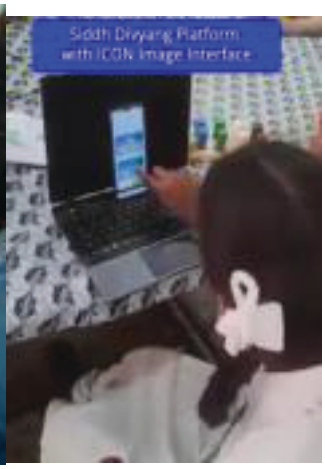
Explained the Work Done : How it Works

An Alternate Keyboard consists of RFID tags with an Image imprinted on tag and RFID reader enables Divyang persons to directly interact with the Application running on the computer. In case of blind children Braille characters are embossed on the image. As can be seen below.

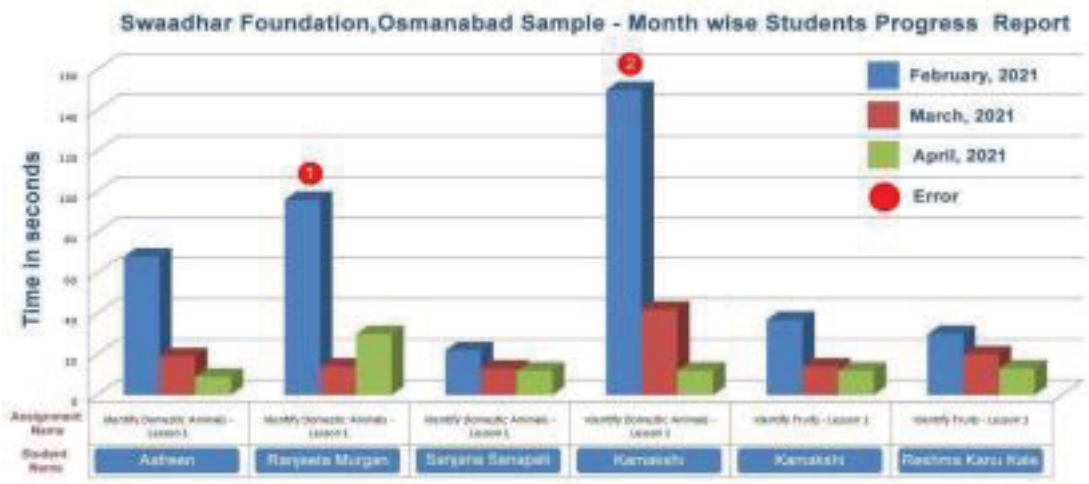
Application has two modes 1) Learning and 2) Assessment. In case of learning Divyang person will place a tag with an image of say "Cat" then system will describe about Cat in different Indian language i.e. Marathi, Hindi, English.

In assessment mode, Application will ask a question say it plays a sound of Cat and Divyang child is asked the question identify the animal. Divyang child is expected to pick up the correct RFID Tag (with Cat image) from five different Tags (Dog, Cat, Cow, Buffalo and Camel) on the table and communicates the answer to the application by placing the tag on RFID reader. Application monitors the time taken to respond and accuracy of the answer. If the answer is incorrect the application will give correct answer also. The report is generated as below.





There is also an online version of "Knowledge Vision" application with Image iCon for the Divyang student to communicate with the application thru touch without requiring RFID tags
and reader combination. To Ensure that students are actually learning please observe the graph as below:



Reports Generated using Gaming Approach"

Result: The Platform is very well received by the Divyang Children and Institutions. It has also been implemented at NIEPID in Secundarabad. Presently there are more than 15 schools using this platform.

We are ready to work with more schools across the country. Author Details: Founding Director Mr. Uday Mehta, B. Tech. (IIT Bombay Electricals 1974 batch), In the USA he did his M.B.A, in Finance from Santa Clara University and C.P.A. from California. Mr. Mehta has vast experience of project management for the projects funded by multilateral and bilateral donors like The World Bank, ADB, US AID, Helvitas, Danida, Bhutan, Maldives and Bangladesh

45

Disability Solutions and Rehabilitation Models for Persons with Intellectual and Developmental Disabilities

Dr. R. Shilpa Manogna

Faculty, Dept of Special Education, NIEPID, Secunderabad

Abstract:

People with intellectual and developmental disabilities (PWIDD) have several rehabilitation needs. Historically it was believed that PWIDD were not productive and should not be brought into the mainstream society. Department of Empowerment of persons with disabilities, Govt of India has established National institute for the empowerment of persons with intellectual disability (NIEPID) with a mandate developing human resources development, Research, models of care & rehabilitation services and community outreach and extension programs in the area of intellectual and developmental disabilities in the country. The multi-disciplinary rehabilitation service model, Transition model, Social Capital model, respite care model and special education and vocational rehabilitation models developed by NIEPID focused on trust building, awareness creation, Parent training, prevention, integrated rehabilitation intervention & support services to promote independence and inclusion of PWIDD. Many milestones have been achieved and significant achievements have been made. Much has been done. However much remains to be done. The objective of this paper is to analyse and discuss the evidence-based rehabilitation models developed by NIEPID to provide comprehensive services to increase the quality of life of PWIDD, disability solutions and the gaps in successful implementation of the models and services for the empowerment and inclusion of PWIDD.

46.

Cost-efficient and customisable home-based Intervention for Cerebral Visual Impairment (CVI)

Prathyusha Potharaju[1], Upendra Sarashi[1*]

1.Research Lead, Grailmaker Innovations, Hyderabad

1. Rehabilitation Consultant, LV Prasad Eye Institute, Hyderabad*

ABSTRACT:

Cerebral Visual Impairment (CVI) is the deprivation of visual function due to neurological damage. Globally, it is the leading cause of childhood blindness. It remains a hidden disability, affecting more than 50% of children with Autism or Cerebral Palsy (CP). However, vision therapy for these children is still inaccessible due to the limited proficiency of the therapists on CVI. Even, the Teaching and Learning Materials (TLM) for CVI are different from those used for ocular impairments. Thus, we have developed specialized materials for the intervention of CVI which are cost-effective and easily designed by both parents and therapists. They are supplemented by a digital application called Vision Nanny, which provides a library of activities for improving the visual skills of children with CVI. These activities can be easily customised for the needs of the child at any phase of CVI. The application is validated with a pilot study on 35 children between the ages of 6 months to 16 years. The results show that the digital intervention is equally engaging and even more user-friendly for parents to provide the home-based intervention. With our materials and application, these children can avail the consistent therapy even at home, which is very crucial for their timely development.

47 A Retrospective Study on Special Educator's Psychosocial Experiences of Online Teaching

Keertisudha Rajput[1], Prem Kumar[2], Milind Karanjkar[3]

[1]NIEPID,Secunderabad, India (keertisudha2012@gmail.com)

[2]NIEPID, RC, Kolkata, India (prem.niepid@gmail.com)

[3]District Civil Hospital, Pune, Maharashtra, India (k.milind06@gmail.com)

Abstract

Introduction:

In the new normal post COVID-19 Situation, online teaching is an equally weighted integrated part of the special education. The various experiences of teachers with online teaching has enriched and brought up many new technical solutions to make online teaching more effective and smoother. But the psychosocial perspectives of the online teaching are still less studied.

Aims and Objectives:

The present study aims to explore the special educator's psychosocial experiences of online teaching to children with disabilities during COVID 19 Pandemic.

Method:

This is a retrospective exploratory study. A structured questionnaire was designed. The special educators shared their psychosocial experiences of online teaching during lockdown in terms of home environment of special educators, home environment of the child with disability while online teaching was conducted, the feelings of the educators, the psychosocial challenges faced and solutions implemented by them. A total of 50 educators participated.

Results:

40 to 50 % of participants reported poor home environment of children such as insufficient light, background noise, improper clothing of family members. 10 to 20 % of participants reported disturbance for household work and discouragement in preparing for the online classes within the family of special educators. The participants have made an attempt to resolve these challenges.

Conclusion:

Along with the technical challenges and solutions, the psychosocial experience of the special educators is also a vital component of the online teaching.

Key Words: Online Teaching, Psychosocial Experiences, Special Educators

NOTES