



Holistic Learning and Inclusion for Children with Developmental Delays in Motor, Language & Cognition

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Abstract

The research project had a heterogeneous group of six children with special needs (ADHD, ASDs, Learning Difficulties, Speech Impairment and Down's syndrome) in an inclusive environment along with children who did not have special needs. This was done with the focus of seeing how these children develop holistically and progress in various domains when complemented with a group of neurotypical (NT) children.

Children with special needs differ in a number of ways from neurotypical children. In an inclusive set up, arts based therapy has been found to facilitate social interactions and learnings in a non-threatening and uninhibited manner. The peers served as appropriate language, social, and behaviour models. There were no control groups in the project.

Motor, Language and Cognition were the key domains that were addressed. The results that emerged at the end of the project showed marked improvement in the skills in the chosen domains and also showed visible progress in the other domains. The therapeutic goals were met quite well for the entire group. The inclusive setting contributed to the progress made by the children with respect to peer interactions and social dynamics.

By virtue of the fact that this research project involved a variety of new techniques to help the children, one had to come up with a different set of measurement criteria to monitor the progress of the children. While most of the new measurement tools showed substantial improvement in the children, further validation came from the fact that the standard tools showed very similar growth patterns as compared to the new measurement criteria used. The usage of the assessment tools in triangulation with Intuitive Metaphysical Machinery (IMM) and the intent of the project has made this research project truly meaningful.

Introduction

2.1 THE LARGER PROBLEM

The population type is a heterogeneous group of children with special needs. It includes children in the Autistic Spectrum, Down's syndrome, ADHD, Speech Impairment and LD's. The children are between 3.5 yrs to 7yrs. They all come from middle class backgrounds and have been part of inclusive learning settings. Most of them have had early interventions and have been undergoing speech, occupational, cognitive and physio therapy. The assessment domains of the group identified for intervention using ABT were motor, language and cognition. They understand instructions but are unable to structure and verbalise their responses. They are unable to initiate social interactions and have two way conversations.

The inclusive environment had neurotypical children in the age group of 4yrs to 7 yrs. This environment was not fixed and had varied through the project.

2.2 DIAGNOSIS OF INDIVIDUAL CLIENT NEEDS

1. Eshaan Raikar
2. Faizan
3. Sneha Sunil Nair
4. Aditya Prabhu
5. Krishika Kataria
6. Shiva Pillutla

Family Background:

4.5yrs, has been diagnosed as having PDD (pervasive development disorder) and shows signs of mild autism with speech delay. Since he did not establish eye contact, respond to his name and showed speech delay he was advised therapy. Eshaan loves songs, doing puzzles and scribbling.

Academic and Rehab Teacher's Input:

- § Eshaan is an active child. He enjoys looking at picture books & tries to read them independently. He is able to recognize many of the numbers, shapes & colours taught so far. He is able to pair objects correctly. He has learnt to ask for a particular activity that he may want through actions or through a few words. Eshaan can be very warm & affectionate once he develops a bond with a particular person.
- § Eshaan goes to Comdeall (Centre for Communication Disorders and Occupational Therapy). He was then started on one-on-one Speech therapy sessions by Dr. Radhika Puvaiya. Within two months, he was able to communicate using 7-8 signs and mouthed 2-3 words. Now, Feb 2011, Eshaan speaks about 100 words and is yet to start speaking sentences.

Medical Background:

Doctors at Manipal Hospital have diagnosed Eshaan for PDD (pervasive development disorder) and assessment tests show signs of mild Autism.

Weakness:

- § Eshaan twitches and jitters when he is unable to express something and screams very loudly. When he gets angry or excited he starts to bite.

Strengths:

- § Eshaan has a good recall memory and is able to express what he wants even with his limited vocabulary and verbal expression.

Creation :

Eshaan's main area of need is motor development –fine, gross and oral motor. The second area of focus will be speech development and language articulation.

CLIENT 2 : Faizan

Family Background:

6yrs 9 months, has been diagnosed for autism with speech disorder. Faizan has a sister who is 8years old and is very attached to his mother. His father doesn't seem to be involved with his development. At times, his mother does get violent with him and that adds on to his aggression. Faizan is always rocking and is unable to say any words.

Academic and Rehab Teacher's Input:

- § Faizan is being exposed to picture cards for associations during his sessions. He can slowly recognize actions in pictures. He can imitate a few actions done. He does have sensory issues and has delayed motor development. He walks on his toes and cannot balance well. He is continuously rocking himself and making loud sounds as he swings himself.
- § He understands instructions well and also acts accordingly. He is able to do climbing activities with a little help.

Medical Background:

Faizan has been diagnosed for autism and speech impairment. He also has delayed motor development and sensory dysfunction. He is undergoing speech therapy with Dr. Deepa Ravi and requires the intervention of an occupational therapist.

Weakness:

- § He does exhibit aggressive behaviour and lands up hurting other children at times.
- § He pushes other children hard at times and that is his strongest way of expression.
- § He also has episodes in which he screams and laughs uncontrollably.

Strengths:

- § Enjoys being with people.
- § Loves music and tries to make actions.
- § Non verbally is able to communicate his likes and dislikes.

Creation:

Faizan's main area of need is motor development –fine, gross and oral motor. The second most area of focus will be speech development , with focus on vocalization of sounds and neuro-physiological structures related to sound.

CLIENT 3 : Sneha Sunil Nair

Family Background:

4 yrs, Sneha is a child with Down's syndrome and born with a congenital complete AV-Canal defect. She does get breathless, blue and is highly susceptible to respiratory distress.

Academic and Rehab Teacher's Input:

- Sneha is fairly comfortable conversing in English and also understands when spoken to in Tamil, Malayalam and Hindi. She follows quite a few of the instructions we give in class in English. She needs to become independent with doing her own activities. Our focus with her has primarily been in terms of facilitating integration with other children in a learning environment.
- Sneha has shown a marked improvement in her language development. She requires immediate intervention in occupational therapy and also in motor development. The physiotherapy needs to be continued along with oral motor stimulation. Sneha should be encouraged to work with her hands.

Medical Background:

Her early developments were very slow. She is on Flohale to help her lung functioning. She is undergoing cognitive therapy and speech therapy.

Strengths:

- § Sneha has an excellent recall memory and a good hear for music.
- § She is an affectionate child who loves to have people around her.

Weakness:

- § She is extremely violent at times and it is difficult to manage her and hold her against her biting and pinching.
- § She is unable to sit upright and is lethargic.

Creation:

Sneha's main area of need is motor and sensory development, initially a little more focus on motor planning and oral motor development. The second area of focus for her will be in bi-parietal motor and other movement related limbic coordination.

Family Background:

4 yrs, Aditya has been diagnosed to be in the ASD spectrum as he has less eye contact, speech delay and no peer interaction. His parents are disturbed that his academic milestones are not at par with children of his age. He is undergoing regular schooling and has been suggested by the school for intervention and remedial assistance.

Academic and Rehab Teacher's Input:

- Aditya has a good vocabulary but however needs lot more clarity in his diction. He rarely speaks in complete sentences. At times he amazes us with his language usage. He is physically agile and loves jumping, running, hopping and all other physical activities. At times, he is quite withdrawn and lost in his own world. It does not matter to him as to what others around him are doing. He has no peer interaction and is not able to have two way verbal communications. He keeps talking to himself.
- There are no behavioural issues visible. He has an excellent memory. He enjoys working with shapes and is able to identify shapes like parallelogram, trapezium. He is poor with his fine motor development and struggles to use writing tools.

Medical Background:

His early development and milestones were normal except for speech delay. There is no medical history available from the parents' end.

Strengths:

- § Aditya is high functioning and has a good recall memory. He is receptive to instructions.
- § He is easy to reason out with and ensures that his work space is kept clean.

Weakness:

- § He is unable to express his likes and dislikes and has no peer interaction.
- § Given his age, his fine motor development is poor.

Creation:

Aditya's main area of need is motor development –fine and gross. The second area of focus will be language articulation , clarity in speech and two way conversation.

Family Background:

6yrs 8months, Krishika is a child with learning disability, expressive speech disorder and is functioning at a mental age which is below her chronological age. She is a slow learner. She is undergoing integrated schooling at Insight Academy. She is the second child of her parents.

Academic and Rehab Teacher's Input:

- Krishika is fairly fluent in her mother tongue, Marwari. However, communication in English is less. She is fairly alert and attentive. She is able to name objects from the pictures but cannot describe a picture in brief sentences. She is able to differentiate between big and small.
- Krishika can identify familiar objects. She is unable to distinguish between right and left concepts. She matches shapes by sight, however can identify only a few of them. She maintains eye contact rarely but can follow instructions. She lacks clarity of speech. She should be encouraged to participate in extracurricular activities, develop social skills and improve peer interaction.

Medical Background:

Her early development and milestones were normal except for speech delay. Family history is not significant to any disorders.

Strengths:

- § She is extremely affectionate and she follows instructions if spoken to slowly.
- § She is good with working with her hands, enjoys music.

Weakness:

- § She is unable to express what she wants and at times she is lost in her own world, refuses to engage with anyone and stares blankly.
- § At times, she gets violent and starts to hurt others.

Creation:

Krishika's main area of creation is acquisition of language and articulation with focus on associative and perceptual memory. Her second important area of focus is peer and social interaction.

Family Background:

4yrs 6months, Shiva is a hyperactive child with clear signs of ADHD. He has a very limited attention span, is high on energy and does not have clarity in speech. He is undergoing regular schooling at Kumarans.

Academic and Rehab Teacher's Input:

- § Shiva is fluent in his mother tongue, Telugu. He speaks in English but most of the times he is fast and cannot be understood. He constantly keeps asking "why", for anything that he is asked to do. He is quite fearless and goes on with things at he wishes to do. He is unable to decide if he needs to use his right or left hand while writing. He doesn't like to sit in a place for more than 5 minutes.
- § He is quite observant and can learn new concepts with ease . His needs a lot of assistance with reading and writing. He enjoys constructing with blocks and is good with patterns. He speaks a lot in between sessions and tends to distract the class. He is unable to articulate with the appropriate response in conversation.

Medical Background:

His early development and milestones were normal except for speech delay. There is no medical history available from the parents' end. Remedial help that address his sitting tolerance and school readiness will help him.

Strengths:

- § He is good at grasping things and has a good recall memory.
- § He is extremely clear of his likes and dislikes.

Weakness:

- § At times, he is very stubborn and just refuses to listen in group sessions.
- § He is unable to focus in any structured learning sessions and is quite distractive.

Creation:

Shiva's main area of creation will be to work on better attention span and social skills. The second most important area of focus will be in helping him deal with his hyperactivity and improve his concentration in structured learning activities.

2.3 LITERATURE REVIEW OF CREATIVE ARTS THERAPIES

Art based therapy that encompasses music, drama, play and visual art is a form of expressive therapy. Experiencing art both passively and actively can improve brain function, motor and cognitive performance. When children find an art form that sustains their interest, the subsequent strengthening of their brains' attention networks can improve cognition more broadly. Children with special needs have an ability to think visually - "in pictures." That ability can be turned to good use in processing memories, recording images and visual information, and expressing ideas through drawing or other artistic media.

Music and visual art help to improve skills in areas such as communication, social skills, sensory issues, cognition and motor skills. It is a natural "reinforcer" for desired responses. Music is a vehicle of communication that would allow one to be "heard," and understood, empowering one to be a part of something larger than oneself. In being a part of a larger whole, self-awareness and consciousness expand allowing one to experience new ways of being.

Music helps those with sensory aversions to certain sounds to cope with sound sensitivities and in auditory processing. Self expression through visual art making is a powerful, safe way of allowing the child to express their feelings in relation to their disability.

A growing body of research supports the clinical effectiveness of play therapy for children with self-concept issues, behavioural adjustment, social skills, emotional adjustment, intelligence, and anxiety/fear. Play showed a benefit in improving both receptive and expressive language skills in children with speech difficulties.

Dance and movement use simple movements to help children form appropriate brain connections. The vestibular, proprioceptive, visual, motor, sensory and auditory systems are significantly enhanced. Dance/Movement Therapy has been a successful intervention in the treatment of autistic children.

Exploring creativity through art based forms acts as a catalyst for healing & learning.

2.4 HYPOTHESIS:

ABT can significantly improve the perceptual learning, associative memory, language articulation, fine and gross motor skills of the selected children with cognitive , language and motor disabilities thereby holistically preparing them for inclusion.

METHODS

3.1 ELIGIBILITY CRITERIA FOR PARTICIPANTS

All the selected children have been part of an inclusive set up either with us or at another school. Some of children have been undergoing one on one interventions but this is their first intervention as a group. The criteria for selection have been children with learning difficulties, speech delay, motor and cognition issues and hyperactivity. Except for one, the others are all toilet trained. There were 10 participants in the beginning. Of these 10, four of them moved on to other schools. The group had to get reconstituted and the final heterogeneous group had six children. These children were a part of a set up with other children in an inclusive environment.

Demographics of the group:

AGE	3.5 to 7 yrs
GENDER	2 girls and 4 boys
BACKGROUND	They all come from middle class homes

3.2 LOGISTICS:

Settings : Heterogeneous Group with 6 children in an inclusive setup
Location : Magic Puddles BTM Layout
Start Date : 3rd June 2011
End Dates : 2nd September 2011
Duration : Tuesday, Wednesday, Friday

3.3 DATA SOURCES & COLLECTION PROTOCOLS

The data collection protocols of observations formats, standard validated tests and the ABT assessment tools will be used along with *Intuitive metaphysical machinery* (IMM).

Data Collection Formats: (see Appendix A)

The Data collection formats will be used to assess the progression in the following skills:

- Appendix A1 -Motor Skills: Fine and Gross
- Appendix A2 -Oral Motor Skills: Life Skills and Speech Related
- Appendix A3 -Cognitive Skills and Language -Communicative Skills

Data Collection Format	NAME OF THE CHILD	FREQUENCY	DATE OF ADMINISTRATION
1) Motor Skills: Fine and Gross	Faizan, Eshaan, Sneha, Aditya, Shiva	Thrice-once every 10 sessions	Last week of June, Last week of July & First week of September
2) Oral Motor Skills: Life Skills	Faizan, Eshaan, Sneha, Krishika	Thrice-once every 10 sessions	Last week of June, Last week of July & First week of September
3) Oral Motor Skills : Speech Related	Faizan, Eshaan, Sneha, Krishika	Thrice-once every 10 sessions	Last week of June, Last week of July & First week of September
4) Cognitive Skills	Shiva, Aditya, Krishika, Sneha	Thrice-once every 10 sessions	Last week of June, Last week of July & First week of September
5) Language-Communicative Skills	Shiva, Aditya, Krishika	Thrice-once every 10 sessions	Last week of June, Last week of July & First week of September

Standard Validated Tests: (See Appendix B)

The standard validated tests that would be administered on the population type to assess motor and cognitive domain would be:

- 1) Intelligence –Sequin form Board.
- 2) Knox-cube Imitation
- 3) Colour Cancellation Test
- 4) Hand Tapping Test

NAME OF THE TEST	NAME OF THE CHILD	FREQUENCY	DATE OF ADMINISTRATION
Hand Tapping	Shiva, Aditya, Krishika, Sneha, Eshaan, Faizan	Twice	First week of July & Last week of August
Intelligence –Sequin form Board.	Faizan, Eshaan, Sneha, Shiva, Aditya, Krishika	Twice	First week of July & Last week of August
Knox-cube Imitation	Faizan, Eshaan, Sneha, Shiva, Aditya, Krishika	Twice	First week of July & Last week of August
Colour Cancellation Test	Shiva, Aditya, Krishika, Sneha, Eshaan, Faizan	Twice	First week of July & Last week of August

ABT Assessment tools: (See Appendix C)

- Appendix C1 : Narrative capability Development (NcD) scale
- Appendix C2 : EPR-based
- Appendix C3 : Observing the way one drums
- Comparisons of Drawings and Paintings

NAME OF THE TEST	NAME OF THE CHILD	FREQUENCY	DATE OF ADMINISTRATION
EPR-based	Faizan, Sneha, Eshaan, Shiva, Aditya, Krishika	Every 10 sessions	Last week of June, Last week of July & First week of September
Observing the way one drums	Faizan, Eshaan, Aditya, Shiva, Sneha, Krishika	Every 10 sessions	Last week of June, Last week of July & First week of September
Narrative capability Development (NcD) scale	Shiva, Aditya, Krishika, Sneha	Every 10 sessions	Last week of June, Last week of July & First week of September
Comparisons of Drawings and Paintings	Faizan, Eshaan, Sneha, Aditya	Every 10 sessions	Last week of June, Last week of July & First week of September

3.4 METHODS USED: (See Appendix D for SRS summary format)

The ABT sessions were planned with the use of the various arts media in alignment with the individual therapeutic goals as well as the collective goals of the inclusive group.

The action research phase of 35 sessions was designed as if it were a single ABT session with the three parts -artistic communion, focussed creation and closure. This meant that the project was in three parts of 12 sessions, following the flow of a ABT session design. The three parts were group dynamics and interactions (*artistic communion*), therapeutic goal/s (*focussed creation*) and improvisations (*closure*).

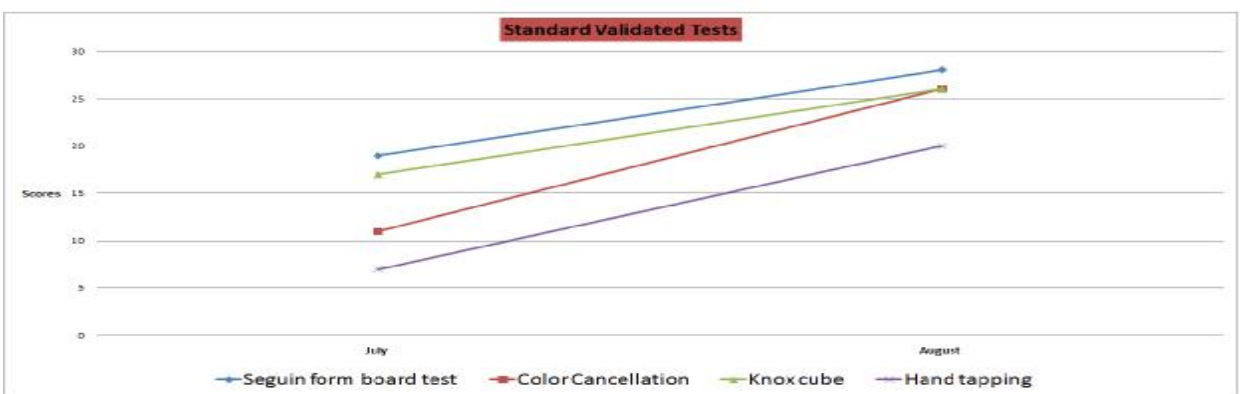
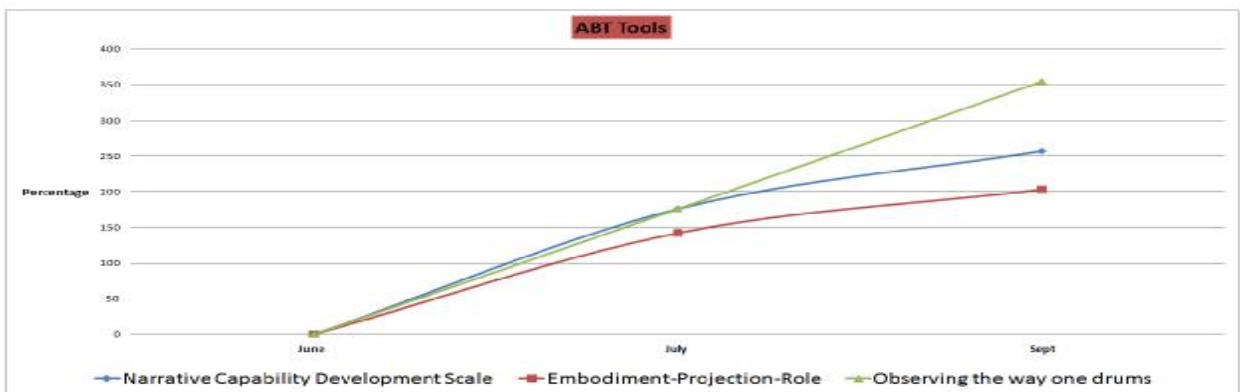
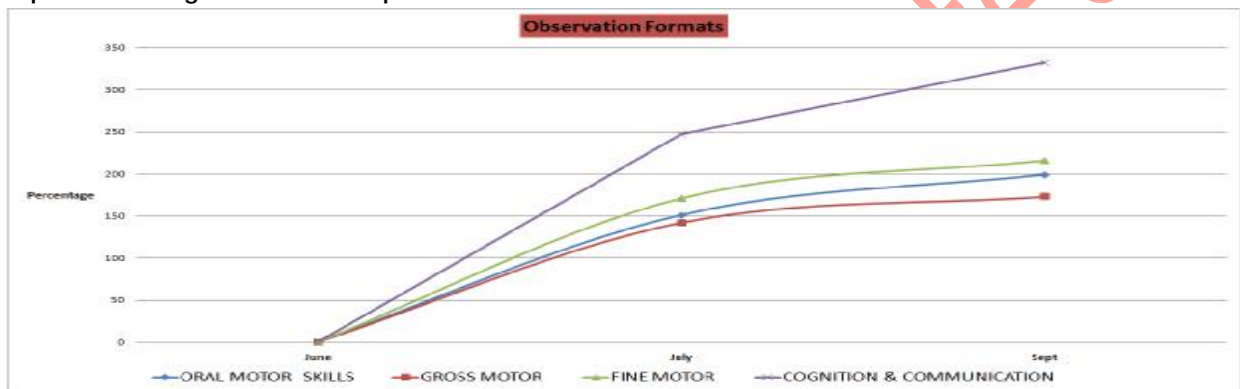
Each of the arts form used aided in both addressing the need of the group better and also addressing the skills in the various domains. The EPR based sessions & the drumming sessions were most enjoyed by the children. Improvisations and techniques in the visual arts media served as a great tool to enhance fine motor skills. Voice and stories helped to work on the cognitive ability of the group. The structured play sessions addressed parameters in the social dynamics domain with ease.

On the whole, the ABT tools served to bring about holistic development in the children as well as in the facilitator.

RESULTS (OUTCOMES)

4.1 RESULTS SUMMARY:

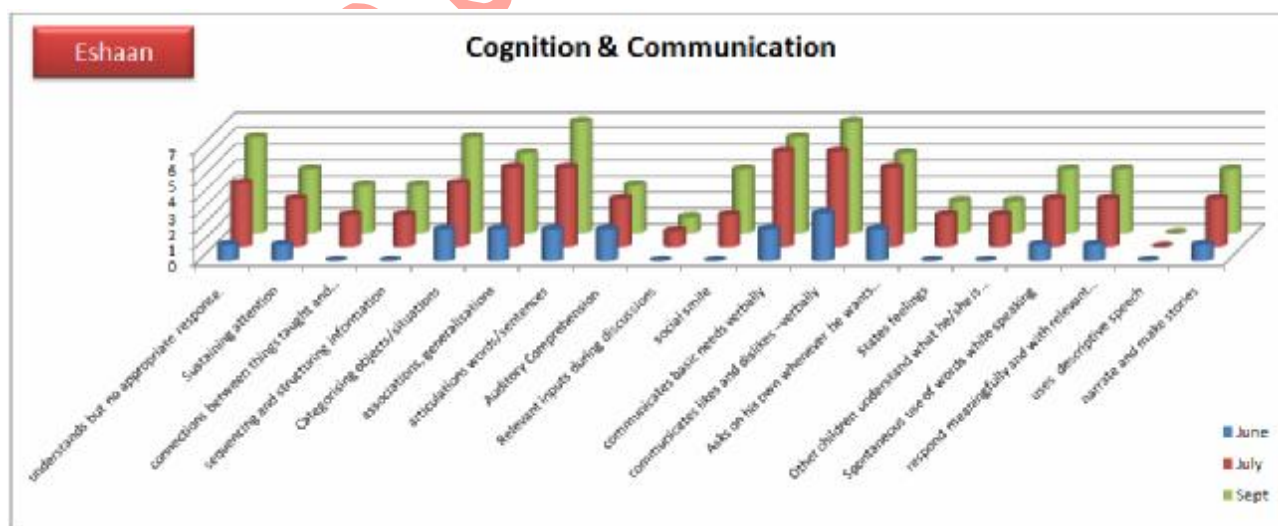
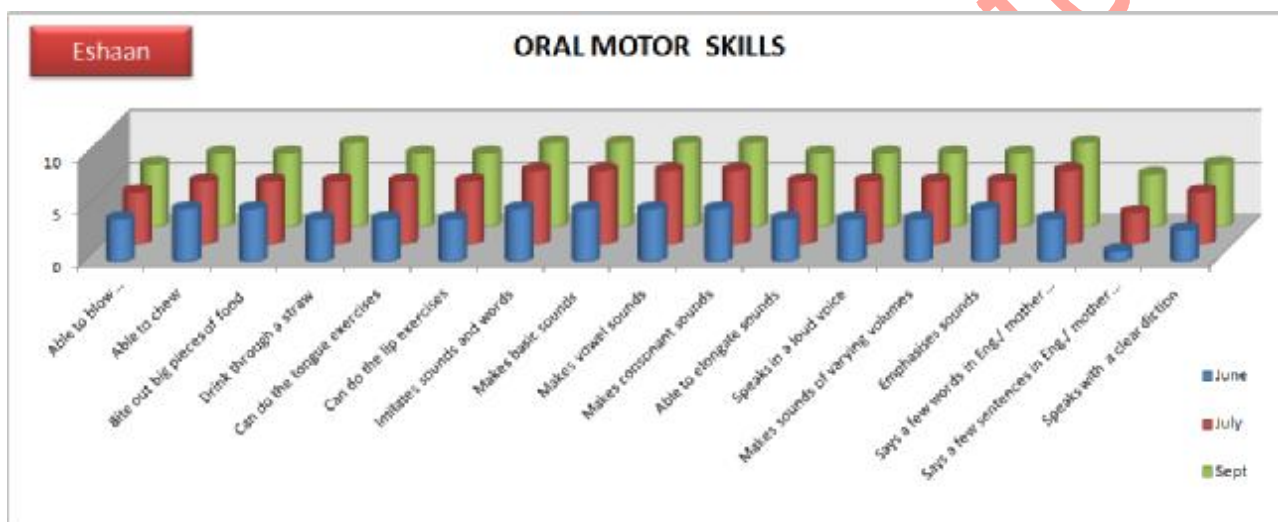
- The consolidated graph in each of the evaluation tests represents the progress made by the group from June to September. The sessions were conducted, tests were administered, progress was tracked and graphs were plotted with June being the baseline.
- There is marked progressive trend seen across motor, language and cognition domains (holistic development).
- There is a marked similarity in the growth pattern of the group across the standard validated tests and the evaluation tools (observation formats and ABT tools).
- The first two graphs clearly indicate that the use of new and innovative techniques and tools showed an immediate growth pattern. Sustaining the progressive trend further would require repetitive and improvised usage of the techniques.

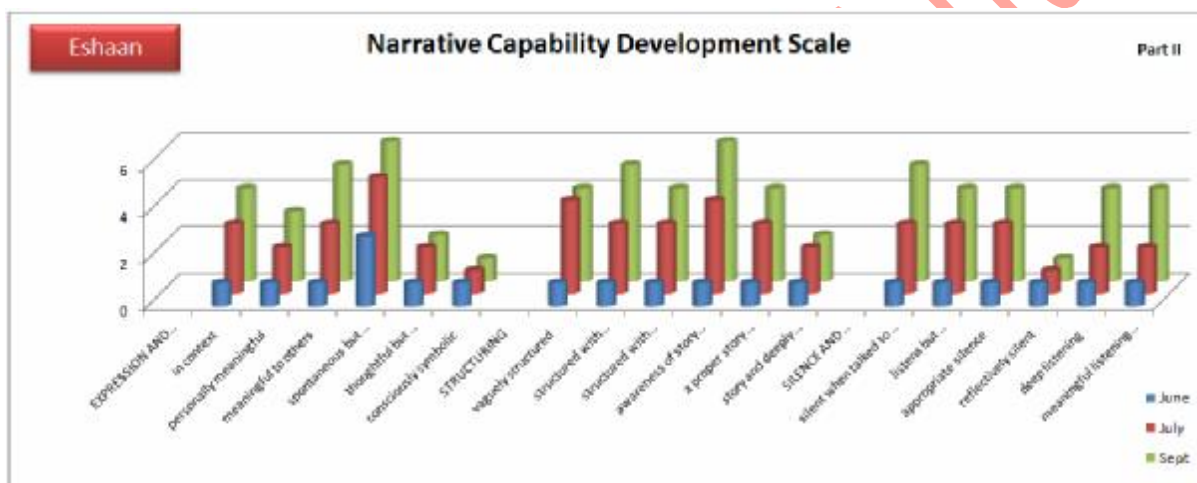
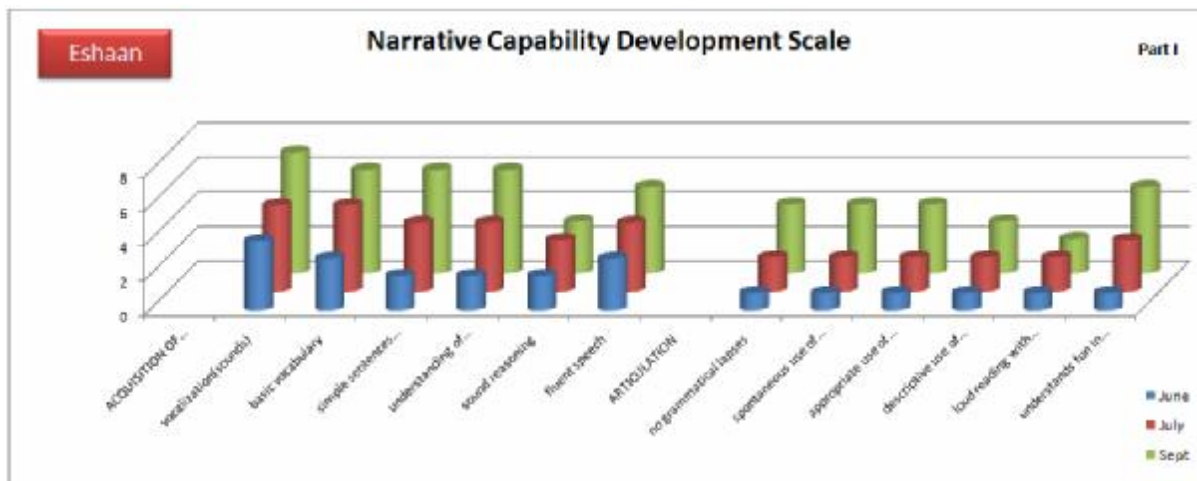


4.2 RESULTS DETAILED:

4.2.1 Eshaan Raikar

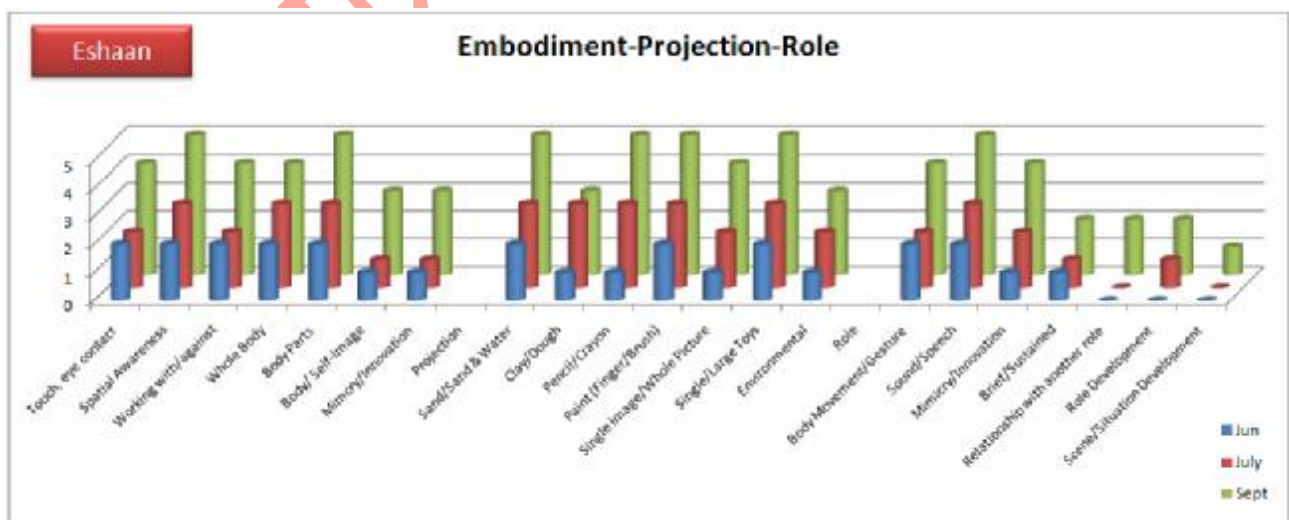
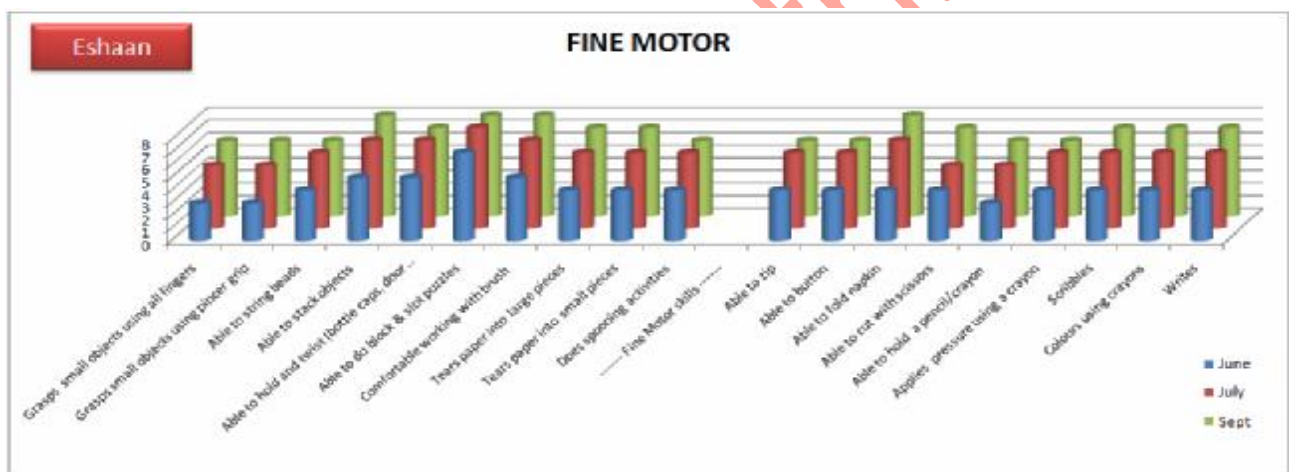
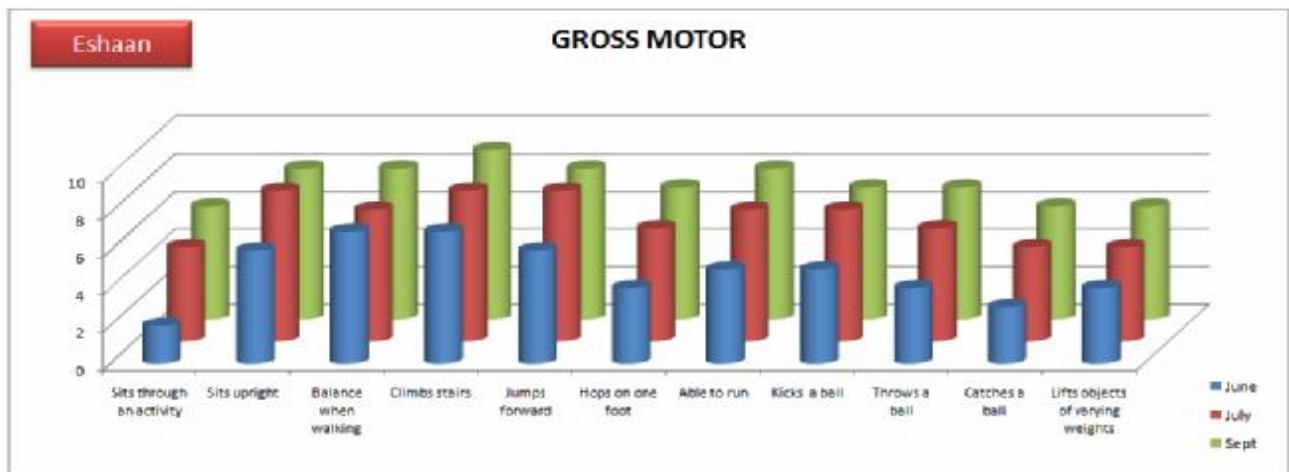
There has been a marked improvement in Eshaan's language skills. From conversing in words and mono syllables, Eshaan now is able to engage in short conversations. He is able to articulate his likes and dislikes well. The ABT story telling sessions have helped Eshaan with connecting words and framing sentences. He has become more confident in his speech and language. Music and songs have served as a tool for language development with clear improvement in his voice clarity. He is making attempts at being understood the others. He is very observant and is trying to imitate by watching. However, he is yet to get as comfortable with his peer as he is with his facilitators. Eshaan likes to be by himself and we are working with his peer interactions by way of partner work in an inclusive environment.





With progress seen in the language acquisition, the next focus area could be language articulation, communication and peer interaction. He now needs to work on spontaneous use of speech, processing and structuring of language and information.

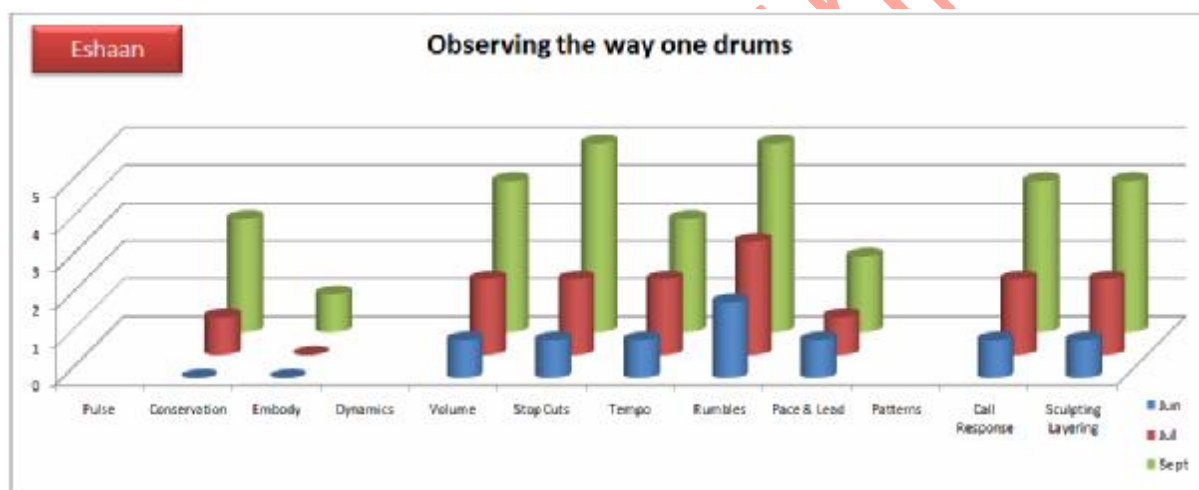
His sitting tolerance and turn taking have also improved with him responding well to activities involving visual arts forms. Improvisations using crayons, paints and other different tools & techniques have helped Eshaan with his fine motor and pincer grip. With focussed work on his pincer grip, Eshaan should be able to easily take on pre-writing activities.



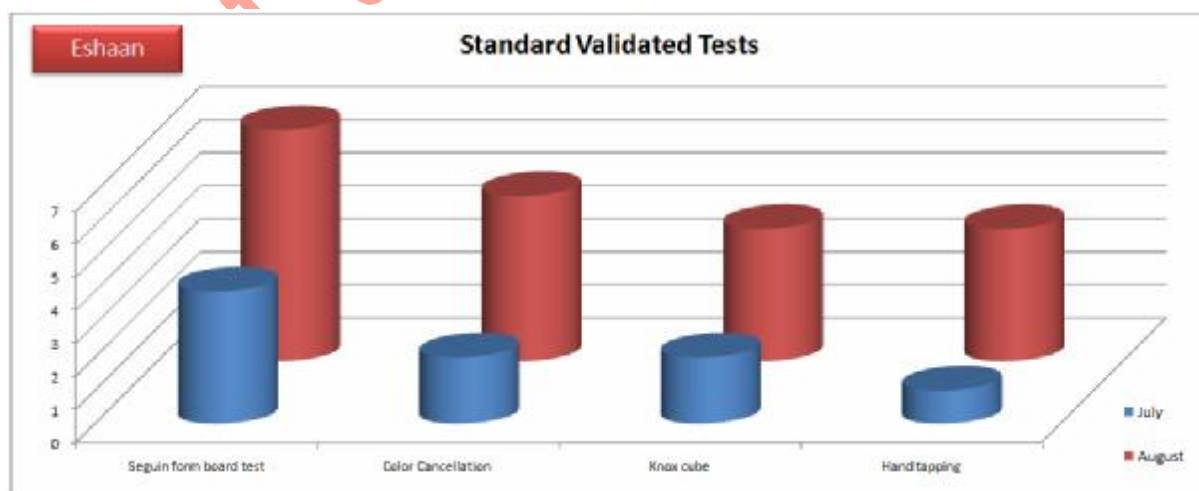
COMPARISON OF DRAWINGS:



He has responded well to all the arts forms used and has also taken a great liking to painting where he is exploring styles for himself. Drumming has helped Eshaan in his cognition. Drumming and music can be used as a key tool in facilitating group interactions and social thinking for Eshaan.

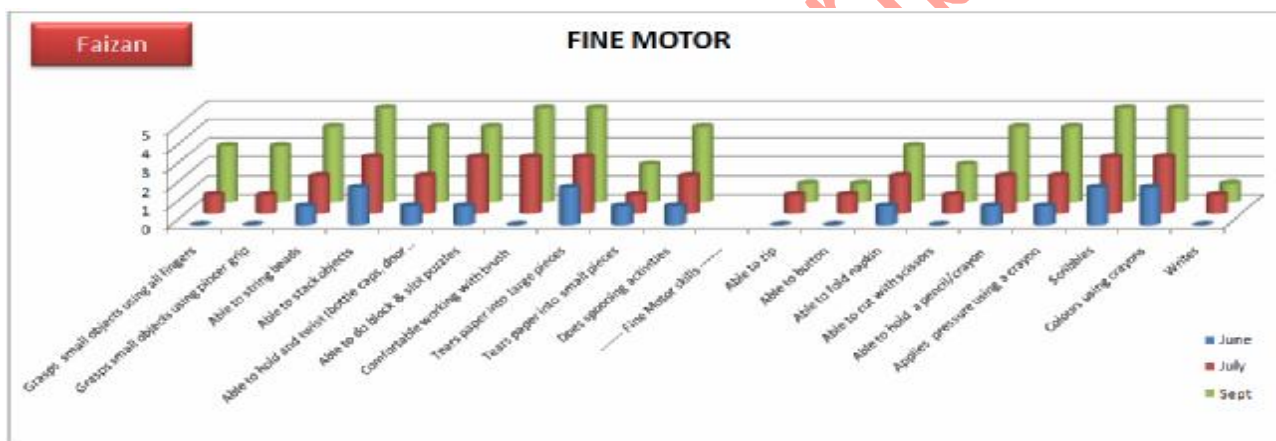
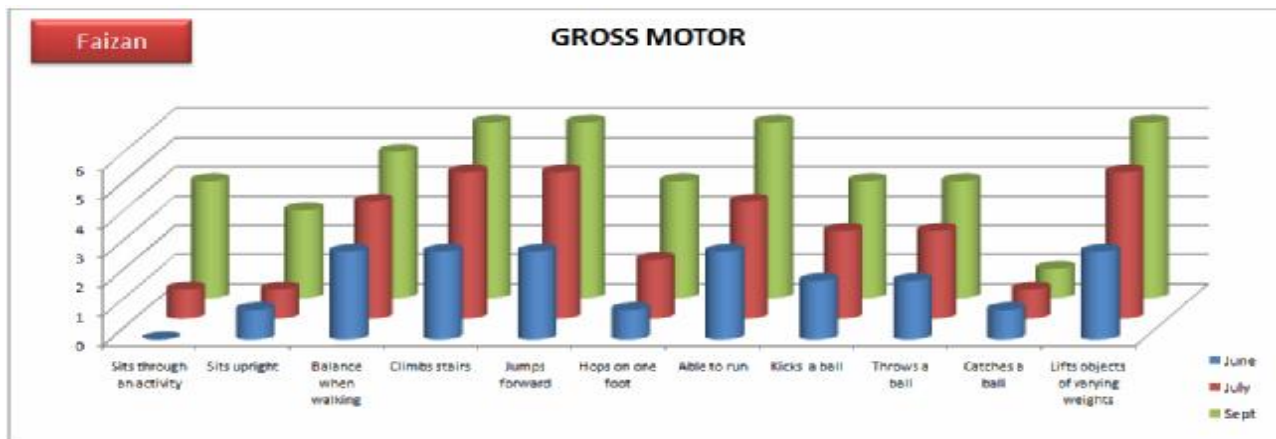


The progressive trend is also seen in the standard validated tests.

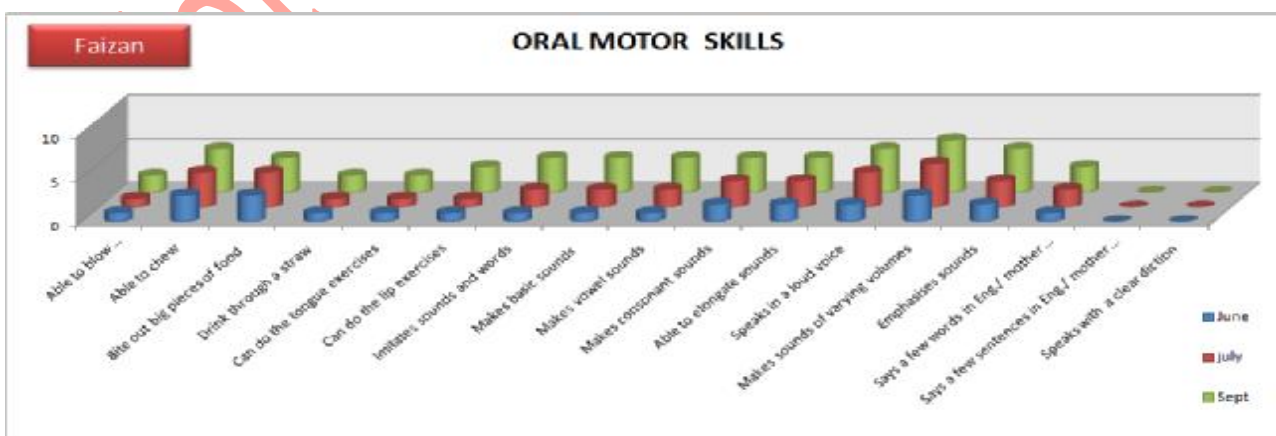


4.2.2 FAIZAN:

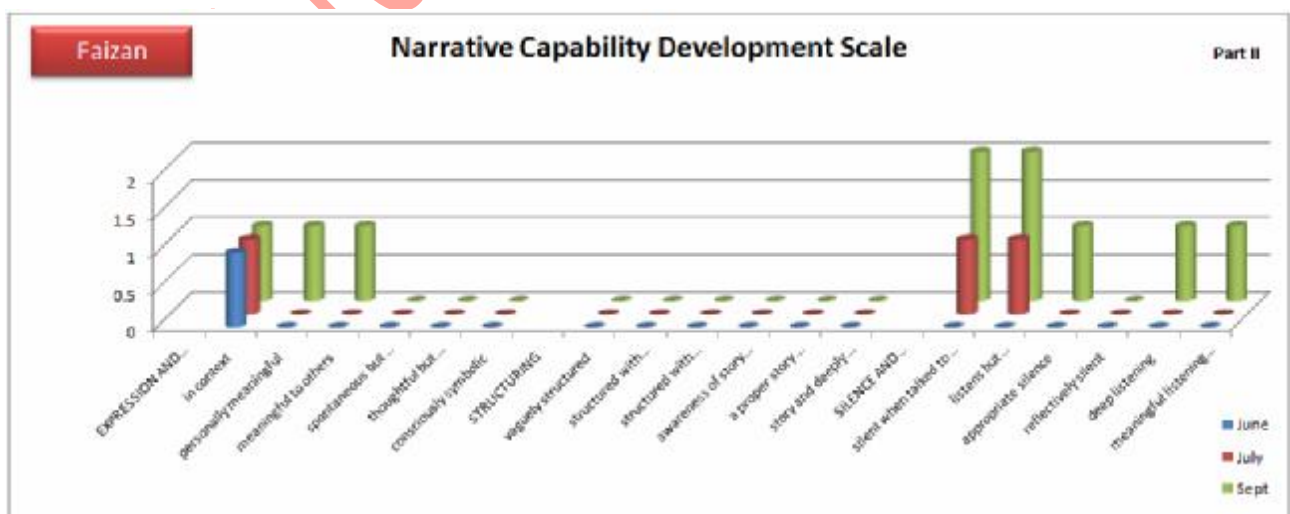
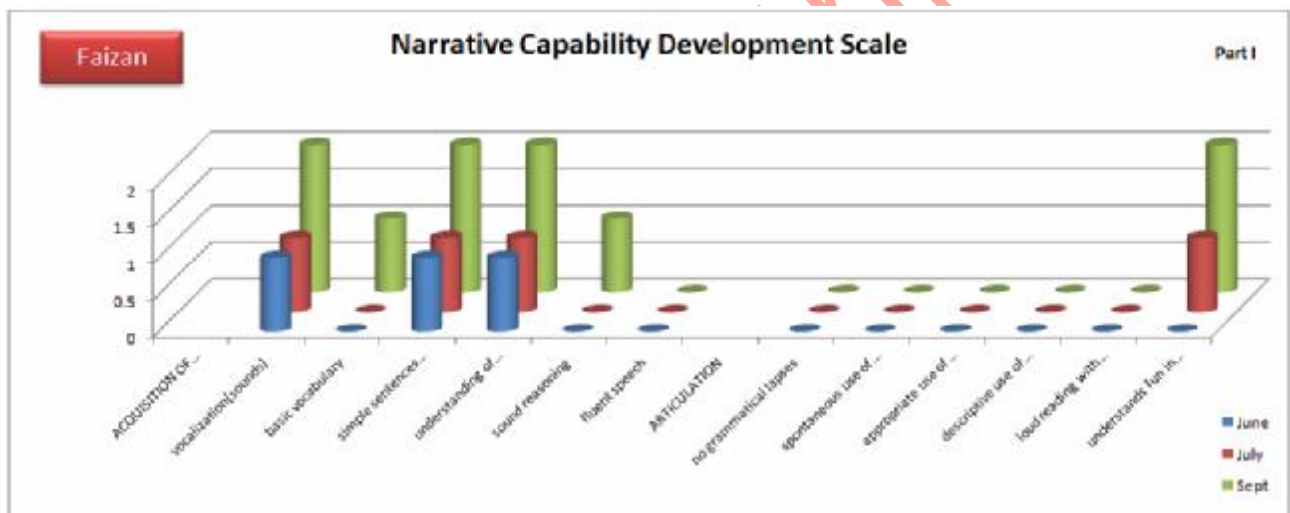
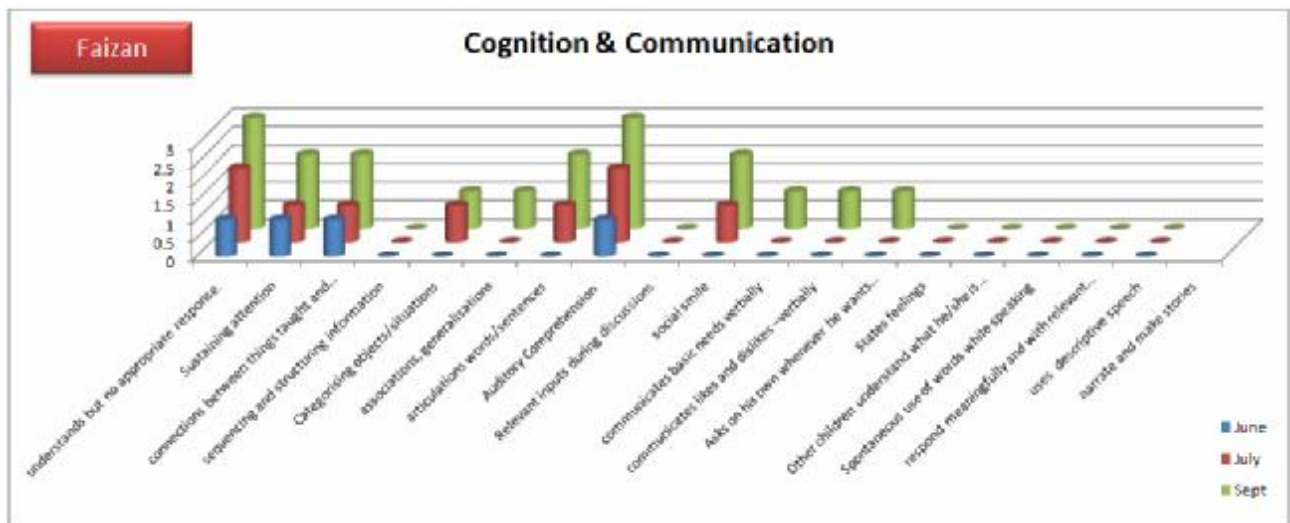
Faizan has shown marked improvement in motor development- gross and fine. The movement based activities have shown an effect in freeing the body parts thereby making him flexible and agile. He is able to balance well and also do all sorts of climbing activities. There has been a marked improvement in his sitting tolerance, turn taking and participation during structured play.



The oral motor activities by way of instruments and lip-tongue exercises have helped him with his vocalisations. He is able to make a few consonant sounds and can imitate basic sounds with ease. He is trying to articulate his needs verbally. He has begun saying a few words like "car, amma, akka, bye and hi". He is also learning by imitation.

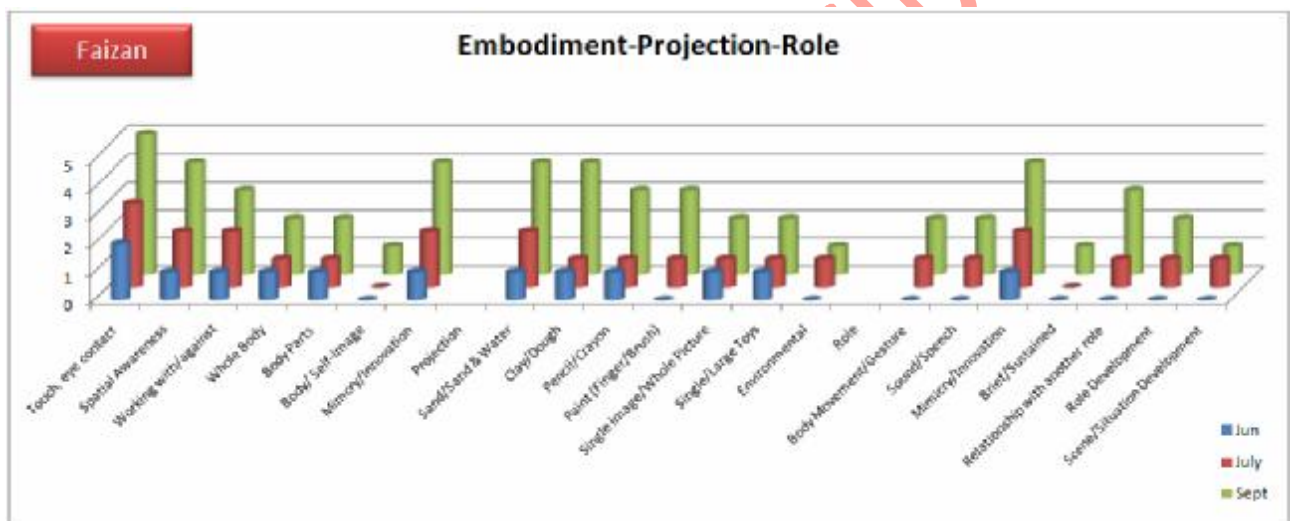
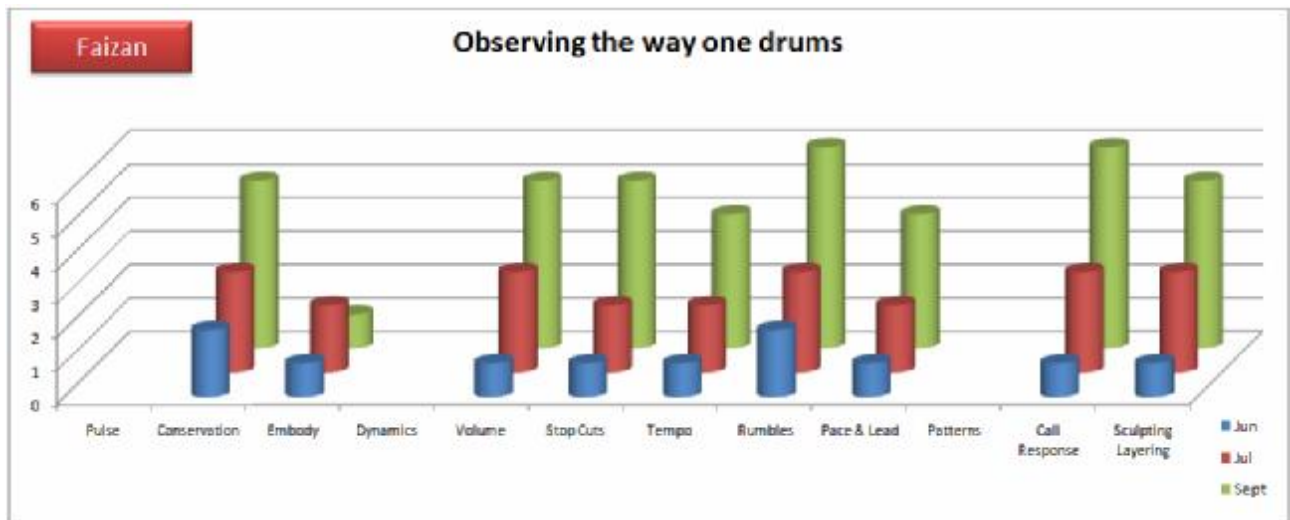


Music and songs have aided in improving Faizan's cognitive skills. He is able to recall things taught to him and is able to slowly process information and make connections. It has helped him with his associative memory. He is now able to follow few instructions and also respond appropriately (not always verbal). He responds better during group activities and the inclusive sessions have helped in his peer interaction. He is more social now and also trying to be understood.

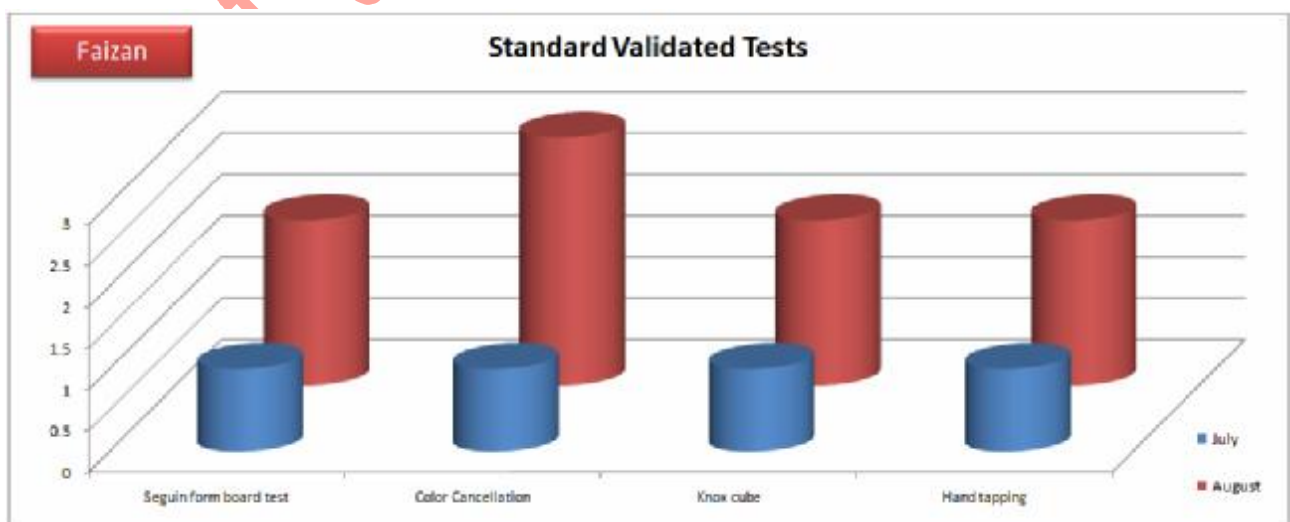


With repetitive vocalisations and voice exercises using music and movement, speech and language acquisition will be the focus area for Faizan.

Drumming has helped him calm down during times when he has exhibited aggressive behaviour. There is great progress visible in the way he follows instructions during the drumming sessions. It has been an effective tool to enhance his cognition. He is more calm and easy to rationalise with now.



The progressive trend is also seen in the standard validated tests.



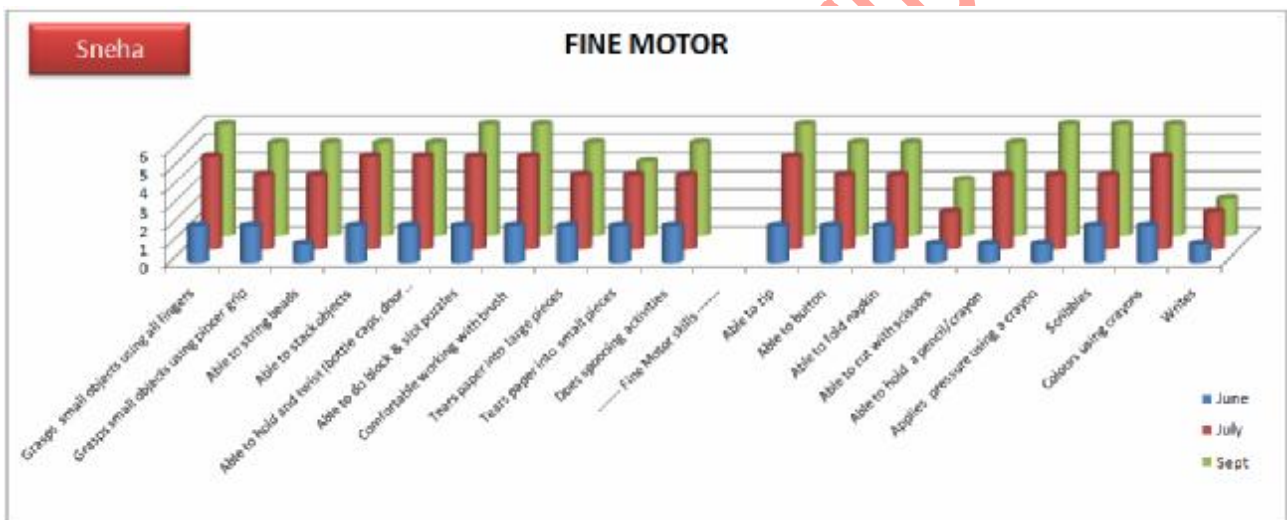
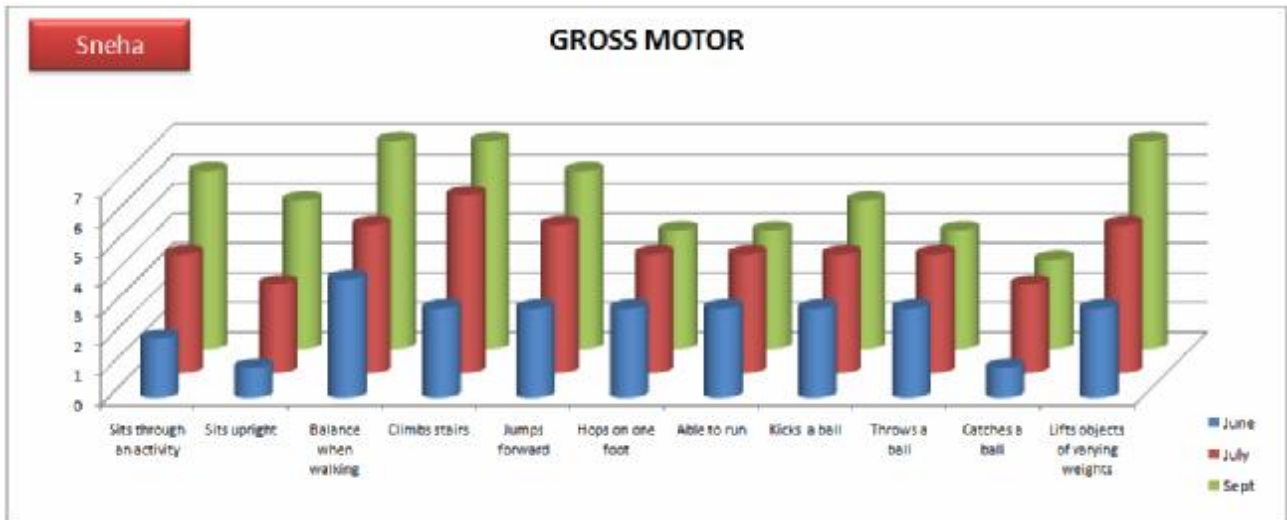
COMPARISON OF DRAWINGS:



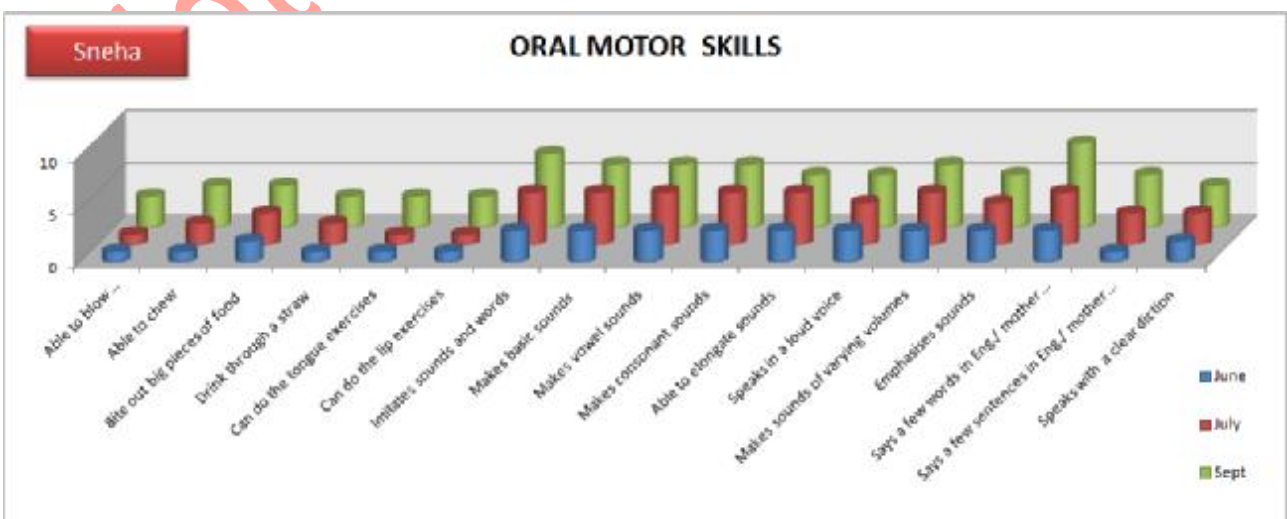
It has been visibly observed that Faizan enjoys the visual arts forms and does not rock himself during activities that involve working with hands. Painting using various tools has helped him develop improved fine motor skills. Given his liking for visual art forms, continued improvisations and techniques will further enhance his fine motor skills. With focussed work on his pincer grip, Faizan should be able to easily take on pre-writing activities.

4.2.3 SNEHA:

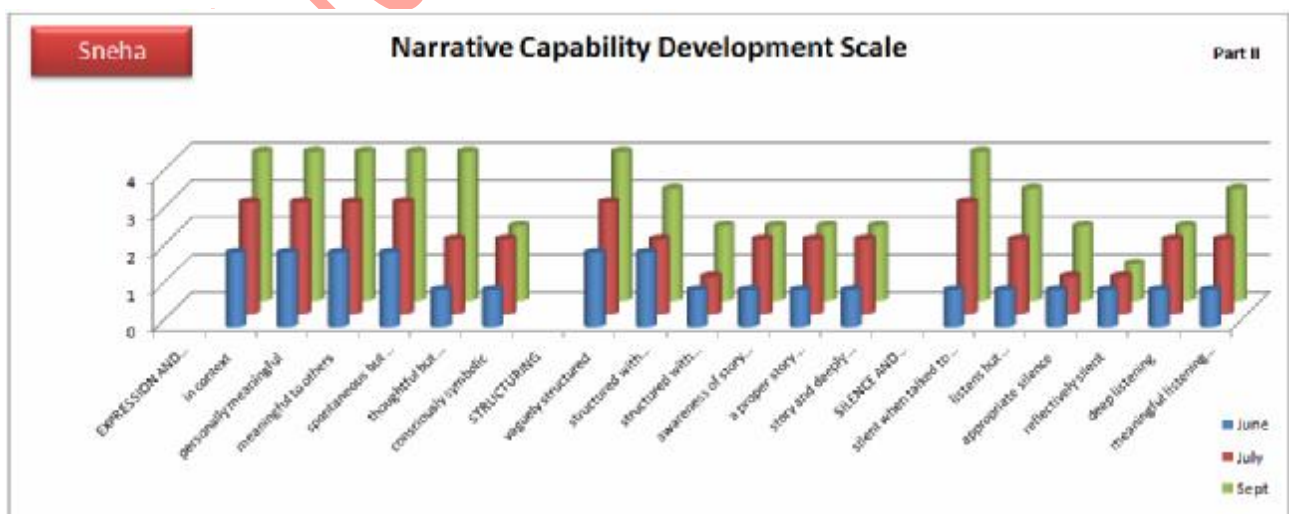
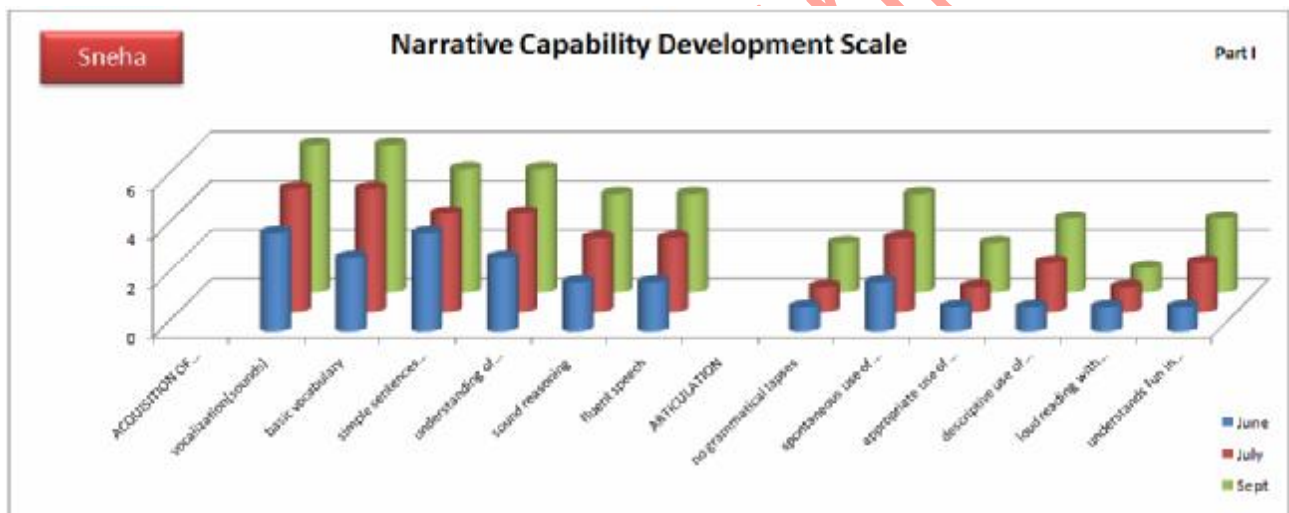
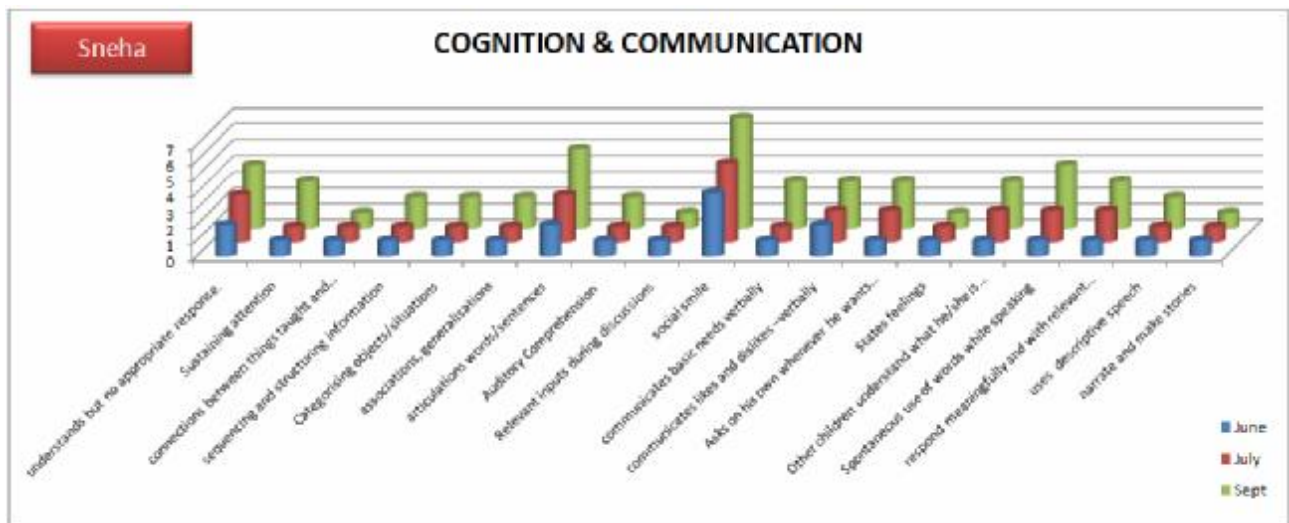
There has been a marked improvement in Sneha's motor development and also in her posture during sit down activities. Structured play and movement sessions have helped her with motor-limbic coordination. Her sitting tolerance during group activities has improved.



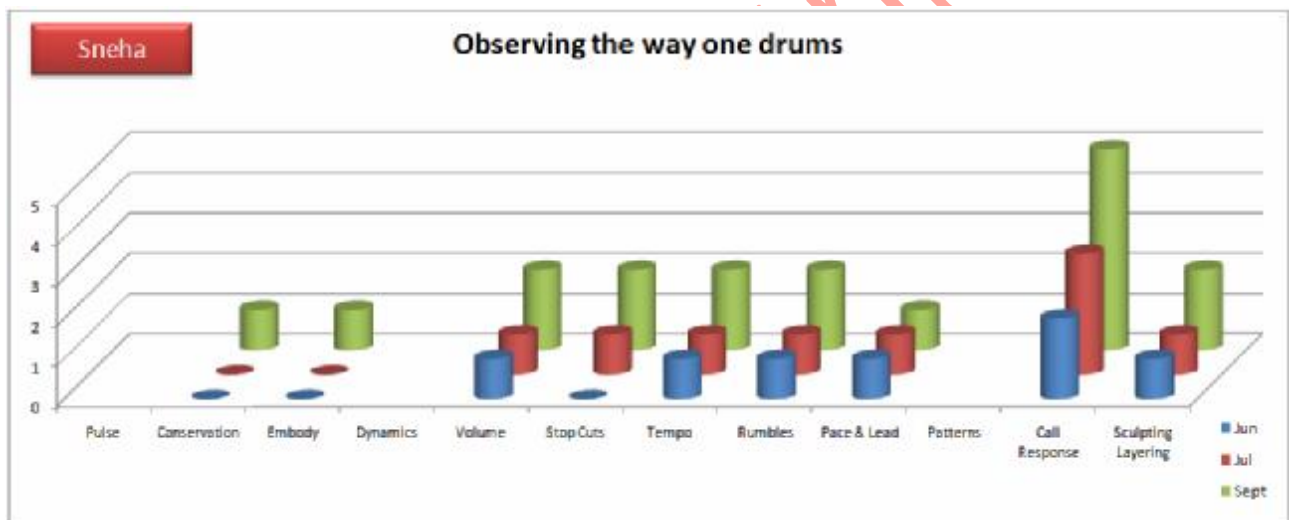
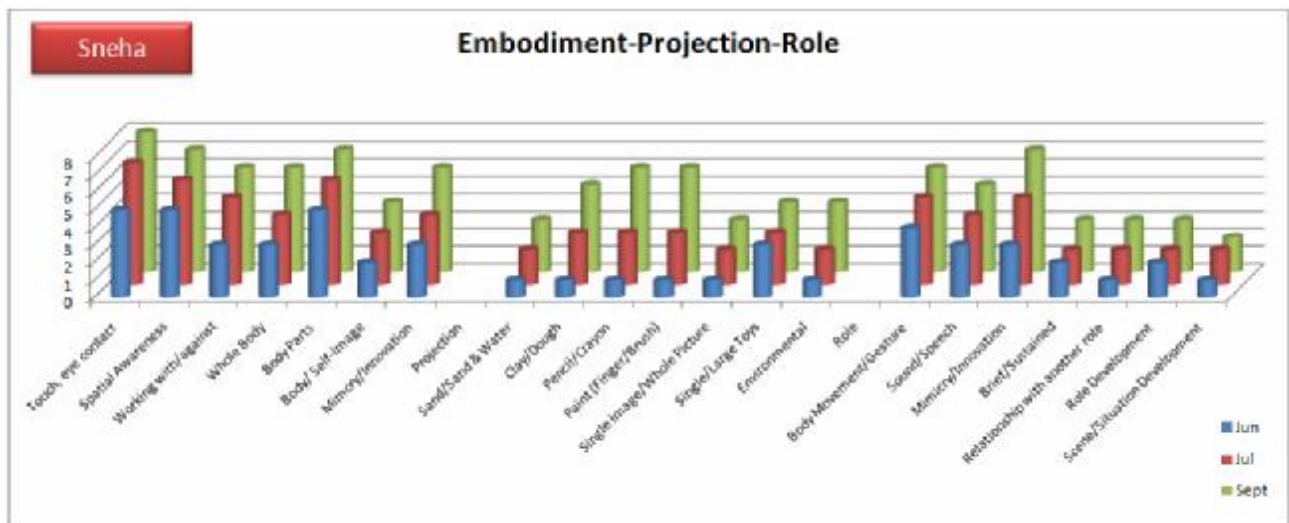
The oral motor activities by way of instruments and lip-tongue exercises have served as a tool for her oral motor stimulation. She greatly reduced biting and pinching other children.



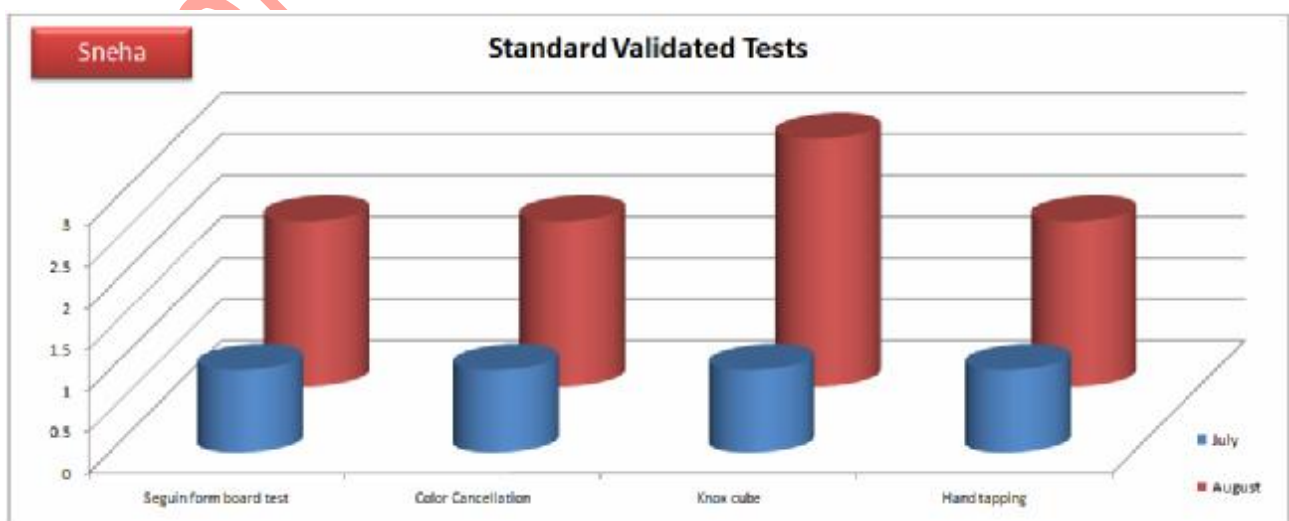
Music and songs has been used as a tool to develop language and vocabulary in Sneha. Given her recall memory, action songs and call response activities have helped her with structuring and processing information. There has been a marked improvement in her two way communication skills, cognitive ability and articulation. She is able to make small conversations and no longer just repeats what she has been spoken to. There has been an improvement in her diction. Voice clarity is compromised during spontaneous speech.



The visual art forms like painting and colouring, tearing paper during collage work and sticking have helped in her fine motor skills. She is now able to exert greater pressure while using a writing tool and she had made some progress in her pre-writing skills. With focussed work on her pincer grip, Sneha should be able to easily take on pre-writing activities. She enjoys colouring activities and no longer puts the crayons in her mouth. Sensory integration using textures, clay, paints and sand have helped Sneha with her sensory issues.



The progressive trend is also seen in the standard validated tests.



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COMPARISON OF DRAWINGS:

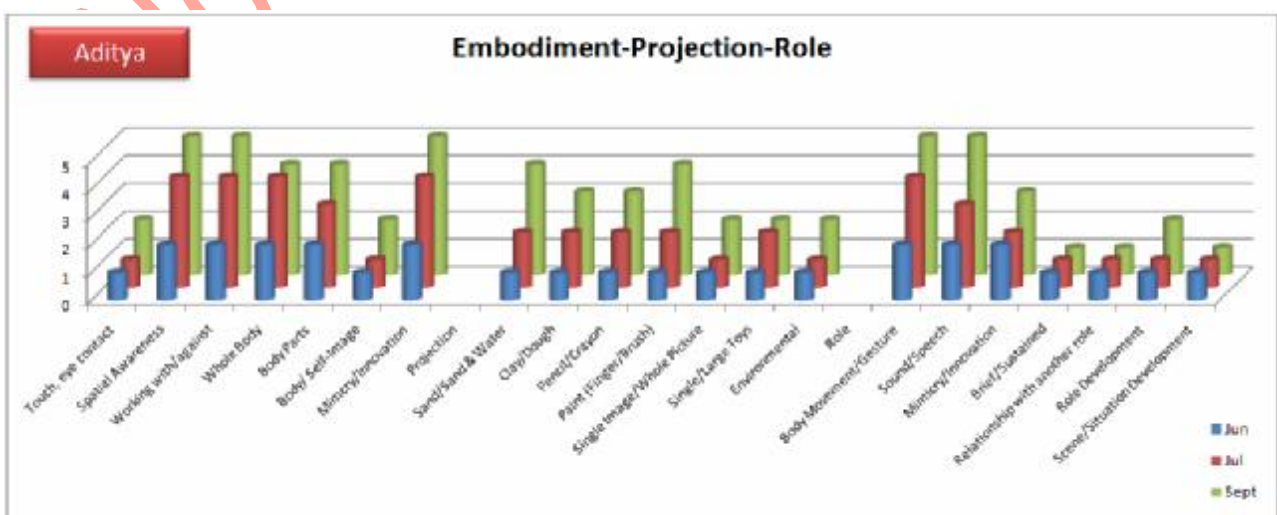
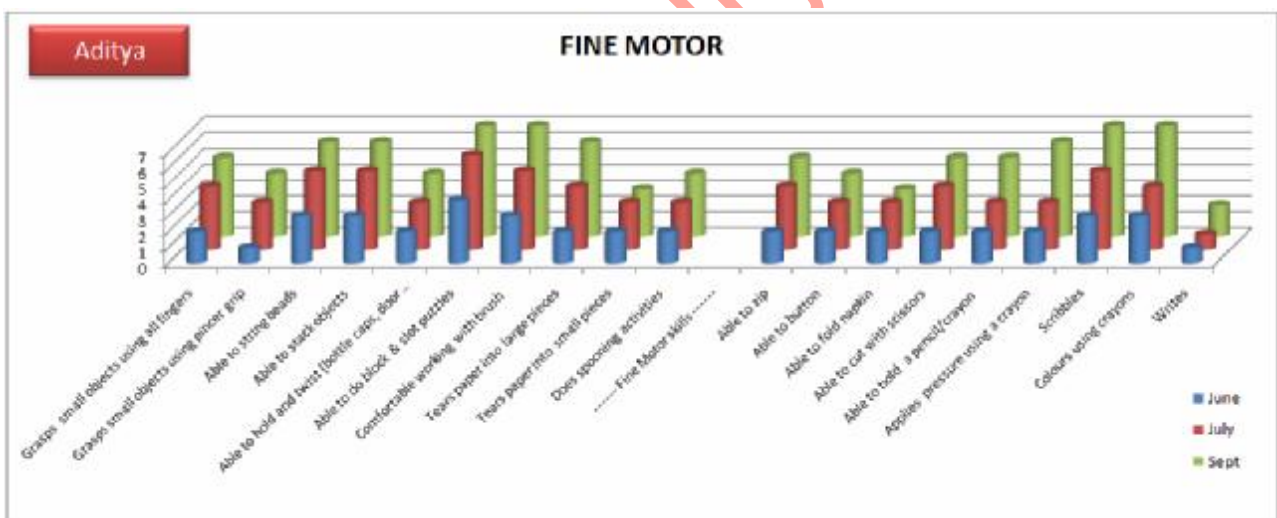
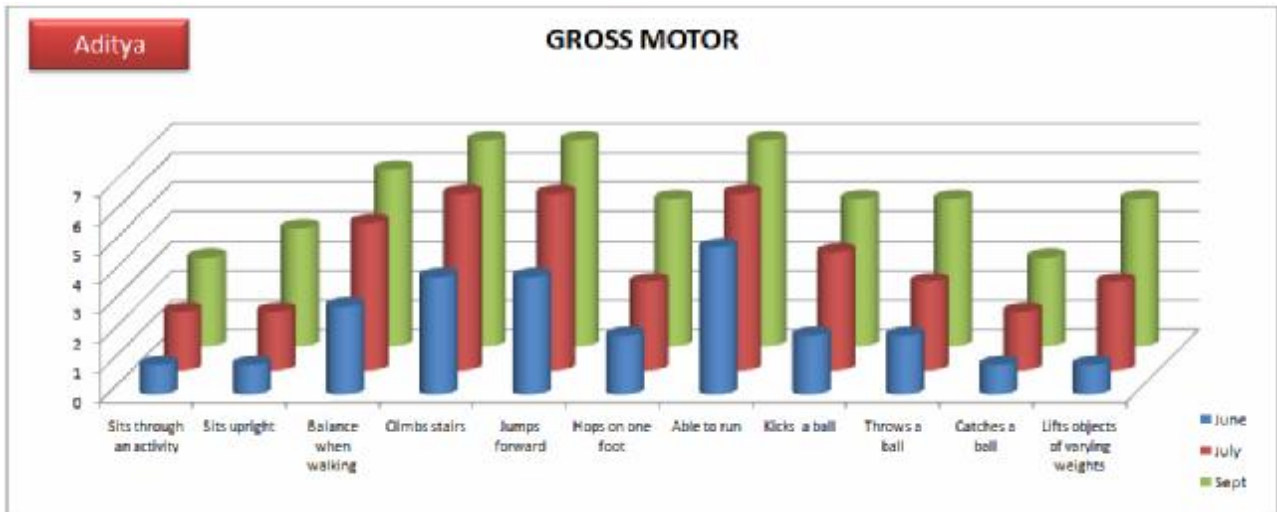


Although, Sneha is quite a social child she is yet to get comfortable in articulating to her peer group. She is yet to start taking the initiative in doing activities. She responds very well to physical displays of affection. With loving insistence and continual use of various arts forms, Sneha should be able to improve in spontaneous speech, social thinking and peer interactions.

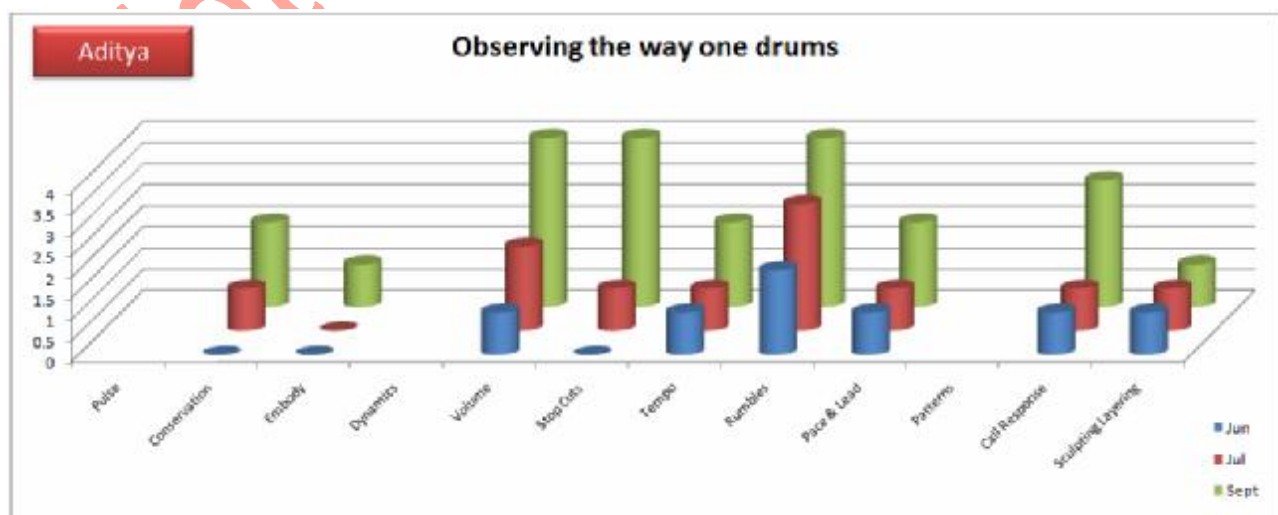
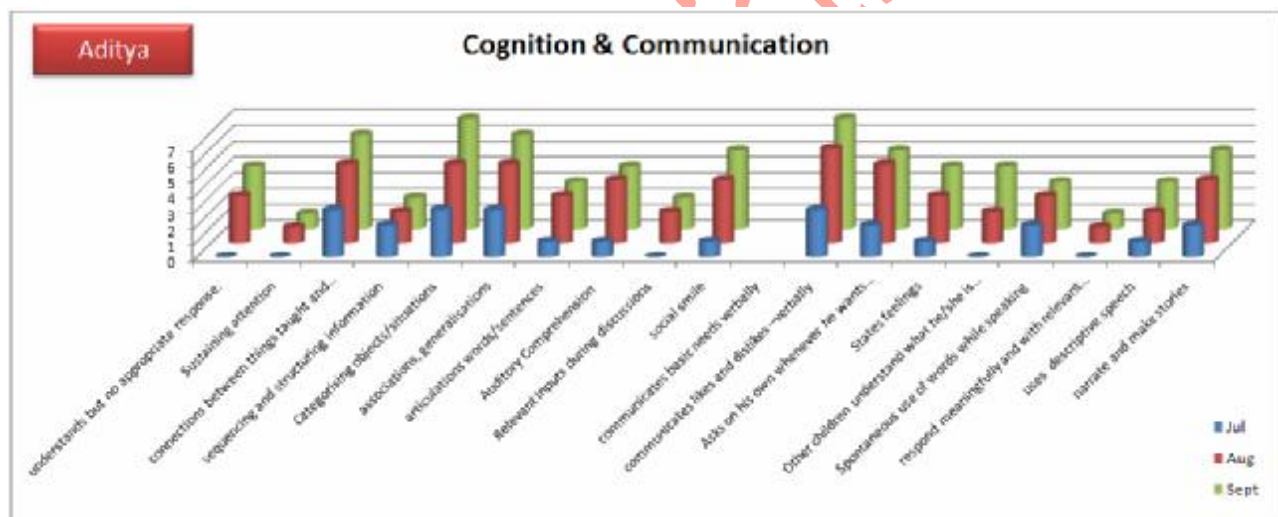
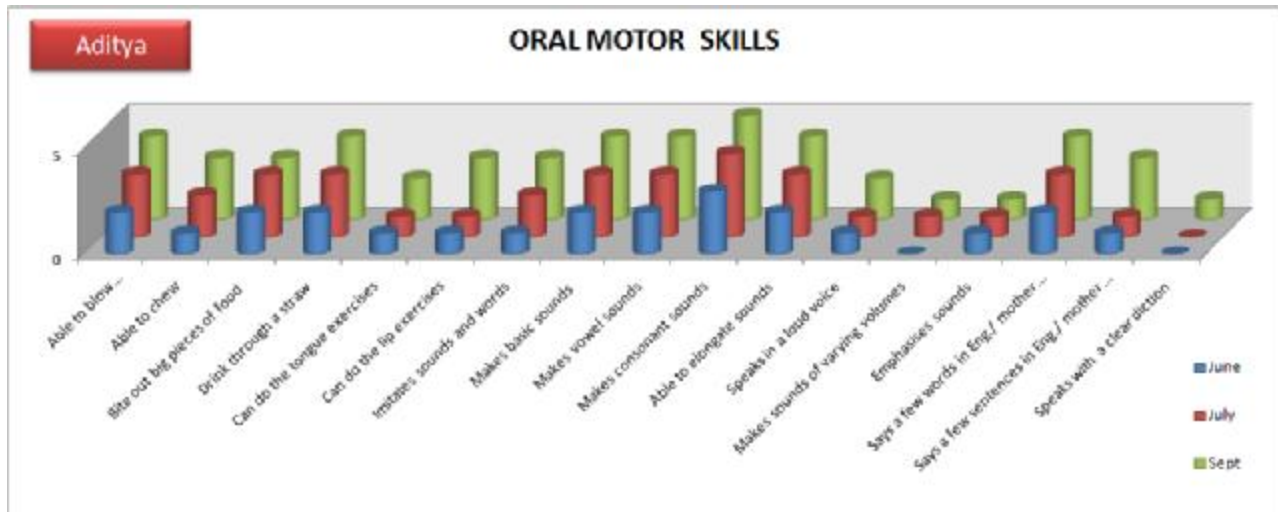
4.2.4 ADITYA PRABHU:

Aditya has shown improvement in his motor skills. Adi enjoys working with paint and maida paste and he is very original in what he does. Adi prefers painting on large sheets and open spaces. He is now able to exert greater pressure while using a crayon and there is an improvement in his fine motor skills.

Using visual arts forms have helped in Adi's sitting tolerance. He completely enjoys painting activities. There have been painting activities where he sat through the entire session without self talk and in some occasions completed the activity just singing to himself.

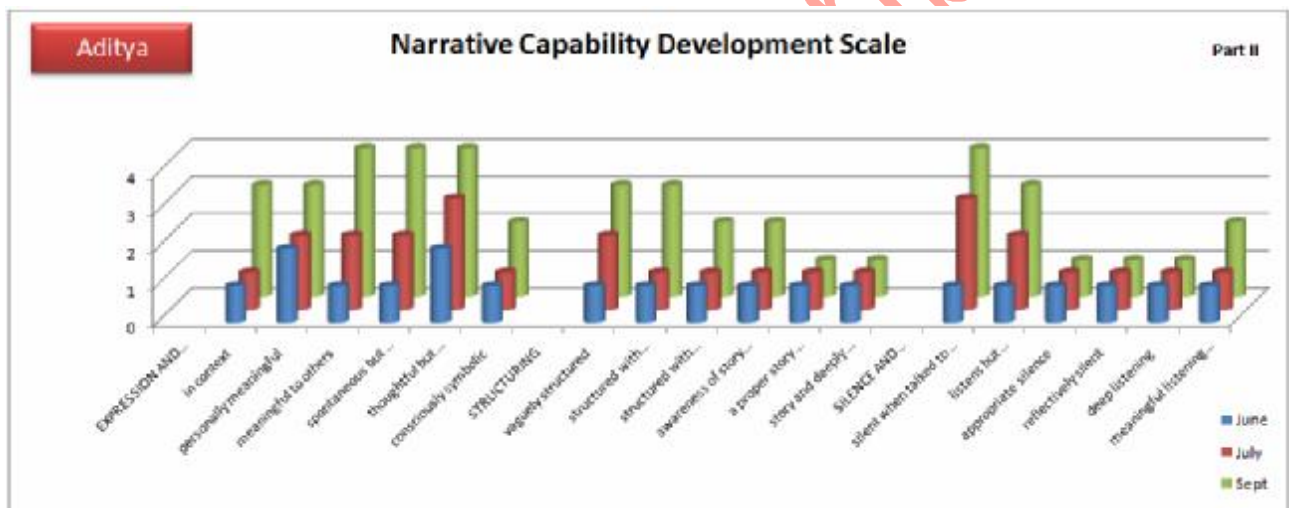
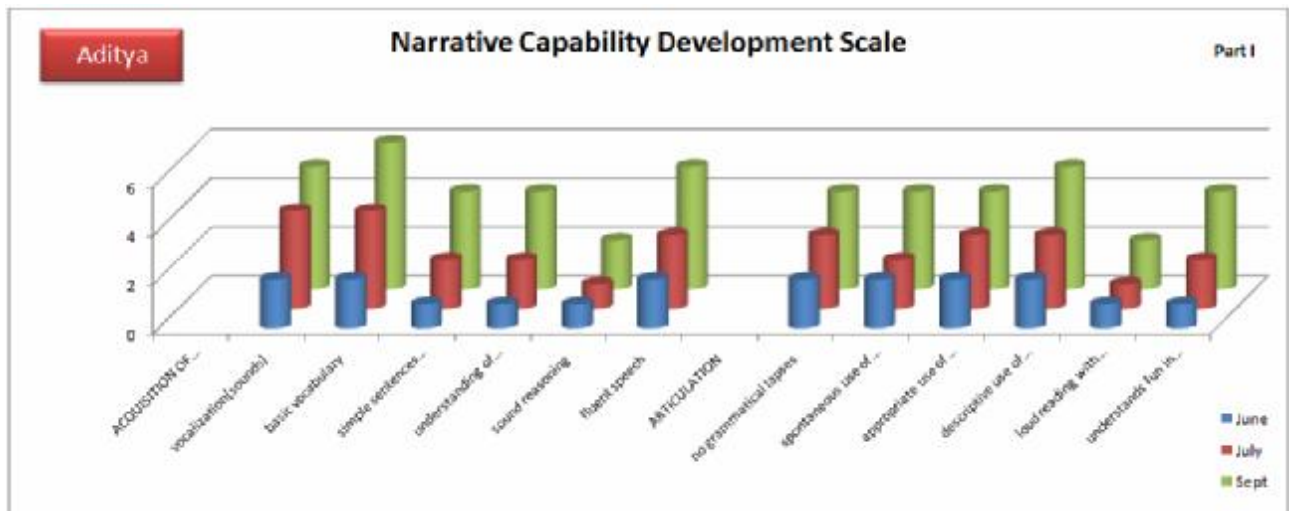


Aditya has a good memory and enjoys music. He has a lovely voice and likes to sing. Songs have helped in getting him to participate in group activities. Initially he would hesitate to sing in a group, but these days he is the first to make suggestions for songs. It has also served as a tool for teaching communication, vocabulary building and cognition. He has also begun to take the lead with songs and that has enhanced his confidence. They has been a slight improvement in him maintaining good eye contact , however he still has difficulty making conversation with his peers in a group session.

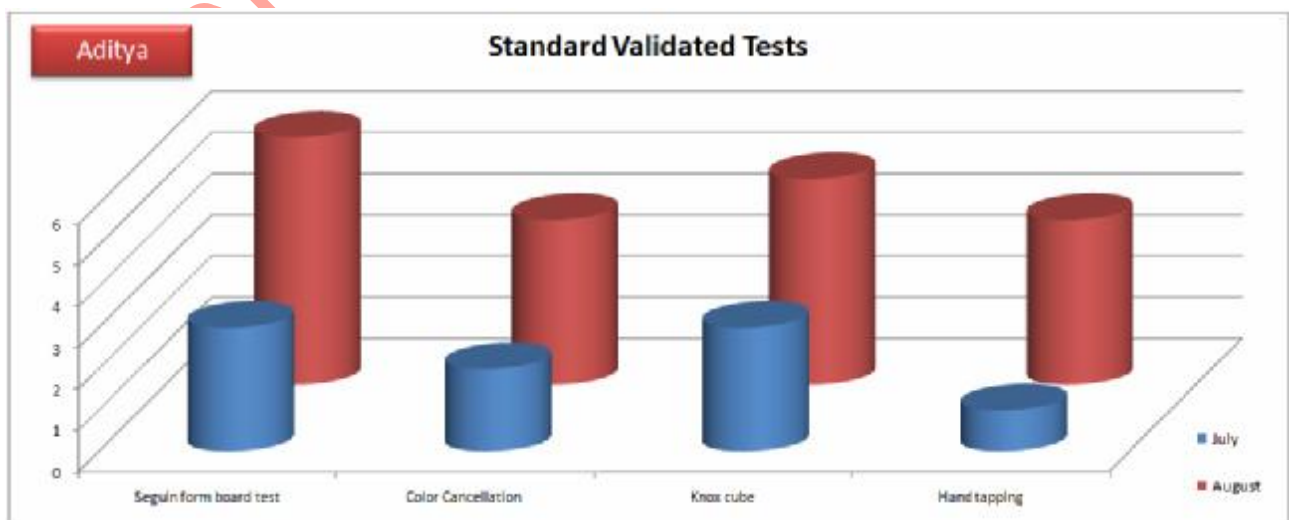


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Aditya has good associative memory and is able to draw parallels between what he knows and what he is learning. He is very fond of stories. He is able to adequately comprehend simple stories. He is able to recall actions and expressions or sentences related to the stories. Stories and drama can be used repetitively to improve receptive and expressive speech, increase attention span and enable him to interact with his peers.



The progressive trend is also seen in the standard validated tests.



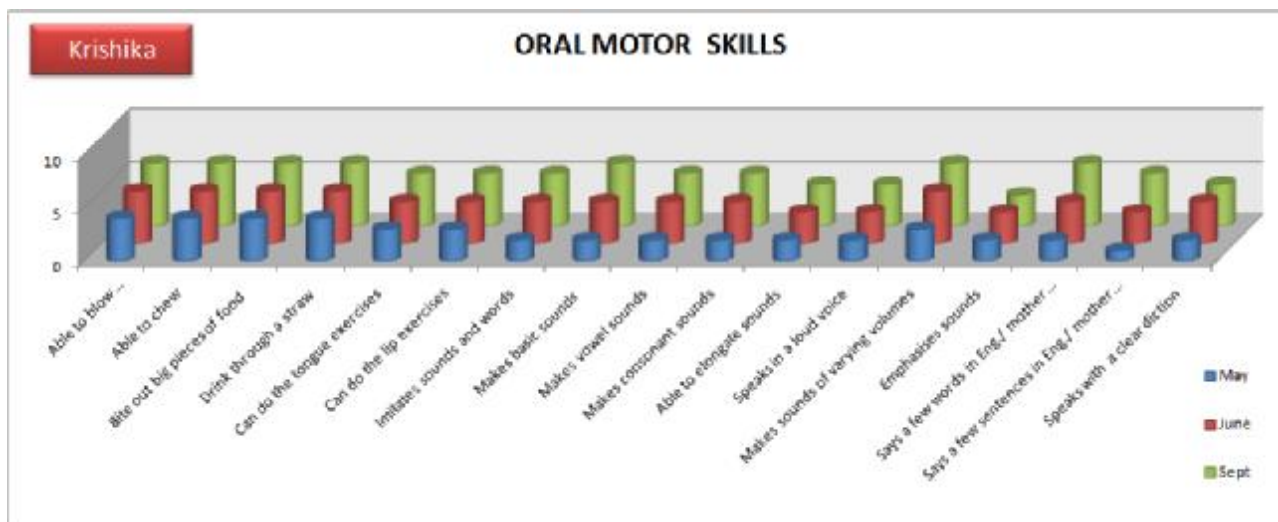
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COMPARISON OF DRAWINGS:

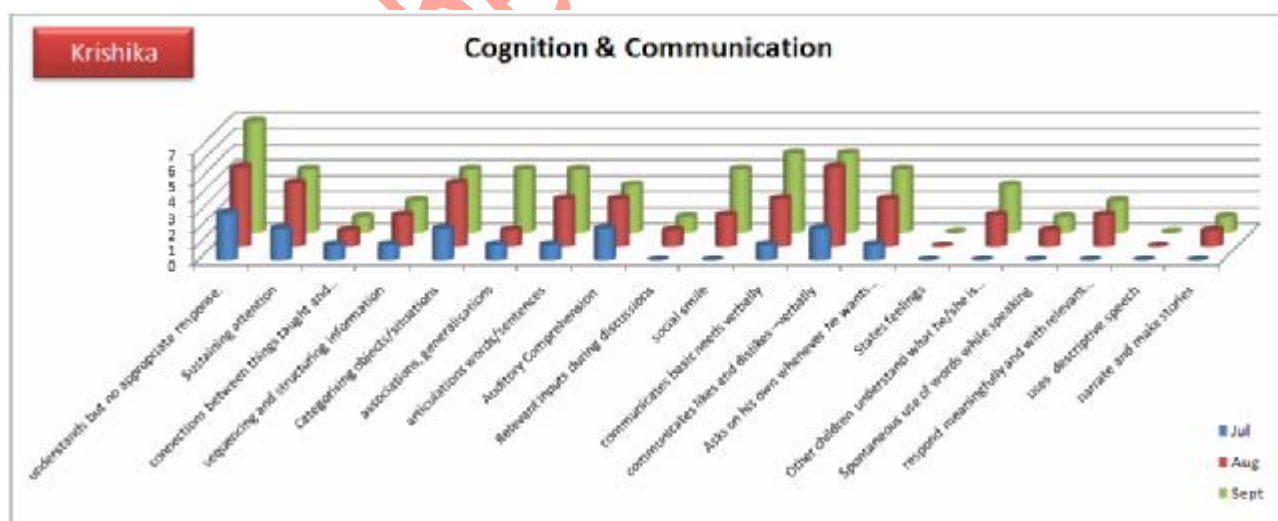


4.2.5 KRISHIKA KATARIA:

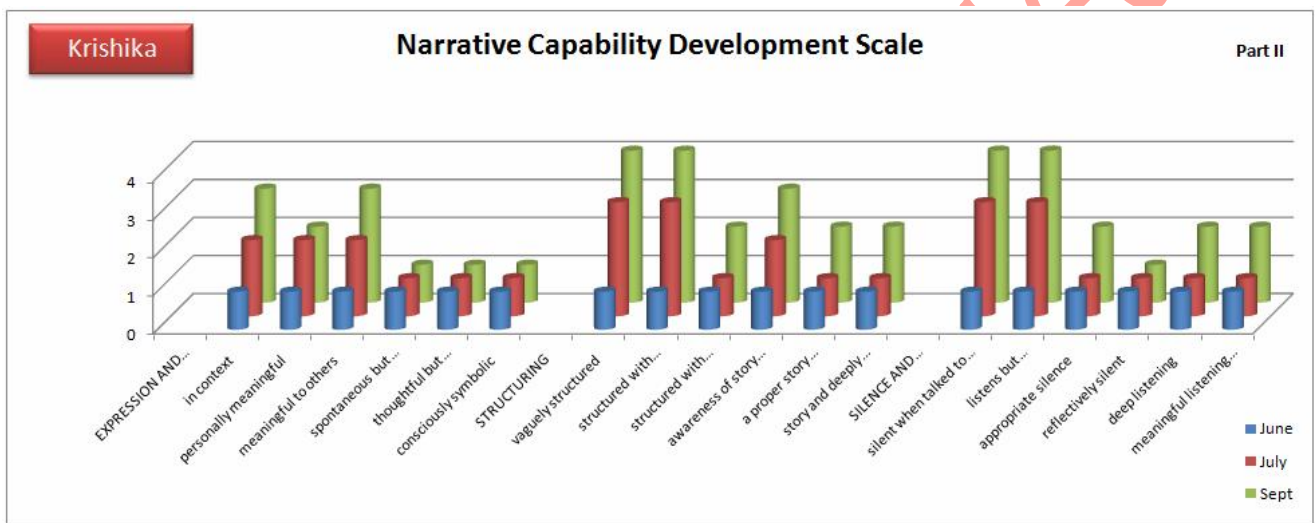
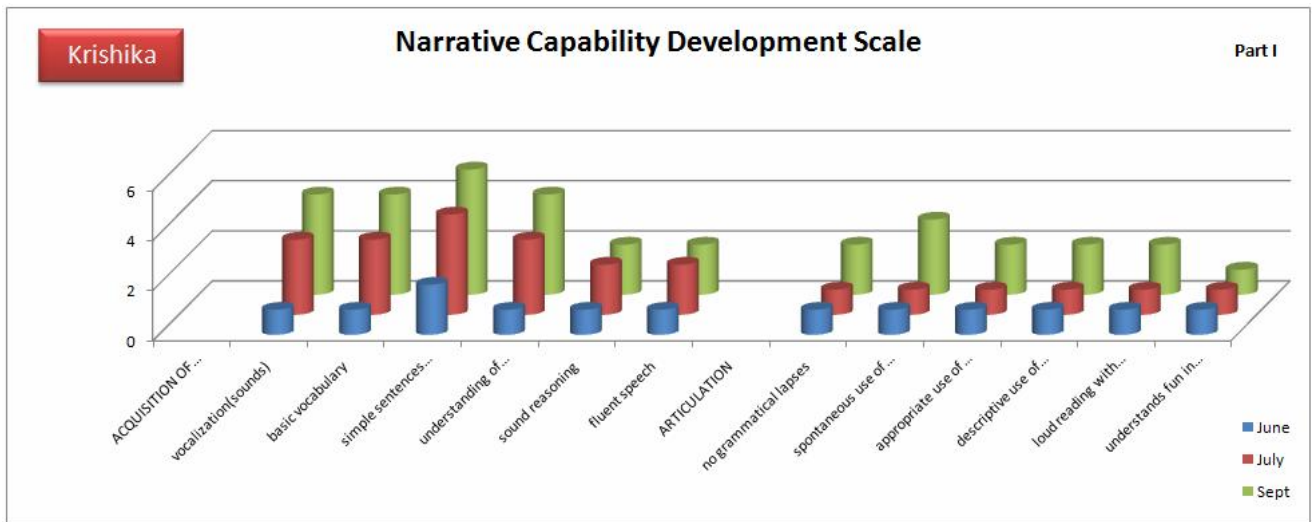
The oral motor activities by way of musical instruments and lip-tongue exercises have helped Krishika with vocalisations of sounds and she is able to produce sounds better. Clarity is compromised during spontaneous speech due to excessive use of the /sh/ sound in spontaneous speech.



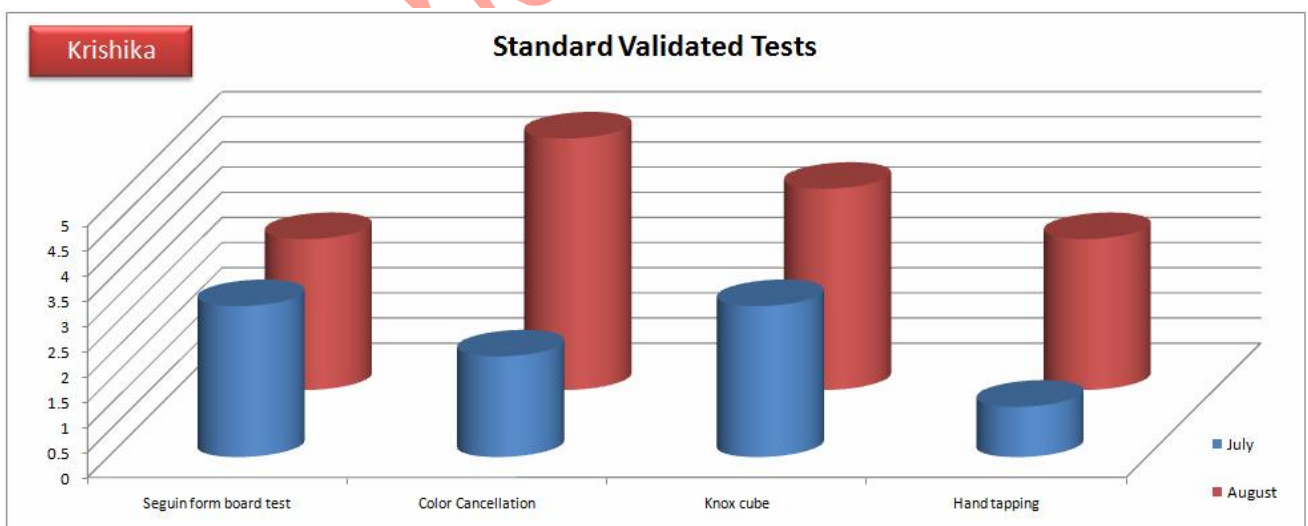
Krishika is unable to answer simple what, where, who, when and why questions. Role plays and story enacting have been used as a tool to aid her with her articulation. She is able to repeat simple expressions and phrases from these stories. However, she is unable to retell the story with adequate details. She has begun understanding simple questions and also giving appropriate responses.



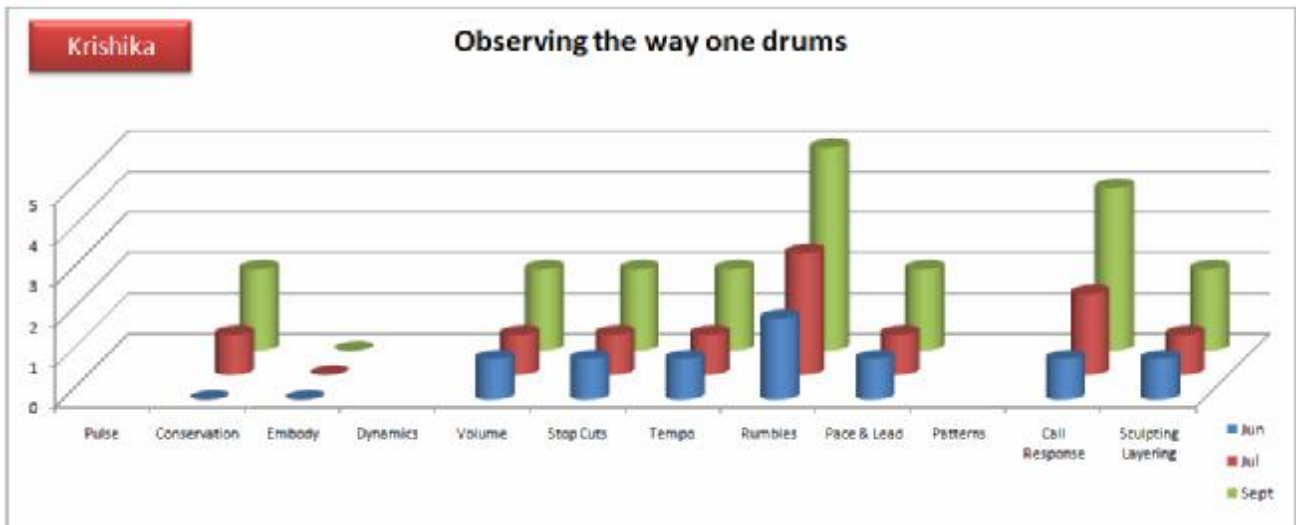
She enjoys songs and music has been used as an effective tool to teach communication, build vocabulary and associative memory. Krishika's attention through the session tends to waver. Structured play sessions have helped in making Krishika physically more agile and also in holding her attention to the task.



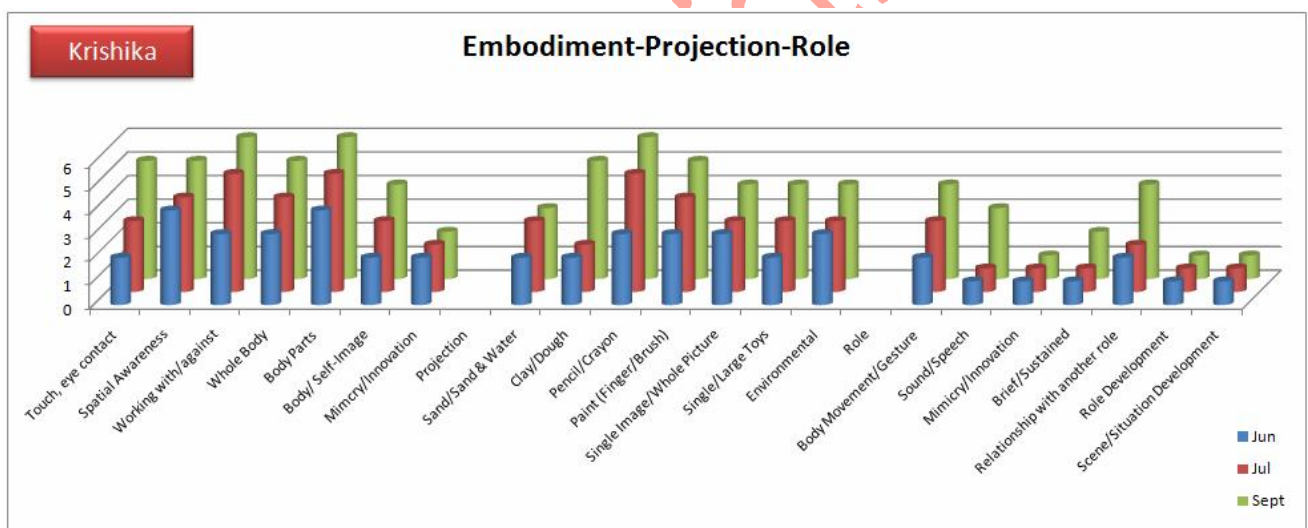
The progressive trend is also seen in the standard validated tests.



She responds well to the drumming sessions and these sessions have helped Krishika with her cognitive ability. She is very good at call response and in picking up the pulse.



Visual art forms have helped Krishika in focussing on her activities and taking it to completion. She is yet to get comfortable with role plays and drama. She needs continuous positive reinforcement that she is doing well. She needs to learn to let go and explore visual forms in order to give her thoughts a language of expression.



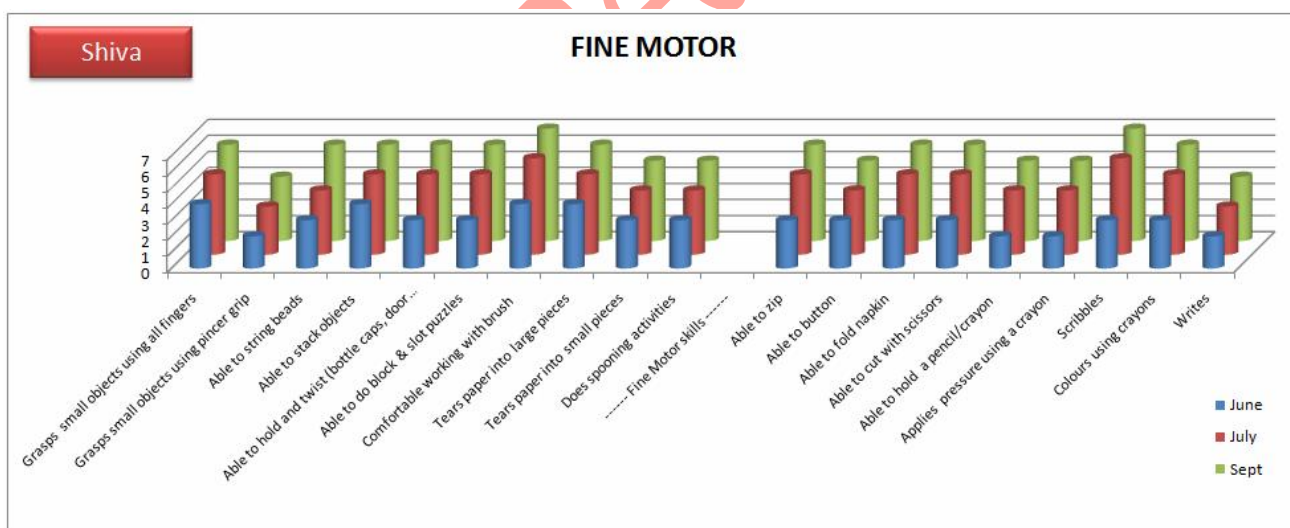
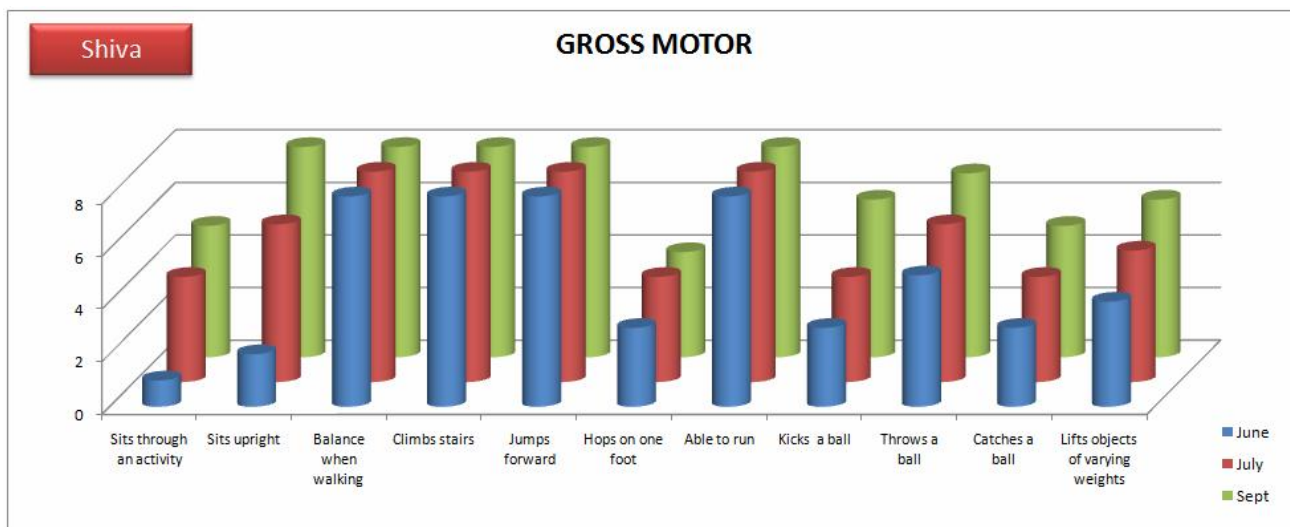
COMPARISON OF DRAWINGS:



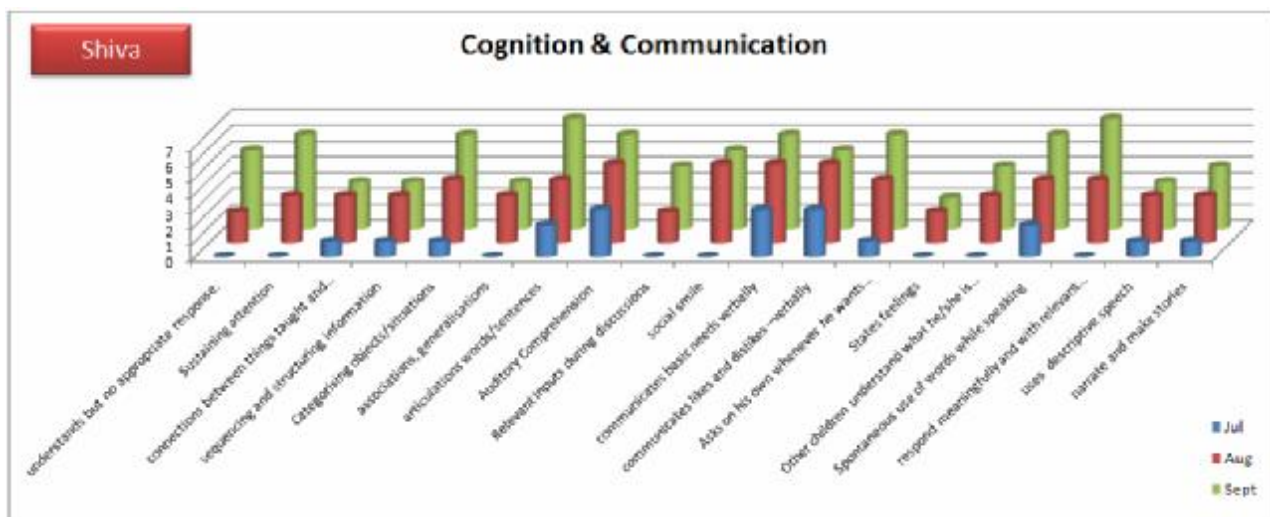
With repetitive sessions in voice, drama and music, Krishika should be able to develop greater clarity in her diction and also start using spontaneous speech. This will help her to be more expressive, improve her peer interaction and enhance her social skills.

4.2.6 SHIVA PILLUTLA

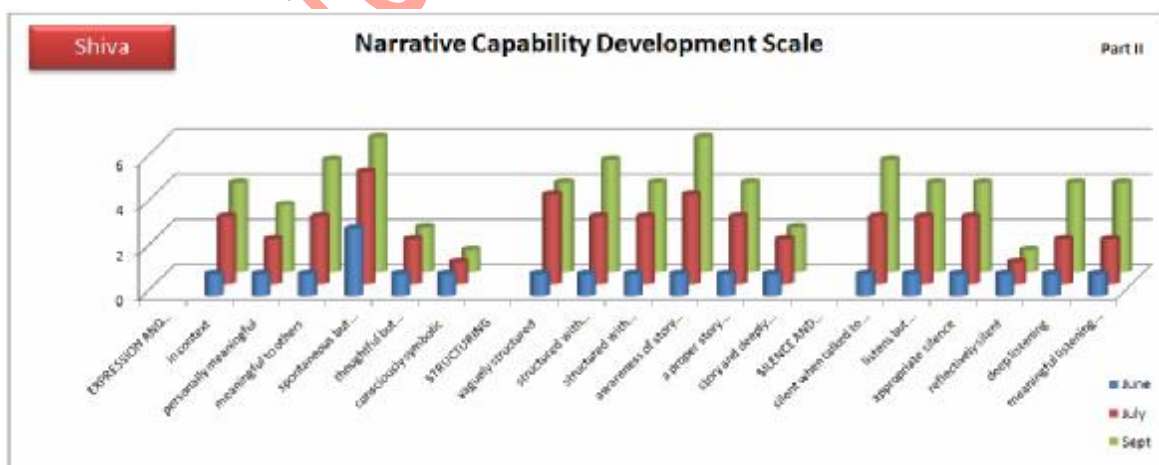
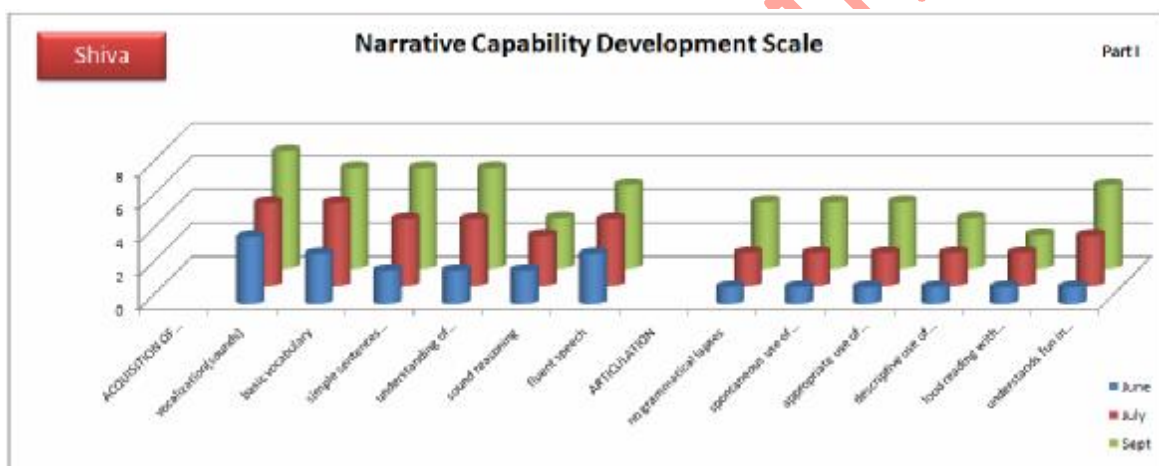
There has been a marked improvement in Shiva's attention span and turn taking. This is evident in games that were played during group structured play sessions and in fine motor activities. His pincer grip has got enhanced with him exploring using various painting tools. He is eager to learn, very cooperative and participates appropriately during the visual art sessions.



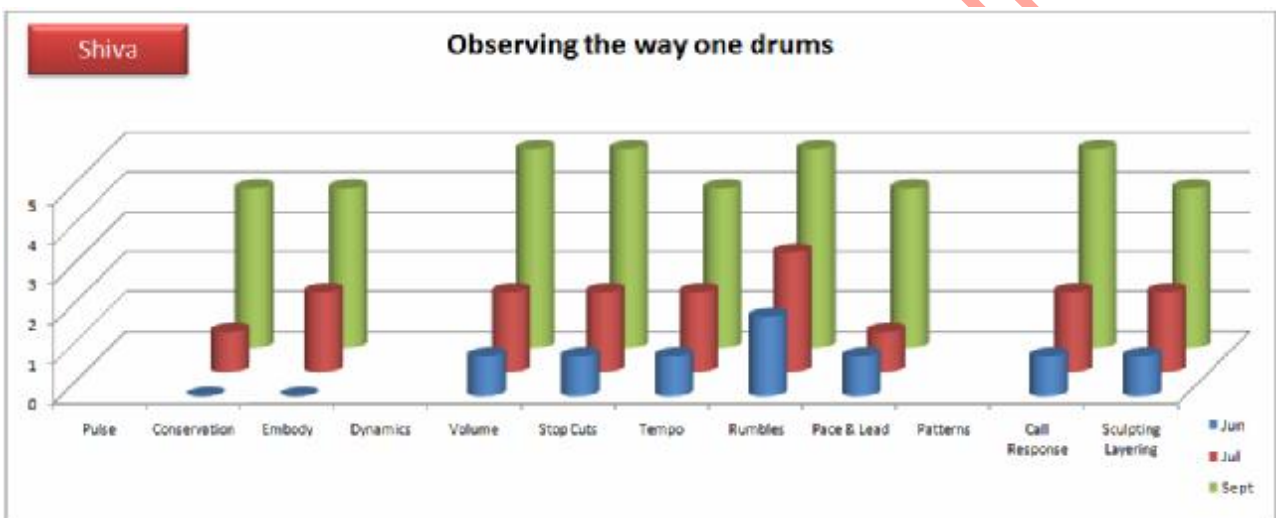
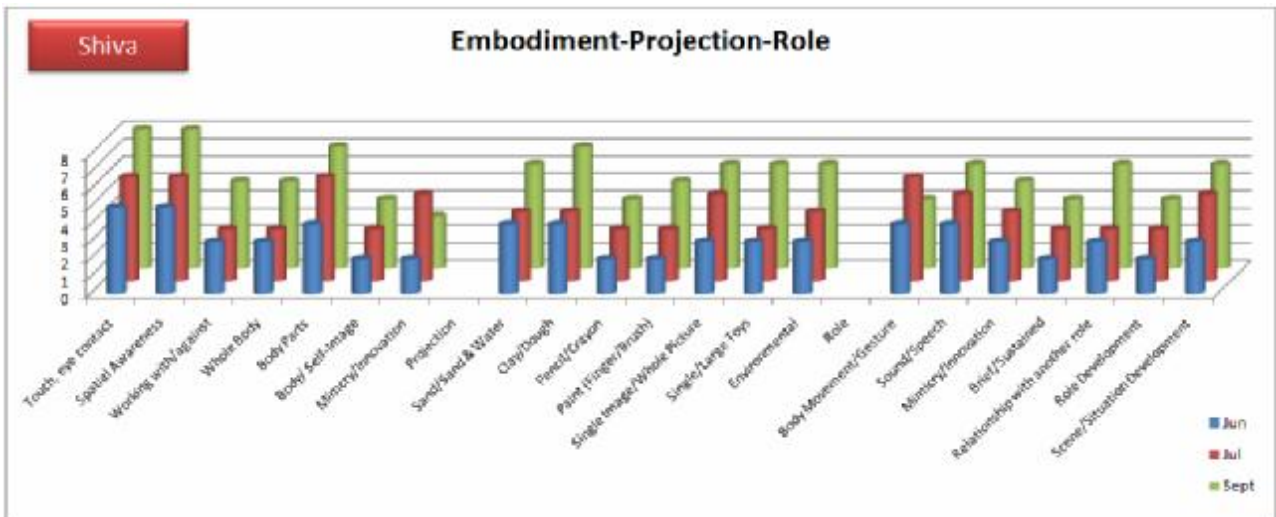
He has an excellent recall memory and the story sessions have improved Shiva's associative memory. It is able to make associations and generalisations with greater ease. He is able to answer what, where, who questions adequately during the role plays and dramatisations. Although he keeps asking the question 'why', he is sometimes unable to answer "why" questions which require prediction and imagination. Shiva has an adequate story retell ability. After a story is narrated to him, he is able to construct the same story appropriately. He is a little shy to narrate to the entire group.



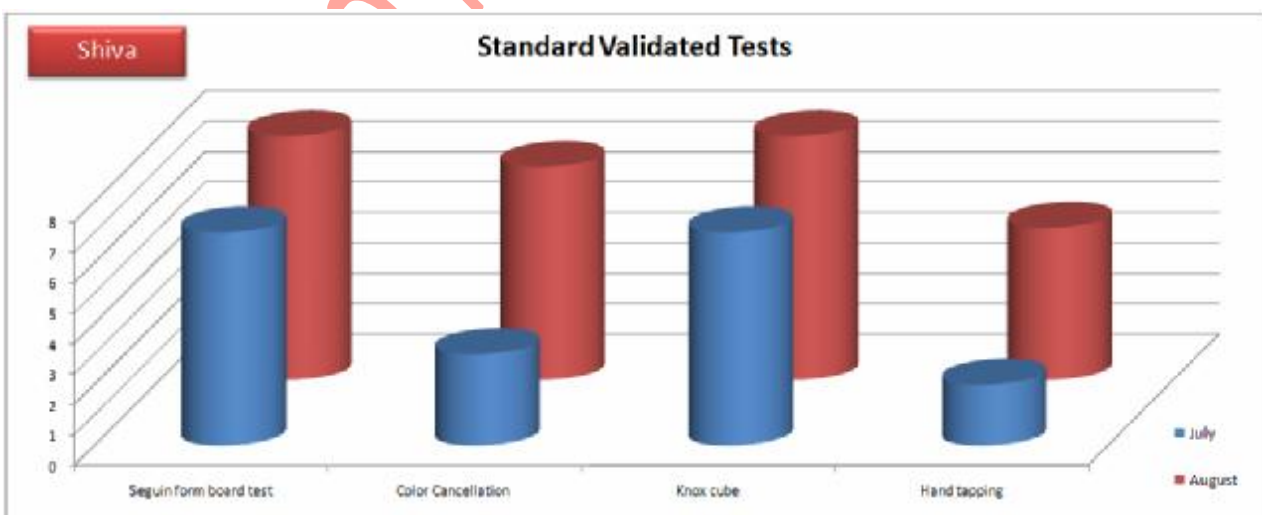
Initially it was observed that Shiva verbalized inappropriate sentences unrelated to the activity at hand. He indulges in less self chatter and we have seen a marked improvement in his communication skills. His conversations are more relevant and he sticks to the topic of the discussion more or less. He is now able to converse with others and express his thoughts clearly most of the time. There is a marked improvement in him responding meaningfully with relevant responses.



His pincer grip has -gotten enhanced with him exploring using various painting tools. He is eager to learn, cooperative and participates appropriately during the visual art sessions. The drumming sessions have had a calming effect on him and he is able to channelize his tremendous energy and restlessness into creating music and sounds.



The progressive trend is also seen in the standard validated tests.



COMPARISON OF DRAWINGS:



Using arts forms have helped Shiva in addressing his hyperactivity to some extent and has created greater school readiness and appropriate social behaviour. Continual sessions in voice, story and drama will help Shiva with sequencing and structuring information, construction of grammatically correct sentences, using appropriate morphological markers and sentence structure thereby enhancing his peer interactions.

DISCUSSION

6.1 LIMITATIONS

The research project was conducted with a heterogeneous population of children with needs in an inclusive environment. The idea behind the inclusion was that increased social interaction enhances acceptance of persons with disabilities, facilitates their social skill development, and promotes positive community attitudes toward disabilities. Both 'normal' children and children with special needs can learn from each other, leading to acceptance of one other. However, the inclusion model presented a few challenges.

Aggressive and self stimulating behaviours by the special children were imitated by the others. Interfacing with the parents to address their resistance and issues of their children in a inclusive set up was a clear challenge.

It is also unrealistic to think that only inclusive programs will lead to intimate friendships between regular class students and their peers with needs. Some children also need additional one-one interventions and smaller class settings for developing social skills.

The frequency or duration with which a child with special needs interacts with socially competent peers may not be nearly as important as the level at which the interaction occurs. Hence along with the inclusive settings there is a requirement for one-one sessions, group sessions with a homogeneous population of children with needs to successfully reach their therapeutic goal.

The other limitation was that the number of contact sessions and the time assigned to the course was inadequate. Based on the post-performance assessments in each creative arts area (dance, drama, music, movement) all children in the study demonstrated growth in each art form. In order to be able to see a consistent shift and progress in various arts settings and to bring in improvisations in techniques that show visible results, there should have been greater contact time. The range of growth would then be from awareness to mastery for both the child and the facilitator. This will also give the facilitator ample time to address other subject content (math, language) using specific multi arts media and look at holistic learning.

6.2 LEARNINGS:

The findings that emerged at the end of the research project were in alignment with the literature review reported earlier. It validated the fact that arts based forms are a very effective medium of self-expression. The most important outcome of this project was the development of skills, self image and confidence of these children. It opened new windows into the inner world of the child and gave an insight into the inherent potential of these children.

Arts based forms aims at holistic growth of the individual. It is a way for one to grow and become sensitive to the beauty of nature, of social values and the aesthetic aspects of life as a whole. Training of the eye, hand, body and voice is only a tool; the objective is to build a creative, fulfilled and well balanced personality. The integration of the senses, body and the brain is necessary for experiencing learning. Arts based activities are the most effective medium, which allow creative expression for the children enabling them to express themselves and experience the joy of doing so. The experiential aspect of arts forms helps one go deeper into the elements of life.

The aspect of rhythm is common to dance, movement, music and painting. Although children do not have extensive verbal skills to express what they have stored within themselves, they do have an alternate language which allows them to express their experiences and tell stories fairly effectively using visual forms. For instance, if there is a hill in a story, it will be made up of a symbolic shape of a hill and not in the form of the word, hill. Hence, for children expressing themselves through the language of arts forms is more satisfying than doing so by the language of words. Mental imagery is an essential part of the thinking process. Visual images are closely related to the mental images. The language of painting made up of lines, colour and planes is related to the mental image.

Music can be used to teach rules of language as they rely on the same brain system. The region of the cortex responsible for analyzing pitch was found to be 25 percent larger in musicians. As soon as the auditory cortex 'hears' a sound, it sends all the information about the sound (pitch, localization, timbre, duration, loudness etc) to all parts of the brain. Each part of the brain receives it and responds according to its primary function. Each time a familiar musical activity is introduced, neural networks are formed throughout the brain. The next time, just one small part of the musical activity will be enough to trigger the entire neural pathway related to the entire activity. Memorized information in language and memorised melodies in music use the same brain system, hence the impact of music on memory. Children who are non-verbal respond to songs by recalling actions and associating it to the music heard.

The instinctive use of physiology whilst playing a rhythm instrument allows children to create new neural networks which enable them to coordinate motor functions with ease. Using the natural 'kinetic melody' of the body - motor planning, fine motor movements (including speech musculature), and limbic coordination can be worked on.

Drawing, drumming and movement based activities provide an excellent outlet for the child's aggressiveness and pent up emotions. It can be called sublimation of aggressiveness.

Playing an instrument (as opposed to listening to music) really catapults one's intellect. Children exposed to music and movement show improvement in spatial-temporal ability. Children learn intuitively and not intellectually.

Truly, exploring creativity through art based forms acts as a catalyst for healing & learning. It creates a sense of consciousness in the multidimensional interconnected cosmos of all beings.

6.3 FUTURE

This is just the beginning. ABT has truly been an enriching inward journey. The future of my ABT work with special children would involve developing skills across all the domains so as to enable children to create opportunities of their own for independent learning. I would want to carry out focused work with children in both inclusive and non-inclusive set ups. I would want to structure a set of best practices for teaching within inclusive set ups. ABT can be used to give children a natural and safe environment for self-expression and experience learning along with fostering a sense of independence .

I would look at instructional methods of arts based forms and evaluation techniques that focus on both qualitative and quantitative aspects of learnings and experiences of daily life. It is becoming more and more clear how important all the arts are in brain development. Since we know now that there is a link between the arts and math and science and expression, we need to consider these things in future curriculum development for children with special needs.

Appendix

IN THIS SECTION

- Ø GLOSSARY OF IMPORTANT TERMS
- Ø Appendix A1 (Motor Skills)
- Ø Appendix A2 (Oral Motor Skills)
- Ø Appendix A3 (Cognitive Skills and Language)
- Ø Appendix B (STANDARD VALIDATED TESTS)
- Ø Appendix C1 (Narrative Capability Development Scale)
- Ø Appendix C2 (Embodiment-Projection-Role)
- Ø Appendix C3 (Observing the way one drums)
- Ø Appendix D (SRS Summary Formats)

GLOSSARY OF IMPORTANT TERMS

ABT

Evidence-based use of art forms to accomplish individualized goals within a therapeutic relationship.

ADHD

Attention deficit hyperactivity disorder

ASD

Autism Spectrum Disorder

Neurotypical (NT)

Having a normal (usual, ordinary) ability to process linguistic information and social cues; used especially as an antonym for autistic

IMM

Intuitive metaphysical machinery – synergy of intuition with consciousness and awareness of the moment.

PDD

Pervasive Development Disorder

Inclusion

Inclusion is the educational practice of educating children with special needs in classrooms with children without special needs (disabilities).

Holistic Learning

Signifies an approach to learning which is predominantly 'whole person', i.e. it seeks to engage fully all aspects of the learner - mind, body and spirit

Appendix A1 (Motor Skills)

Name of the child: _____ Date: _____ Assessment by: _____

Dimension: Motor skills

Gross motor movements	Is able to sit through an activity	Excellent / Good / Average / Fair / Poor/ No
	Is able to sit upright	Excellent / Good / Average / Fair / Poor/ No
	Is able to balance when walking	Excellent / Good / Average / Fair / Poor/ No
	Climbs stairs	Excellent / Good / Average / Fair / Poor/ No
	Is able to jump forward	Excellent / Good / Average / Fair / Poor/ No
	Is able to hop on one foot	Excellent / Good / Average / Fair / Poor/ No
	Is able to run	Excellent / Good / Average / Fair / Poor/ No
	Is able to kick a ball	Excellent / Good / Average / Fair / Poor/ No
	Is able to throw a ball	Excellent / Good / Average / Fair / Poor/ No
	Is able to catch a ball	Excellent / Good / Average / Fair / Poor/ No
	Is able to lift objects of varying weights	Excellent / Good / Average / Fair / Poor/ No
Other observations		
Fine Motor skills	Is able to grasp small objects using all fingers	Excellent / Good / Average / Fair / Poor/ No
	Is able to grasp small objects using pincer grip	Excellent / Good / Average / Fair / Poor/ No
	Is able to string beads	Excellent / Good / Average / Fair / Poor/ No
	Is able to stack objects	Excellent / Good / Average / Fair / Poor/ No
	Is able to hold and twist (bottle caps, door knobs etc.)	Excellent / Good / Average / Fair / Poor/ No
	Is able to do block & slot puzzles	Excellent / Good / Average / Fair / Poor/ No
	Is comfortable working with brush	Excellent / Good / Average / Fair / Poor/ No
	Is able to tear paper into large pieces	Excellent / Good / Average / Fair / Poor/ No
	Is able to tear paper into small pieces	Excellent / Good / Average / Fair / Poor/ No
	Is able to do spooning activities	Excellent / Good / Average / Fair / Poor/ No
	Fine Motor skills-6.1 A	Excellent / Good / Average / Fair / Poor/ No
	Is able to zip	Excellent / Good / Average / Fair / Poor/ No
	Is able to button	Excellent / Good / Average / Fair / Poor/ No
	Is able to fold napkin	Excellent / Good / Average / Fair / Poor/ No
	Is able to cut with scissors	Excellent / Good / Average / Fair / Poor/ No
	Is able to hold a pencil/crayon	Excellent / Good / Average / Fair / Poor/ No
	Is able to apply pressure and use a crayon	Excellent / Good / Average / Fair / Poor/ No
	Is able to scribble	Excellent / Good / Average / Fair / Poor/ No
	Is able to colour using crayons	Excellent / Good / Average / Fair / Poor/ No
	Is able to write	Excellent / Good / Average / Fair / Poor/ No
Other observations		

Progress of the child was calculated using the following 5 point rating scale.

1-2	3-4	5-6	7-8	9-10
Poor	Fair	Average	Good	Excellent

Appendix A2 (Oral Motor Skills)

Name of the child: _____ Date: _____ Assessment by: _____

Dimension: Oral Motor skills

Life skills	Is able to blow (candle, balloon, pinwheel, bubbles, musical instruments)	Excellent / Good / Average / Fair / Poor/ No
	Is able to chew	Excellent / Good / Average / Fair / Poor/ No
	Is able to bite out big pieces of food	Excellent / Good / Average / Fair / Poor/ No
	Is able to drink through a straw	Excellent / Good / Average / Fair / Poor/ No
	Is able to do following tongue exercises	Excellent / Good / Average / Fair / Poor/ No
	Is able to do following lip exercises	Excellent / Good / Average / Fair / Poor/ No
Other observations		
Speech related	Tries to imitate sounds and words	Excellent / Good / Average / Fair / Poor/ No
	Is able to make basic sounds	Excellent / Good / Average / Fair / Poor/ No
	Is able to make vowel sounds	Excellent / Good / Average / Fair / Poor/ No
	Is able to make consonant sounds	Excellent / Good / Average / Fair / Poor/ No
	Is able to elongate sounds	Excellent / Good / Average / Fair / Poor/ No
	Speaks in a loud voice	Excellent / Good / Average / Fair / Poor/ No
	Is able to make sounds of varying volumes	Excellent / Good / Average / Fair / Poor/ No
	Is able to do emphasis w r t sounds	Excellent / Good / Average / Fair / Poor/ No
	Is able to say a few words in English / mother tongue	Excellent / Good / Average / Fair / Poor/ No
	Is able to say a few sentences in English / mother tongue	Excellent / Good / Average / Fair / Poor/ No
	Speaks with a clear diction	Excellent / Good / Average / Fair / Poor/ No
	Other observations	

Progress of the child was calculated using the following 5 point rating scale.

1-2	3-4	5-6	7-8	9-10
Poor	Fair	Average	Good	Excellent

Appendix A3 (Cognitive Skills and Language)

Name of the child: _____ Date: _____ Assessment by: _____

Dimension: Cognition & Communication

Cognitive skills	Listens and understands but no appropriate response.	Excellent / Good / Average / Fair / Poor/ No
	Pays attention and is able to sustain attention	Excellent / Good / Average / Fair / Poor/ No
	Is able to make connections between things we teach and those known already	Excellent / Good / Average / Fair / Poor/ No
	Is able to sequence and structure information	Excellent / Good / Average / Fair / Poor/ No
	Is able to identify and categorize objects/situations	Excellent / Good / Average / Fair / Poor/ No
	Is able to make associations, generalisations	Excellent / Good / Average / Fair / Poor/ No
	Is able to articulate and use words and sentences	Excellent / Good / Average / Fair / Poor/ No
	Auditory Comprehension	Excellent / Good / Average / Fair / Poor/ No
	Relevant inputs during discussions	Excellent / Good / Average / Fair / Poor/ No
Other observations		
Language & Communication skills	Has a social smile	Excellent / Good / Average / Fair / Poor/ No
	Is able to communicate basic needs verbally	Excellent / Good / Average / Fair / Poor/ No
	Is able to communicate likes and dislikes – verbally	Excellent / Good / Average / Fair / Poor/ No
	Asks on his/ her own whenever he/ she wants something	Excellent / Good / Average / Fair / Poor/ No
	Is able to state his / her feelings	Excellent / Good / Average / Fair / Poor/ No
	Other children understand what he/she is saying	Excellent / Good / Average / Fair / Poor/ No
	Is able to use words and sentences spontaneously while speaking	Excellent / Good / Average / Fair / Poor/ No
	Is able to respond meaningfully and with relevant responses	Excellent / Good / Average / Fair / Poor/ No
	Is able to use descriptive speech	Excellent / Good / Average / Fair / Poor/ No
	Is able to narrate and make stories	Excellent / Good / Average / Fair / Poor/ No
Other observations		

Progress of the child was calculated using the following 5 point rating scale.

1-2	3-4	5-6	7-8	9-10
Poor	Fair	Average	Good	Excellent

Appendix B (STANDARD VALIDATED TESTS)

The following standard validated tests were used. These tests were relevant to the therapeutic goal being measured.

Colour Cancellation Test Author: Kapur. Measures : visual scanning/selective attention. It consists of 150 circles in red, blue, yellow, black and grey. The participants were required to cancel only the yellow and red circles as fast as they can. Time taken in seconds to complete the test comprised the score. Age : 3-8 years Developed in the year: 1974
Knox Cube Test Author: Dr. Howard Knox Measures: Motor Free Visual Perception . It is a nonverbal test of intelligence. Age: 4-11 years Developed in the year : 1914
Seguin Form Board Test Author: Seguin Measures: Seguin form board is a nonverbal intelligence test and a performance-based nonverbal measure of cognition. It is also used to assess visual discrimination and matching and eye-hand coordination. Age: below 15 Developed in the year: 1866
Hand Tapping Author: Luria Measures: motor coordination and eye hand coordination (attention span) Age: 3 years and above Developed in the year : 1973

Progress of the child was calculated using the following 5 point rating scale.

1-2	3-4	5-6	7-8	9-10
Poor	Fair	Average	Good	Excellent

Appendix C1 (Narrative Capability Development Scale)

ACQUISITION OF LANGUAGE	
vocalization(sounds)	Excellent / Good / Average / Fair / Poor/ No
basic vocabulary	Excellent / Good / Average / Fair / Poor/ No
simple sentences understood	Excellent / Good / Average / Fair / Poor/ No
understanding of simple questions	Excellent / Good / Average / Fair / Poor/ No
sound reasoning	Excellent / Good / Average / Fair / Poor/ No
fluent speech	Excellent / Good / Average / Fair / Poor/ No
ARTICULATION	
no grammatical lapses	Excellent / Good / Average / Fair / Poor/ No
spontaneous use of words	Excellent / Good / Average / Fair / Poor/ No
appropriate use of pronouns, prepositions	Excellent / Good / Average / Fair / Poor/ No
descriptive use of speech	Excellent / Good / Average / Fair / Poor/ No
loud reading with considerable ease	Excellent / Good / Average / Fair / Poor/ No
understands fun in speech	Excellent / Good / Average / Fair / Poor/ No
EXPRESSION AND MEANINGFULNESS	
in context	Excellent / Good / Average / Fair / Poor/ No
personally meaningful	Excellent / Good / Average / Fair / Poor/ No
meaningful to others	Excellent / Good / Average / Fair / Poor/ No
spontaneous but expressive	Excellent / Good / Average / Fair / Poor/ No
thoughtful but expressive	Excellent / Good / Average / Fair / Poor/ No
consciously symbolic	Excellent / Good / Average / Fair / Poor/ No
STRUCTURING	
vaguely structured	Excellent / Good / Average / Fair / Poor/ No
structured with beginning and end	Excellent / Good / Average / Fair / Poor/ No
structured with beginning, middle and end	Excellent / Good / Average / Fair / Poor/ No
awareness of story structure	Excellent / Good / Average / Fair / Poor/ No
a proper story constructed	Excellent / Good / Average / Fair / Poor/ No
story and deeply meaningful	Excellent / Good / Average / Fair / Poor/ No
SILENCE AND LISTENING	
silent when talked to (no response)	Excellent / Good / Average / Fair / Poor/ No
listens but understands, appropriate response	Excellent / Good / Average / Fair / Poor/ No
appropriate silence	Excellent / Good / Average / Fair / Poor/ No
reflectively silent	Excellent / Good / Average / Fair / Poor/ No
deep listening	Excellent / Good / Average / Fair / Poor/ No
meaningful listening and relevant response	Excellent / Good / Average / Fair / Poor/ No

Progress of the child was calculated using the following 5 point rating scale.

1-2	3-4	5-6	7-8	9-10
Poor	Fair	Average	Good	Excellent

Appendix C2 (Embodiment-Projection-Role)

Embodiment	
Touch, eye contact	Excellent / Good / Average / Fair / Poor/ No
Spatial Awareness	Excellent / Good / Average / Fair / Poor/ No
Working with/against	Excellent / Good / Average / Fair / Poor/ No
Whole Body	Excellent / Good / Average / Fair / Poor/ No
Body Parts	Excellent / Good / Average / Fair / Poor/ No
Body/ Self-Image	Excellent / Good / Average / Fair / Poor/ No
Mimcry/Innovation	Excellent / Good / Average / Fair / Poor/ No
Projection	
Sand/Sand & Water	Excellent / Good / Average / Fair / Poor/ No
Clay/Dough	Excellent / Good / Average / Fair / Poor/ No
Pencil/Crayon	Excellent / Good / Average / Fair / Poor/ No
Paint (Finger/Brush)	Excellent / Good / Average / Fair / Poor/ No
Single Image/Whole Picture	Excellent / Good / Average / Fair / Poor/ No
Single/Large Toys	Excellent / Good / Average / Fair / Poor/ No
Environmental	Excellent / Good / Average / Fair / Poor/ No
Role	
Body Movement/Gesture	Excellent / Good / Average / Fair / Poor/ No
Sound/Speech	Excellent / Good / Average / Fair / Poor/ No
Mimicry/Innovation	Excellent / Good / Average / Fair / Poor/ No
Brief/Sustained	Excellent / Good / Average / Fair / Poor/ No
Relationship with another role	Excellent / Good / Average / Fair / Poor/ No
Role Development	Excellent / Good / Average / Fair / Poor/ No
Scene/Situation Development	Excellent / Good / Average / Fair / Poor/ No

Progress of the child was calculated using the following 5 point rating scale.

1-2	3-4	5-6	7-8	9-10
Poor	Fair	Average	Good	Excellent

Appendix C3 (Observing the way one drums)

Pulse	
Conservation	Excellent / Good / Average / Fair / Poor/ No
Embody	Excellent / Good / Average / Fair / Poor/ No
Dynamics	
Volume	Excellent / Good / Average / Fair / Poor/ No
Stop Cuts	Excellent / Good / Average / Fair / Poor/ No
Tempo	Excellent / Good / Average / Fair / Poor/ No
Rumbles	Excellent / Good / Average / Fair / Poor/ No
Pace & Lead	Excellent / Good / Average / Fair / Poor/ No
Patterns	
Call Response	Excellent / Good / Average / Fair / Poor/ No
Sculpting Layering	Excellent / Good / Average / Fair / Poor/ No

Progress of the child was calculated using the following 5 point rating scale.

1-2	3-4	5-6	7-8	9-10
Poor	Fair	Average	Good	Excellent

Appendix D

SRS Summary Formats

S.No	Date and Time	Therapeutic Domain	Metaphor	Artistic Communion	Focussed Creation	Closure
1	3rd june, 3-4pm	Turn Taking	Pause	Free walking and freeze at the sound of the drum, varied walks, with sounds, crawls. Introduction of a Hawaiian song with pause	As the music plays, the children begin to colour using oil pastels, strokes to the sound of the drum, improvisation by teaching them dot pattern. Each child gets a turn to play a beat on the drum for the rest. The dot pattern & the crayon pick up the beat from the drum.	Circle closure with breathing in and out, rubbing palms and keeping it on the face of the child next to you.
2	7th June, 3-4pm	Vocalization of consonants and visual comprehension	Bonding	A circle formation, basic stretches of the hands, up and down movements, with the basic sounds, as a group first and then individually. Sounds, tongue exercises, and gestures for each consonant of the alphabet up to g-gargle.	Introduction of the magic box with puppets(mystery), pluto the dog says hi to all, each child is given a puppet from the box, greetings to the puppet as each one speaks to the puppet, names their puppet, gets it ready for school.	Walking the puppets back and then walking in the room slowly, saying bye to the puppets, singing songs to the magic box. In a circle, breathe in and out with hands crossed on the chest.
3	9th June, 3-4pm	Gross Motor	Turn Taking	In a circle, free claps, sequenced claps, alternate claps to kangaroos paws, alternate claps to foot taps. Voice basic sounds, recall of the song done with prolonged sounds, song with claps.	Establish a pulse, say 1,2,3...get the kids to say aloud, and then clap and then play it on the drum. Bring in tempo, volume with the pulse in between rumbles. With the song, get them to play the pulse in a gap. Eg: nani nani yahova 123, noka nani yahova 123, replace the 123 with rumbles, go on.	Put back the instruments, clear up the space together with music playing, lie down on the floor, and move hands and legs to music. Close with brahamari pranayam

S.No	Date and Time	Therapeutic Domain	Metaphor	Artistic Communion	Focussed Creation	Closure
4	10th June, 3-4pm	Gross Motor and Cognition	No Boundaries	In a circle, body jamming warm ups with the Hawaiian song. Claps, stamps, snaps, sounds. Stretches and forming lines at the count of 10. Backward counts, run to the wall, sit in a line	Introduce the gym ball. Get the kids to roll it. One by one get them to front roll without taking the hands off the ball, back roll, stand on the ball and jump, lie on the floor and move the ball, sommersault in the cushions laid and touch the ball.	Saying bye to the ball, stretches- wide and tall using hands and legs. At the count of ten, settle down, close our eyes and stay quiet. Three times "OM"
5	14th June, 3-4pm	Gross Motor and Cognition	Leader	In a circle, basic sounds, fading in and fading out, aa, oo, mm...with gestures and eurythmy. In between the sounds, stop cuts, freezes....free walking, exploring the space, foot taps to a rhythm.	Each child is given a musical instrument and is allowed to play on it for a while and in the process bring in stop cuts, volume, tempo. Introduce valancha cha and add teach the pulse by hand clap, foot tap, cha cha cha. call response with drum 1-1, 2-2, 3-3 with volume. Play with the song. Sculpting jingles and drums.	Walking with the instrument and freezes in between. Slowly get them to keep the instrument back. Partner up...cycle, pull-push, back to back, pull-push. rub your palms and gently place it on your partners face...do this three times, thank your partner and slowly get up.
6	16th June, 3-4pm	Auditory Comprehension, Fine motor skills	Birds	In a circle, Free movement, light body movements, flying gestures, throwing feathers, watching them come down, imitating that movement. Gestures and symbols for stone and tree in the story...bird sounds- honk, hoot, coo, caw	The story of Koel finds her song with sounds and dramatisations, followed by working with hands using clay and creating the characters or objects in the story.	Recall from story and discuss the character or object by dramatisations. Call response of gestures, rub the palms, and breathe in and out....

S.No	Date and Time	Therapeutic Domain	Metaphor	Artistic Communion	Focussed Creation	Closure
7	17th June, 3-4pm	Sitting Tolerance and peer interaction	Body	Start with a few warm up settling in action songs. Bring in volume control in the songs , fade out words, only actions, slowly quiet time with energy circle.	Talk about body maps and get the kids into groups of three-four. Get one in the group to volunteer. Draw it out for them and then get the other kids to tear paper and stick. Large, small, long pieces.	A song on body- every single cell in your body is happy...Form an energy circle, Breathe in breathe out, rub palms on the face, eyes, cross hands on the chest
8	20th June, 3-4pm	Fine motor and Vocalisation of sounds	Space	Form train and explore the space in the room making sounds...aaa..coo chuk chuk...da da da (banging the feet), ssshhh ssshhh . Paint the room, with hands, up down, sideways, sit down and with legs, feet, paint your hands, face and settle down for the activity.	Using the rag cloth pieces, dip in the various colours given and create a pattern on the paper provided. A palette of colours given between two children, partner pairing and colouring.	A song- We are cleaning up the room, we are cleaning up the room. Sit in a circle. Breathe in and breathe out.Energy circle.
9	21st June, 3-4pm	Attention span and Cognition	Transparency	Circle formation and basic hand stretches and warm up followed by forming gestures for flowers- sunflower, lotus, rose buds. Sitting down & playing with the gestures learnt. A song - " like the sunflower which follows every movement of the sun"	The story of the dew drop using dramatisations, voice and props. Each one given a dew drop to colour.	With the dew drop that each one has, the children to dance with it, as music plays. Sit down in a circle, breathe in and out, energy circle, rub your palms and on your face, eyes, hands, body and blow it into the air.

S.No	Date and Time	Therapeutic Domain	Metaphor	Artistic Communion	Focussed Creation	Closure
10	23rd June, 3-4pm	Gross motor and Spatial intelligence	Largeness	In a circle, roly polly roly polly up up, down down, in in, out out, fast fast, slow slow. Rolling and rocking with hands tied around the knees followed by full body rolling.	On large sheets of paper do the rolling and stamping using the rollers, big brushes that one paints the walls with, explore the sense of largeness and space .	Wind up the activity and talk of what they liked the most and what they didn't. Sit down in a circle, breathe in and out, energy circle, rub your palms and on your face , eyes, hands, body and blow it into the air.
11	24th June, 3-4pm	gross motor and perception	Water- flow	In a circle sat back to back and began with the Mee Dolkara song. Get the children to make various water sounds...drop. Drip, rain drop, pitter patter, filling the bottle. Build on the sounds and get each kid to create a sound.	Large motor movements around a simple story of crossing a stream, a lake, the sea, on a boat, drowning and swimming back. Fish, whale, frog, people, in the water. Play a water relay after dividing the kids into two groups.	A song- Badal garaje bijli chumke. Sit down in a circle, breathe in and out, energy circle, rub your palms and on your face , eyes, hands, body and blow it into the air.
12	27th June, 3-4pm	Gross Motor and Cognition	Fantasy	Sit in a circle, do some hand exercises. Get them to do a call reponse to " dum lagake Haisha" and dramatise it. Introduce gestures for rain, village, cows, trees that feature in the story.	Share the story of the Wrestler and bring in the "dum lagake haisha" and the gestures in the story thereby making the story interactive.	Get the kids to choose a partner with whom they would like to arm wrestle and get them to play with the partner in a gentle way. Close with gifting your partner a hand massage.

S.No	Date and Time	Therapeutic Domain	Metaphor	Artistic Communion	Focussed Creation	Closure
13	28th June, 3-4pm	Aural and Associative Memory	Continuation	Recall the gestures of the story and form two groups representing the two villages in the story of the wrestler. Get the kids to stand opposite each other and mirror the actions of the other group led by the facilitator.	The children are given two large sheets of paper and made to recreate the story or their understanding of any character in the story using paints.	Play music and get the kids to move around in the room and imagine they are a character in the story. As the music stops they freeze and sit down. Breathe in and out and relax with hands crossed on the chest.
14	30th June, 3-4pm	Attention Span and Sitting tolerance	World of Puppets	In a circle, Finger exercises- move in, front up, come back, sideways, jump with the fingers, hop. Get the children to see the finger puppet, wear them in their fingers and introduce themselves to the puppet.	Using the puppets weave a story of how all the puppets meet each other and introduce themselves and talk of their likes and dislikes at school. Mr. Simpson the string puppet takes them to a tour of his school	Each child talks of what they like and what they don't like in school. Picture cards for those who can't articulate with words. Massage your hands and fingers. Look around and go and touch one thing you like in the room, come back and place your hands on your chest holding what you have touched. Blow in the air.
15	1st July, 3-4pm	Sensory Integration	Touch	Get the kids to form a train and walk bare feet on the terrace and outside to feel the textures with the feet. Bring in voice with aa, oo, ouch sounds as they walk.	Putting their hands inside the sand tray and feeling the sand. Making patterns in the sand. Blindfold them and get them to find objects hidden in the tray and describe it.	Sit face to face with a partner and feel the partner's hands, and face gently. Rub your palms on your chest. Breathe in and Breathe out.

S.No	Date and Time	Therapeutic Domain	Metaphor	Artistic Communion	Focussed Creation	Closure
16	5th July, 3-4pm	Sensory Integration	Fluidity	They sit in a circle and feel different textures of cloth with their hands and face. Pairing of the textures.	Get the kids to mix food colour in the maida paste. Give them Cardboards and get them to apply the coloured maida on the cardboard and make patterns. Place a chart paper on the cardboard and remove it to see the patterns formed.	Ask the group to arrive at a name for the creation. Brahamari Pranayam and three OMs,
17	6th July, 3-4pm	Motor Skills	Earth	Circle formation followed by free walk and freeze, walking in mud, walking on stones, climbing the hill, climbing a mountain, crossing a river	Dramatised version of piggy on the railway picking up stones. Get the children to pick up stones they want and paint on it . Set up the stones in any manner that they like.	Clearing up the area and then walking through air, sit down, wonderful world closure.
18	8th July, 3-4pm	Fine motor	Building Blocks	Circle formation followed pound legs, spider fingers, star snaps, building hands, kneading, rubbing hands.	Give the children dough. Get them to pinch it, roll it. Each child creates something with the dough. Give tooth picks and sticks and get the children to make patterns on the dough. Connect what they have all created using sticks.	Action Song ' Its I who build a family'. Breathe in and out. Energy circle.

S.No	Date and Time	Therapeutic Domain	Metaphor	Artistic Communion	Focussed Creation	Closure
19	15th July, 3-4pm	Fine motor And Cognition	Transformations	Circle formation and do a recall of last time sessions and the dough modelling. Give them dough to just roll and make balls. Collect the dough balls , put them together and make a caterpillar.	Each child makes a caterpillar and a butterfly with dough and then colour it. We go out to collect a leaf to place our models.	The children talk about what they have made and take a look at the creations of the others. Close your eyes and take a deep breath, breathe in, breathe out. Cross your palms on your chest.
20	19th July, 3-4pm	Language articulation and associative memory	Life cycle	Get the circle to sit around a circle of the dough models and watch it. Slowly bring out the caterpillar and the butterfly they made.	Narrate the story of the hungry caterpillar using visual aids. After the story is narrated get kids to introduce their models. Give it a name and talk about them. Put all the characters together and weave a story around it with inputs from the kids. Give the story a name.	Get up, move around the room slowly to the music. As the music stops , freeze , rub your palms , on your face, on your eyes and blow.
21	26th July, 3-4pm	Attention Span and Sitting tolerance	Openness	In a circle do stretches, full body- beginning with face, neck, hands, waist, and legs.	Play a game of pass- pass a pat, pass a sound, pass a beat, and pass a kiss. Circle in, out, sit, jump, move. Get kids in a circle and get them to pass the ball. Pass using palms, using elbow, pass from the back. Throw and catch as names are called, then without names. Skipping rope- get kids to pass underneath the rope as it is lowered without touching any part of the body to the rope.	Back in a circle. Sit down. Massage feet and hands. Sing together- wonderful world. Energy circle. Close eyes. Breathe in - out. Hands crossed on the chest. Slowly open the eyes.

S.No	Date and Time	Therapeutic Domain	Metaphor	Artistic Communion	Focussed Creation	Closure
22	28th July, 3-4pm	Language Acquisition and development	High and Low	In a circle get the kids to stand with hand on the waist. Start with: I can sing highI can sing low. Bring in pitch and volume, fading in, fading out. Introduce the vowel sounds with fading in and out	Get kids to make the consonant sounds for b, d, f, s, t. Attach the vowels and vocalise. Eg: ba ba ba ba ba ba ba, bey bey bey bey bey bey, bi bi bi bi bi bi, bo bo bo bo bo bo bo. Repeat with d, t, s. Give the dough to the kids, get them to make a letter and then repeat the four sounds for the letter they make.	In a circle - I can sing high, low, slow, fast, in whispers. Energy circle. Close eyes. Breathe in - out. Rub your palms, on your face, on your hands, blow.
23	2nd Aug, 3-4pm	Language Acquisition and cognition	The space around me	Repeat the last time ritual. I can sing highI can sing low. Bring in pitch and volume, fading in, fading out. Consonant-vowel sounds with assigning numbers. 1 for aa, 2 for ey ey, 3 for I, 4 for o	Show the book-ABC Treasure Hunt and open to the B sheet. Get children to start pointing out to things from B. Give everyone a chance. But the book away and get them to recall from things around that begin with the letter B. Make an object from B get kids to guess. Repeat this with D, T, F, S	A quick on the spot song with words the kids suggested. Energy circle. Hum abcd with the kids and use that humming as a closure. Thank you.
24	4th Aug, 3-4pm	Motor development	Obstacles	In the terrace get kids to walk around, explore the space and stay with themselves as the music plays. Get them in a circle and do movements of jumping, higher, touching the toes, sideways, bending backwards.	Get the kids to bring up the tyres and arrange it in a line that forms a bridge. Get them to climb up on the platform and in a straight line walk on the tyres, jump in-between the tyres, jump into alternate tyres and then walk back climbing and overcoming the obstacles.	In a circle - Sit down, stretch your legs, touch your toes, lie down backwards. Lying on your back, look up into the sky, close your eyes. Stay quiet and calm. Slowly turn to one side and get up.

S.No	Date and Time	Therapeutic Domain	Metaphor	Artistic Communion	Focussed Creation	Closure
25	5th Aug, 3-4pm	Fine Motor and Peer Interaction	Patterns and Partners	Simple warm up- whole body, settling down in a circle. Lighting of a candle. Finger Play, movement, formation, connecting with partner's finger, walking together with partner's finger, scribbling in the air, mirroring the partner's finger movement.	The kids sit with a partner and in-between them is a sheet of paper. They chose their partner. The kids make random strokes on the paper. Later, as the music plays they keep making alternate strokes each. When the music stops playing they are to look at the figure they have created and together decide what it looks like. Change the partners and repeat the same.	Winding up together, Walking the crayons back to the box. Stretching. Massaging your partner's fingers and hand. Energy circle, quiet time , inhale and exhale.
26	8th Aug, 3-4pm	Gross Motor and Cognition	Making Melodies	Get the children to slowly walk up to the chair giving a single beat with their feet. As the kids sit on the chair, begin with call response with foot tapping. Claps and Taps with sounds of dhoom and tak. Various sequences eg: dhoom dhoom.	Establish the pulse first using voice and then drumming. Rumbles, stop cuts, call response, volume and tempo. Do the valancha cha song. Watch how the kids pick up their pulse for the song and then add improvisations.	Putting back the instruments. Sitting on the floor with legs outstretched. Swaying to the music being played. Circular moving of the hands and the legs as we sit. Breathe in Breathe out . Hands crossed on the chest, eyes closed. Open the eyes look around and smile.
27	10th Aug, 3-4pm	Fine Motor and Cognition	Creation	Get the kids to curl up as a bundle and then slowly get up and stand high on their toes. Get them to stand straight and upright without moving. Play a game by telling them to pair up when a colour is called if they are wearing that colour. Once they are together they need to tell me what object they would like to associate with based on that colour.	Put them in small groups and give them each sheets of the paper, scissors and plates. They have to cut pieces or tear them into various sizes and sort them in the plates. Once that is done they pick up a few pieces from each plate and create something together. At the end after telling the facilitator what they have created they put the pieces back according to the colour.	Teach the children " Hum honge kamyab".Stand up still in a circle and sing the national anthem.

S.No	Date and Time	Therapeutic Domain	Metaphor	Artistic Communion	Focussed Creation	Closure
28	11th Aug, 3-4pm	Fine Motor	Flag	Sit in a circle with the kids and get them to recall the colours of the paper they cut in the last session. Link it and introduce the Indian flag to them. Have a flag put up	In a large sheet, with the flag already drawn, get the children to start sticking the pieces of the colour paper after observing the flag. This is a group work. Together when done, put up the flag on the wall. Give the kids crayons and get them to draw out something around the flag on the sheet.	Repeat hum honge kamayab and introduce it in English as well. Stand up still in a circle and sing the national anthem.
29	16th Aug, 3-4pm	Language Development and Associations	Words	Form a circle. Get the group together. Do voice exercises with basic sounds, consonant sounds, elongated sounds, sound emphasis.	Sit down in a circle and pass a sound, vary the volume while passing, vary the tempo. From the magic bag pull out objects one by one and get the kids to tell what they see. Not get them to tell what it looks like to them (making associations). Eg : Ladoo, face ,moon for a ball.Go with the pace of the class and make a little song for every association they make.	From the Magic Bag pull out a scarf for each child and get them to move freely as music plays feeling and tossing the scarf. Sit down with feeling the scarf on their face and slow singing of 'I like the flowers'...end with umbala umbalala humming.
30	17th Aug, 3-4pm	Gross Motor and Cognition	Sound	Get the kids to pick up from the instruments and objects kept after hearing how they sound. They should pick up the sound they liked the best. Get them to play on the instruments and experience various sounds	Settle the kids in a group and then get them to pick up the pulse that the facilitator is showing. Vocalise the pulse. Build in volume, tempo and teach them 'oh when the saints'. Get them to play prelude, interlude. Sculpt out the groups based on the sounds. The kids rearrange their position to form the sculpt. Do call response with the sub groups with rumbles in between. Bring in the common 'dhoom machale dhoom ' and get the kids to play.	Put the instruments back to their places and then close with making different sounds with the mouth, hands, feet and try sculpting this too. Settle down with ssshhh whisper sound . Cross hands on the chest and close eyes.

S.No	Date and Time	Therapeutic Domain	Metaphor	Artistic Communion	Focussed Creation	Closure
31	19th Aug, 3-4pm	Motor Development and Cognition	Colours in Nature	In a circle , call response with clicks, snaps, kangaroo paws that lead into a Hawaiian song to connect with the group. Move around the room with beats and then freeze at the beat as butterflies, rain,trees,flowers	For pincer grip and motor exercise - Bagurumba song. Each child is given a sheet and paints; they explore the colours and bring in the colours on paper. Put up their work. Later given a large sheet and divide them into groups of four and get them to paint together on one sheet. Get them to point out what they see and associate it to something they see in nature. Outline it with a crayon. Put up the art work.	Clearing up the space as we sing the song colours of nature. To pep up the group introduce a full body action song "seeing colours all around". Settle down with the song. Back straight 'I like the flowers'..Breathe in-breathe out...thank you...blow your kiss into the air
32	23rd Aug, 3-4pm	Fine Motor	Lightness	Give each child a balloon and get them to toss it and play with it as the music plays. Spread out a satin cloth and get them to hold it and drop their balloons in the cloth and swing the cloth slowly.	With the balloons on the cloth give each child a feather to hold and toss it in the cloth. When the music stops, each child picks up a feather and sits down. Mix paints to a diluted consistency and get the kids to paint using their feathers. Once they have finished get them to stick a few feathers to their sheet.	Give the kids their balloons and get them to toss it high up and move in the room following the movement of the balloon. Settle down with the balloons in the hand. Place it on their face, keeping the balloons down, rub your palms , on your face, eyes and blow.
33	24th Aug, 3-4pm	Motor Development	Layers	Get the kids to sit in a circle and do hand, arm, wrist and finger exercises. Give them newspapers and get them to tear out long stripes of paper.	With the maida paste get kids to stick these long stripes of paper on the balloons. They keep sticking it with multiple layers. Let is dry. Get them to take one sided papers and paint on it. As it dries they make a fan of it.	Play a closure game with them placing their hands one over the other and forming a tower. Call out a colour. The person wearing that colour pulls their hand off as the rest of them maintain the tower of layered hands.

S.No	Date and Time	Therapeutic Domain	Metaphor	Artistic Communion	Focussed Creation	Closure
34	26th Aug, 3-4pm	Language acquisition and Narratives	Masks	Give the children the paper mache balloons. Cut it in to two halves. Get them to stick the fan as feathers and make a bird.	With the other half get the children to make a mask for themselves. They decorate the mask and give it a name. Get them to introduce the mask to the group and weave a story around it.	The kids hold on to their masks and dance as the music plays. Settle down and place their masks next to them and breathe in and out, and sing 'what a wonderful world'
35	30th Aug, 3-4pm	Oral Motor Development	Bubbles	Get the children to sit in a circle and watch preparing the bubbles solution with soap oil, glycerine and sugar. They are given loops and blowers and blow bubbles outside and watch	Mix paint in the bubble solution and get them to do bubble painting with the loops and straws. Initially let them blow into the solution till froth is formed and then rub their paper over it. Improvise by getting them to blow bubbles and let the bubbles fall on the sheet.	Get them to form a circle and curl up on the floor like they were fitted inside a bubble, Tell them to wish for something (intent) and slowly get out of their bubble, hold the bubble in the hand and gently send the bubble upwards.

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References

- Aurobindo, Sri - *The Significance of Indian Art*, Sri Aurobindo Ashram Press, Pondicherry, 1947.
- Bratton SC, Ray D, Rhine T, Jones L. - *The efficacy of play therapy with children: a meta-analytic review of treatment outcomes*. *Profess Psychol Res Prac*. 2005;4; 376–390.
- Cathy A. Malchiod - *Handbook of art therapy*
- Cheek, Joyce M.; Smith, Lyle R. - "Music Training and Mathematics Achievement," *Adolescence*. Winter 1999, 34(136): 759-61.
- Dana Foundation - *How Arts Training Improves Attention and Cognition*
- Danger S, Landreth G - *Child-centered group play therapy with children with speech difficulties*. *Int J Play Therapy*. 2005;1; 81–102.
- Georgetown University Medical Center (2007) - *Music And Language Are Processes By The Same Brain Systems*. <http://www.sciencedaily.com/releases/2007/09/070927121101.htm> (Retrieved Nov 10, 2007)
- Gibbs, Evelyn - *The Teaching of Art in Schools*, London, 1934
- Graziano, AB; Peterson, M; Shaw, GL. *Enhanced Learning Of Proportional Math Through Music Training And Spatial-Temporal Training*," *Neurological Research*. March 1999; 21(2): 139-52.
- Griffiths, Ruth - *A Study of Imagination in Early Childhood and Its Functions in Mental Development*, London, 1935.
- John A. Carpenete, MA, NRMT, CMT - *Creative Music Therapy with a Boy with Multiple Impairments: Stepping out of isolation into new experiences*.
- Johnson, Lillan - *Child Art to Man Art*. Macmillan, London.
- Lisa Jo Rudy, About.com Guide - *Dance Therapy for Autism*
- Lisa Jo Rudy, About.com Guide - *Music Therapy for Autism*
- Loewenfeld, V. - *The Nature of Creative Activity* (Translation: O.Oeser), London, 1939.
- Pantev, C, et al. - "Increased Auditory Cortical Representation In Musicians," *Nature*. April 23, 1998; 392(6678): 811-4.
- Rauscher, FH, et al. - "Music Training Causes Long-Term Enhancement Of Preschool Children's Spatial-Temporal Reasoning," *Neurological Research*. February, 1997; 19(1): 2-8.
- Roederer, J.G - (1985) *Neuropsychological processes relevant to the perception of music an introduction in R.Spintge & R.Droh, Music in Medicine* (pp 61 86)
