

# **Tink Tank –An interactive space to make exercise fun for children with various abilities**

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## **Abstract**

The children in SETU (A Developmental Intervention Centre) have been enjoying Tink Tank for the last eight months. Every Monday in SETU is celebrated as “Tink Tank” day. Tink Tank is a universal concept aimed to make certain exercises fun for children with various abilities. As a result of being inspired by the children’s present toys I developed a new space to make their exercises more interactive and fun. The tank has four different environments (water, jungle, galaxy and springtime). Each environment is associated with an exercise. The exercises include (blowing, gripping, hand eye coordination, fine and gross motor coordination and hand exercises). The exercises provide auditory, tactile and visual stimulation. The more they exercise the brighter the light becomes, the movement becomes faster and the music becomes louder. The table of the tank teaches colour, shape, numbers, alphabet and expressions.

*Keywords:* interactive play therapy, exercise stimulation, multi-sensory play, developmental toys, edutainment, disability.

## **1. Introduction to Tink Tank**

Play is how kids grow; it is what they do. All children need opportunities to discover and actively explore the world around them. The importance of play in a young child’s life cannot be over-stated; it affects all areas of development. However, for many young children with disabilities, play is often limited.

The term ‘developmental toys and games’ may give an impression that the fun element has been relegated to a back seat, however this is not the case as Tink Tank is not only a developmental space but also a fun space. It is a space with universal appeal. Tink Tank has been designed with a holistic concept in mind for children with various abilities that not only addresses single barriers but also offers a combination features to provide the greatest access for all children. Tink Tank is a universal concept aimed to make certain exercises fun for children with special needs. It is an open-ended space that promotes discovery and offers a variety of learning opportunities for all children. Certain elements allow more children to successfully interact and play. It is a flexible, customisable, user-friendly platform with inherent multiple activities.

Tink Tank is a platform that assists children to learn about cause and effect, fine motor skills, eye-hand coordination, spatial concepts, auditory, tactile, visual stimulation, fine and gross motor skills and more. One can easily customise Tink Tank to the needs and abilities of each of the children. This complete cause and effect motivational centre is being used in a therapeutic and educational environment in India. Tink Tank is designed in such a way that many senses can be simultaneously stimulated, which can help in the training of deficient physical functions. This encourages the child to become active and develop creative talents while playing. It is a specifically designed environment, which enables children with special needs to create a range of sensory experiences for therapy, learning, relaxation, play, stimulation, control, physiotherapy, communication and fun. The concept is to create events and focus on particular senses such as tactile, vision, sound, all of which can be manifested in many ways, through special sound, visual effects, tactile experiences, vibrations, and the use of music in various combinations.

Tink Tank is a play space in which the children can completely relax without being conscious of the exercise involved. It gives biofeedback proportional to the amount of exercise a child does and enables children with different degrees of disabilities to change and influence their environment in a positive way. The child’s curiosity is stimulated by Tink Tank’s colours, shapes and sounds. These factors inspire the children to play and feel joyful; experience surprises, gain knowledge and simulate success. Tink Tank does not have a standard model; rather it can be modified according to requirements and conditions. It can be used as a teaching tool for children with specific learning disabilities. This is a way to improve the quality of learning by interactive play for children with various abilities.

## 2. Design Process

The design process began with brainstorming. The user study was done in an early developmental intervention centre (SETU in Ahmedabad). Interacting with children, parents, therapists, teachers, specialists as well as other designers was a part of the research. Following observations of the children exercising and playing with the toys supplied by the institute it became obvious that they did not enjoy their existing daily routine. A number of concepts were generated to tackle this problem area. The prototype evolved after a number of iterations. Tink Tank was designed keeping in mind sanitation, safety, hygiene, and child psychology, as well as social, ethical and aesthetic aspects. A working prototype was made keeping in mind the cost and space constraints.

## 3. Tink Tank Final Prototype



Figure 1 Tink Tank

The Tink Tank consists of two boxes. The upper box is made from clear acrylic with four compartments that are each colour coded to match different environments. Each of these environments is designed for a child with disability to exercise playfully and is described in section 4. The lower box is described in section 5.

## 4. The Upper Box Environments



Figure 2 'Spring/Summer' environment



Figure 3 'Enchanting Galaxy' environment

Figure 2 shows the Tink Tank's 'Spring/Summer' environment of flowers and fruits inside the tank. When a child exercises with the hand gripper the wind chimes inside rotates with a soothing sound and the yellow light intensity in the box increases.

Figure 3 shows the 'Enchanting Galaxy' environment which has colourful glowing stars and planets. When a child blows into a disposable plastic tube the planets starts revolving. The red light intensity increases according to the amount the child blows and the music "Twinkle twinkle" plays along.



Figure 4 The Tink Tank Green environment



Figure 5 Child and the blue waters environment

Figure 4 illustrates inside the Tink Tank's 'Jungle Jungle' Green environment. When a child uses the hand exerciser (Figure 2 foreground), the light intensity increases according to the pressure and the music is activated. The jungle environment is filled with plastic plants and wild animals. When a child uses the hand exerciser, the light intensity increases according to the pressure and the music is activated. Figure 5 shows a child using Tink Tank's 'Blue Waters' environment where plastic fishes with metal mouth can be moved by a magnet that is held and manipulated by the child on the acrylic wall of the tank. The magnetic fish love to be fed by the magnetic food by the children. This helps the child in fine motor coordination. As the fish feed an interior light turns on and the air pump is activated.

## 5. The Lower Box Games

The acrylic 'environment' tank sits upon on a square wooden box that has a different activity game on each of its sides (Figure 1).

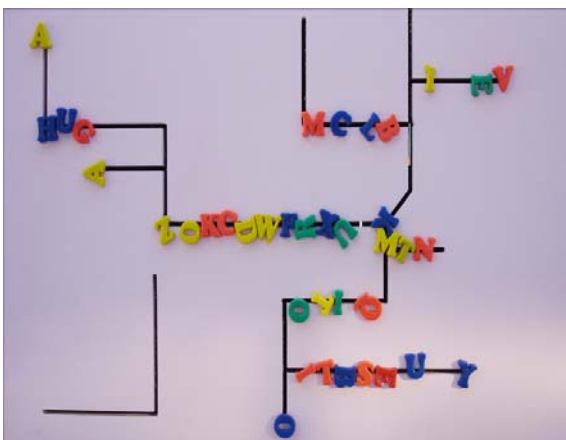


Figure 6 Alphabet Grids (side 1)



Figure 7 Magnetic Turn Taking (side 2)

The 'Alphabet Grids' game is on one side of the lower box. This game consists of colourful plastic alphabet with a protrusion that can slide through a slot in the box (Figure 6). These can be arranged in any manner and be used as a learning aid for different age groups. For younger children it can be used to teach alphabets and for elder ones it can teach formation of words.

The Magnetic Turn Taking Game is on a second side of the lower box (Figure 7). In this game there are four magnetic Disney characters and three shining stars. There is a path made with magnets on which the characters can be fixed. Each child takes a turn and rolls a die. According to the number on the die the child moves forward on the path to reach a destination. Whenever the child lands on a glowing star, he gets an extra turn. The child who reaches the end of the path first is the winner. Targeted is learning concepts involved in turn taking in which the Disney characters are individuals and the stars represent an extra chance.



Figure 8 Numbers Grid (side 3)



Figure 9 Shapes, Expression and Colours (side 4)

The 'Number Grid' activity is on the third side of the lower box (Figure 8). Here there are plastic numbers and functions (addition, subtraction, division multiplication and equal symbols) with a small protrusion made of aluminium rod which can slide through a slot in the box. These numbers and symbols can be arranged in any manner. This activity can be used as a learning aid for different age groups. It can assist in arithmetic with basic numbers to simple equations. On the fourth side of the lower box are twelve wooden pieces of different shapes painted with various facial expressions (Figure 9). Each piece can be put into any of twelve different holes that are on the side. Children can play with each of the pieces and then locate them back into the hole that corresponds to the shape. Targeted is the child's learning to recognise and differentiate shapes, colours and painted face expressions.

## 6. Tink Tank helps through the emerging play stages

### Sensory Exploration Play

The young child uses his/her senses to "explore" objects in the same undifferentiated way with repetitive movements. Tink Tank is multi-sensory, e.g. the harder, you blow into the tube, the faster the planets which are plastic balls rotates along with the light intensity increasing, thus motivating the child to exercise more.

### Functional Play

The child manipulates objects in a functional manner, and then combines objects. He further sees how his action triggers reactions inside Tink Tank.

### Constructive Play

The child begins to sort and build with various objects. Materials are used in simple and then more complex ways. Creative expression begins to emerge, e.g. two sides of the lower box are made of grids on which there are numbers and alphabets in the form of a puzzle. Children can create their own words by bringing words from different parts of the grid together. The complexity of the game is determined by age and ability.

## 7. Tink Tank and Universal Design Concepts

**Multiple Ways of Presentation:** The design appeals to children's sensory (sound, vision, touch) abilities. It has multiple colours, textures, dimensions, movement and sounds. It is designed in such a way that play is intuitive. Tink Tank's feedback encourages a child to continue exercising.

**Multiple Ways of Use:** All children can use equivalent ways for playing with Tink Tank. A variety of actions can stimulate with toys. It can be dismantled completely and be used in different positions and places. It can be adjusted to the child's preferences and requirements. It is easy to use and accepts a variety of movements. Tink Tank is adjustable and stable

**Multiple Ways to Play:** Tink Tank appeals to children at varying developmental levels and abilities. It encourages use for more than one purpose. It holds a child's interest and encourages exploration and discovery. It can be played in different ways and adjusts for age/levels. It promotes use in more than one way. Your child can choose to play in this space alone or with other children. It encourages the child to be active (physically and mentally). There is no right or wrong way to play. Its use promotes discovery and encourages imagination.

## **8. Tink Tank caters to:**

**Attention Grasping:** Tink Tank is attractive and colourful with lights and music to make it the focus of attention.

**Turn Taking:** In this kind of structured group activity, children with autism learn to take turns with others, wait until their turn comes and respond to the speech and actions of others. They learn social skills and behaviours, which increasingly enable them to join in activities with other children.

**Social Interactions:** The four sides of Tink Tanks lower box each has a different game or puzzle. The one with letters on a grid helps the child to practice learning in series of alphabets; first making small words and later bigger and more complicated words. In this kind of structured group activity, children with autism learn to take turns with others, wait until their turn comes and respond to the speech and actions of others. They learn social skills and behaviours, which increasingly enable them to join in activities with other children.

**Physical Activity:** In Tink Tank, one can remove the shapes and put it back. Pass the shape from one hand to another. It even has hand and blowing exercises.

**Fine motor coordination:** The alphabet and number grid puzzle as well as the magnetic fishes in the Tink Tank help in exercise of finger coordination.

**Social Relationships:** It is important to build a warm relationship with a socially and emotionally withdrawn child. These children may feel threatened when other people attempt to occupy their 'space', especially if they are relative strangers. Through gradually introducing them to Tink Tank they gain growing familiarity and are likely to accept the presence of others and the pleasurable experiences from playing together.

Children need to be motivated if they are going to make the effort to interact with others, they need to have a reason to communicate. It can be rewarding for the child to learn different ways of controlling his or her world. Thus in Tink Tank the child can control his or her own environment, and can move the galaxy, control the sound, intensify the light etc.

**Biofeedback:** As all the compartments in the tank are activated by an exercise and the amount of that exercise generates a corresponding amount of movement, light or sound, Tink Tank can be considered a mechanism to achieve biofeedback.

## **9. Tink Tank in the future**

Around twenty-five children have been playing with Tink Tank for the last eight months - every Monday at SETU is called "Tink Tank Day". Tink Tank can be used in a wide variety of establishments such as schools, hospitals, nurseries, resource centres, leisure centres, and residential houses for elderly people, community resource centres, psychiatric hospitals and centres, private houses and many other places. On a larger scale it can be used in exhibitions and Amusement Parks.

## **10. Conclusion**

Tink Tank is a student project and despite time, money and technological constraints it has been realised as a prototype. At present, it is electronic, but in the future when manufacturing with the latest technologies of wireless computing it can be sturdier and safer for children to use. After user testing, it has been seen that the children enjoy doing these exercises and thus such environments are useful for children with special needs.

The therapeutic efficacy of play therapy has not yet been proven scientifically. Some contend, however, that it is virtually impossible to scientifically prove the efficacy of any psychotherapeutic model, new or old. They argue that the variables are simply too vast, infinite in fact, making a controlled experiment impossible.

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