

# Developing the learning method for Hearing Impaired Children in Andhra Pradesh

Project-II

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Submission:  
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# Approval Sheet

The Industrial Design Project II entitled "Developing the learning method for Hearing Impaired Children in Andhra Pradesh" by Srinivas Godala; Roll no.126250012 is approved, in partial fulfilment of the Master in Design Degree in Visual Communication at the Industrial Design Centre, Indian Institute of Technology Bombay.

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Date: \_\_\_\_\_

Place: \_\_\_\_\_

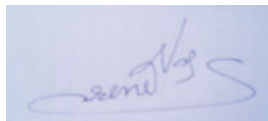
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# Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/ data/face/source in my submission.

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A handwritten signature in blue ink, appearing to read 'Srinivas Godala', is centered on a light blue rectangular background.

Srinivas Godala  
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Date:



# Acknowledgement

I would like to thank Prof. Mandar Rane for giving the chance to work on this topic and his valuable guidance and direction during the project and his way of questioning style to help me in brainstorming. I would also like to thank Dr. Srinivas (Apollo Hospitals, Hyderabad) for his suggestions and for allowing me to work with the Audio Verbal Therapy teachers and children.

I would also like to thank Prof. G.V. Sreekumar, Prof. Raja Mohanty and Prof. Sudesh Balan for their support and encouragement.

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# Abstract

This project is aimed at improving the learning and communication of hearing impaired children aged 4-7 years. Hearing impairment is a major setback as the child loses the chance to learn language and speech at this precious age. Added to this, the parents do not know how to teach new things to the child for basic communication. These children require a special learning method after proper treatment through hearing aid with Cochlear implants.

Specially trained teachers of Auditory Verbal Therapy (AVT) are very instrumental in improving their auditory, speech and language skills as regular teachers don't spend enough time teaching these children or parents remove the cochlear implants.

I have designed an interactive learning method designed for solving auditory & language problems which can be used at home with help of parents as well.



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# Introduction

From the beginning, I always wanted to work on children-oriented projects, especially for the children with different inabilities. Thus I have chosen the Hearing Impaired Hearing Impaired children and help them in learning the language and speech at nursery level through my solution. It was very challenging to teach and learn about these children. Also, the various standards of education do not follow any specific methods of teaching to impaired children. Hence, I visited the local Ear, Nose, and Throat (ENT) Hospital in Hyderabad, to study the ground realities. I observed the children with cochlear implants to win the battle of learning language, audition and communication to some extent.

Consequently, I have proposed my Project-II topic on “Hearing Impaired children problems” to Prof. Mandar Rane and discussed on developing learning methods to help them learn new things. He encouraged me to the core and clarified on the vastness and ambiguity of the topic.

After series of discussions, he allowed me to do the project on “Developing learning method for Hearing Impaired children” in Andhra Pradesh. I express my gratitude for his valuable suggestions which helped in bringing clarity and which further supported me in completion of the project.

During the process, I met the ENT specialist, audiologist and teachers for better assessment of the project, interacted with Hearing Impaired children and their parents in special schools to understand their problems. When the Hearing Aid or Cochlear implants were switched on, the children could hear the sound, but could not understand “what is sound”?

Hearing Impaired children need special trained teachers, special learning methods for understanding the sounds, speech and the language. Parents do not know how to teach new things to these special children. Teachers communicate to children with facial expressions, hand gestures and repeating words of nouns. We can't

understand how they perceive the sounds; they do not know how to spell the words and pronunciation is very difficult. Sound experience is very important for HI children; understanding the sounds with supporting visuals is something easy to understand both sound (voice) and visual to learn the language, speech and pronunciation. Looking at these problems, I have designed a few concepts to improve the audition, speech, nouns and the cognition. Among all the methods one interactive learning method would inculcate interest in the Hearing Impaired children to listen to the voices of animals and birds. Parents can teach children even at home without switching of the hearing aids or cochlear implants after the school. The child can spend more time for self-learning at home too. This interactive method can help to 4 to 7 years age group children.

# Data collection

## How we hear

Hearing is one of the five senses; it is very complex process captures the sounds understanding its meaning. Human ear is fully developed part in our human body at the time of birth and respond to sounds.[1]

Sounds are invisible vibrations it is travel through the air, when we speaks, dog bark, vehicle horn, and mobile rings create sounds, Its vibrations are travel in the air in all directions, when ear capture the sound then it convert in to messages then brain can understand, But it is depends on how well ear working, how ear captured the sound waves and how much it clearly transfer then we understand the meaning proper.

## There 3 parts in ear

- Outer ear - catches the sound waves and directs them into the middle ear.
- Middle ear - the middle ear transfers sound waves in air into mechanical

pressure waves that are then transferred to the fluids of the inner ear.

- Inner ear (cochlea) - turns pressure waves into sound signals that our brain can understand. [2]

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[1] <http://www.asha.org/public/hearing/How-We-Hear/>

[2] <http://www.cochlear.com/wps/wcm/connect/intl/home/understand/hearing-and-hl/how-hearing-works/how-hearing-works>

## What is hearing impairment (loss?)

Hearing impairment is the inability of an individual to hear sounds adequately. This may be due to improper development, damage or disease to any part of the hearing mechanism. Hearing is a prerequisite for the development of normal speech & language. A child learns to speak by hearing the speech of others in the family and surroundings.[3]

## What are the types of hearing impairment

### Degrees of hearing impairment

Hearing loss is measured in decibels hearing level (or dBHL). This number represents the how much softest level you can hear. Hearing level can be measured for pure tone sounds  
The amount of hearing loss someone has experienced is ranked as mild, moderate, severe, or profound.

### Normal hearing

You can hear quiet sounds down to 20 dBHL.

### Mild hearing loss

Hearing loss in your better ear between 25 - 39 dBHL. You have difficulty following speech in noisy situations.

### Moderate hearing loss

Hearing loss in your better ear between 40 - 69 dBHL. You have difficulty following speech without a hearing aid.

### Severe hearing loss

Hearing loss in your better ear between 70 - 89 dBHL. Require powerful hearing aids or an implant.

### Profound hearing loss

Hearing loss in your better ear from 90 dBHL, You need to rely mainly on lip-reading and/or sign language, or an implant. [4]

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[3] <http://ayjnihh.nic.in/aw/awareness/audiology2.html>

[4] <http://www.cochlear.com/wps/wcm/connect/intl/home/understand/hearing-and-hl/what-is-hearing-loss-/degrees-of-hl/degrees-of-hearing-loss>

# My Observations

I met an Audiologist Dr. Srinivas in Apollo hospital at Hyderabad for better understand about my project related queries. I introduced myself and explained about my project in brief “Developing learning method for Hearing Impaired Children” then he replied that “it may not possible within a month or two months it would take around year or more for developing learning methods. Later on he explained about his experience on this.

Audiologist determines if child is audiological suitable for a cochlear implant. This involves determining the levels of hearing loss, fitting suitable hearing aids, assessment of benefits obtained from the hearing aids and performing other audiological investigations such as monitoring of the child’s ear function. Assessment of auditory function in general includes behavioral assessments where a child’s responses to sounds are assessed and also objective test, such as electrophysiology assessments and otoacoustic emission test.

The audiologist works closely with the therapist. I asked few questions to audiologist like what is the reason of getting the hearing disability and how they learn language and communicate to others. He replied accidents, infections in ear and close blood relations, heredity of parents cause to get hearing impairment; they use sign language, finger spelling and hand gestures in deaf children for communication but we are not encouraging those, Mostly we have been encouraging to child for speech, audition and improve language for mainstream education with the help of hearing aids, cochlear implants.

Later on he introduced to me an Auditory Verbal Therapy (AVT) department speech therapist, teachers, they were trained with special education in B.Sc (ASLP), M.Sc. (ASLP), There are 7 teachers are working for five classes, in every class one teacher teach to one individual HI child with parent in class. Teachers are teaching the class every

individual class only 45minutes to 1 hour in every day, to improve audition, speech and follow their syllabus.

**Observation:** I was sitting in the Ms.Thaslim a teacher for a class of observation. she have five years' experience in teaching her qualification is B.Sc (ASLP). There is one boy Manish 1 year old sit on chair with his mother the boy, worn the hearing aid. There is many colour full toys on the table and pictures pasted on wall. She started class with the toy car holding in hand show to boy, saying toy name car, car, car...repeating many times to have attention of the boy. He was looking at car sometimes and trying to catch the car with hands. Teacher changing the toys one by one like duck, fish, ball explain the names same way repeated and pronounce loudly for encourage the boy to hear. I did not understand whether the boy able to hear or not, how would he perceive the voice understanding the sounds.



Manish with his mother at AVT department

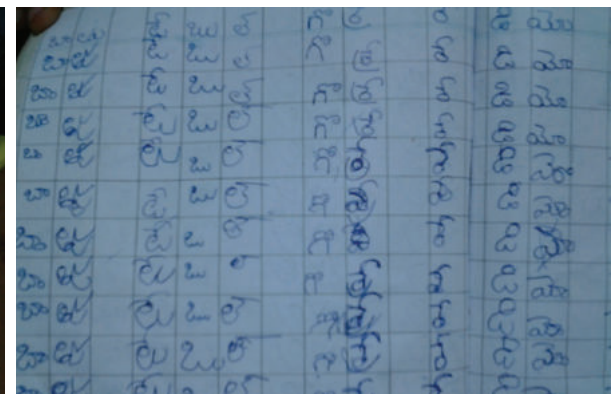
Then teacher started second method deferent colour rings are holding on straight bar one by one while explain to boy, After she given rings to boy one by one for holding on straight bar she is explained with hand gestures and oral to boy. The boy started holding rings on bar slowly one after other. This exercise to improve the thinking mechanism of child. After the class his mother removed his hearing aids. I asked to teacher what hearing loss the boy has and what are the methods you are being followed. She told me that the boy Manish have sever hearing loss, I am giving pre-therapy treatment for habit of hearing aid, understand the sounds and hearing for before going to surgery for cochlear implants.



Hanumans (7years) have been taking training since 2years while going to main stream school



Hanuman's writing notes and drawings





# MY DAY

7:00 	7:30 	8:00 	 getting up
			 washing
			 eating breakfast
8:30 	9:00 	10:00 	 getting dressed
			 walking to the kindergarten
			 playing at the kindergarten
12:00 	14:00 	16:00 	 eating lunch
			 walking dog
			 shopping with mother
18:00 	19:00 	20:00 	 eating dinner
			 having a bath
			 sleeping



Inside class room pictures



**Venkata Ramana (72 yrs old) have profound Hearing loss**



**Teacher examining visual learning ability of HI child (Subramanyam)**



# Interview with Teachers

I prepared following questioner for teachers to collect information; since they were busy in teaching throughout and could not spend time to answer in person. Hence i collected information through questionnaire.

- 1.What is your observation in Hearing impaired children?
- 2.What kind of problems do they face at the time of learning?
- 3.What are the learning/teaching methods being followed by you?
- 4.Which age group people coming for treatment?
- 5.Why the parents are too late to recognise problem?
- 6.What is the role of parents during the treatment?

I had a discussion with teachers in person later on and they came up with their comments about the questionnaire as stated following paragraph:

## **Answer 1:**

After immediate switch on the device, they don't know any sounds (Verbal, Non-verbal) mainly would observe and they could communicate through gestures. They could communicate by using words after few months and respond to all sounds. They can understand localization and localization of sounds. This learning process takes around 1 year for them.

Hearing impaired children mainly based upon lip reading, they depend upon others like parents. They would listen loud sounds comparatively than less sound. HI Children will try to listen with their hearing aid up to 60%.

## **Answer 2:**

Initially they don't know what sound is actually. So they can't turn towards the sound. If they are 10 years or above they will be psychologically imbalance after immediate switch on (the implants) they could not understand anything due to lack

of language and since they are very new for verbal communication.

Mostly we encourage the hearing not to concentrate much on the lip reading. Number of repetitions says words will be more for children hearing. For them in first stage of hearing aid the therapist should talk loud sounds and more number of repetitions.

Children don't pronounce words properly. Children get tied while auditory training.

## **Answer 3:**

Teaching methods they are following

- Awareness of sounds, Teaching through listening
- Identification of sounds
- Discrimination
- Comprehension
- Expression of words, Phrase and sentences.

- Teaching through Auditory comprehension and expression

**Answer 4:**

Maximum under 2 years children are coming for treatment in this generation because of early identification of problem

**Answer 5:**

They believe that their children don't have problem. They believe that their family members do speak very late, so they do also speak late. Majority of the parents are not aware of hearing loss, they thought their children are in normal condition and uneducated parents hence the parents do not recognise the problem in delay and too late. Children are missing valuable learning age of 0-3 years, that leads to delay in language and speech.

**Answer 6:**

Parents have to follow same goal what we have done in the regular sessions. If parents will show good achievements in practice to children then we can see good improvement in speech, language and audition. We are spending only 20% of time with children and parents spend 80% of time with their children.

After completing the class parents are removing the hearing aids from children.



# Problems

After my interaction with audiologist, speech therapist and teachers I understood the following problems:

- Children between 1 to 2 years age are not listening properly and unable to concentrate on what teachers are training
- They could not understand what the sound is after switch on hearing aid, cochlear implants. So they can't turn towards the sound
- Teachers are made to repeat the words many times and loudly for improving concentration and understand the sound
- 0 to 3 years age is good for learning speech, language and audition. Parents could not identify hearing disability problem in early age of children. This is delaying the language development in children
- Making visual interest is important (Toys, Pictures and Shapes)
- Child observe the hand gestures, facial expressions, depends on lip reading
- Parents don't know how to teach their children. They are removing the hearing aids, cochlear implants at home; it is reducing the hearing habit of children
- After one year training also hearing impaired children have word pronunciation and sentence formation problem
- They have memory problems when teacher asked the toddlers about how many days for a week and day names, month names. They could not tell in order
- Making habit of wearing the hearing aid, cochlear implants is important

# Design goal

I started thinking on how to solve the problems of HI children and encourage learning the language and speech.

- Encourage the hearing sound (audition) and understand the sound is very important.
- Connecting the sound with visuals (toys, pictures) better understands nouns, words for learning language.
- Learning should be fun for make interest, easy to understand and avoid the bore.
- Children should spend more time at home for audition, learning speech.
- Parents are mostly being with children for learning

# Brainstorming

After understanding the problems and the user needs, I thought on solutions which will be easier and create a fun loving learning environment for children with visuals, animations with sounds/ voice, and games. I got this idea with a intention to encourage the children speak, listen and learn the language.

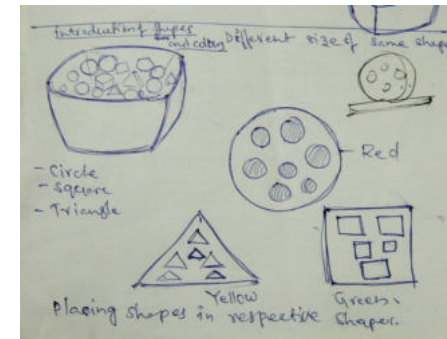
## Ideas:

- Story telling with visuals (story board) arranged in sequence and making the children arrange the visuals in same order as explained
- Introduction about how to pronounce the father (Nanna), mother (Amma) and other family members in Telugu language
- Learning numbers for addition, subtraction and multiplication
- Geometrical forms arranged in such a manner and matching forms
- Solar planet concept with animation
- Introduction about eating food which is fed to children (milk, juice, fruits, rice)
- Game with toys of transport vehicles, birds and animals
- Learning drawing pictures lines and colour filling
- Listening environment sounds to encourage auditions
- Introducing the names of birds, animals and flowers with animation what we call and how to pronounce the names
- Find the Telugu letters (glyphs) sounds from talking toys
- Encourage the basic lip movements from ling sounds like ma, pa, ka, tha and so on to improve the tongue movements, learn the speech
- Listening to sounds of birds and animals when clicked on respective visuals
- Identifying the birds and animals by hearing the sounds and matching them accordingly

# Design concepts

After brainstorming the ideas on how to make use full to children for informative learning, I have imagined the ideas one by one from children's' point of view. I visualized how it could support to speech, thinking and learning. Thus, I have developed concepts modelling visualizing with sketches and paper prototypes.

Parents can also teach children at home. By practice the children will know the shapes, understand how they look and what to say. This exercise improves the thinking ability.

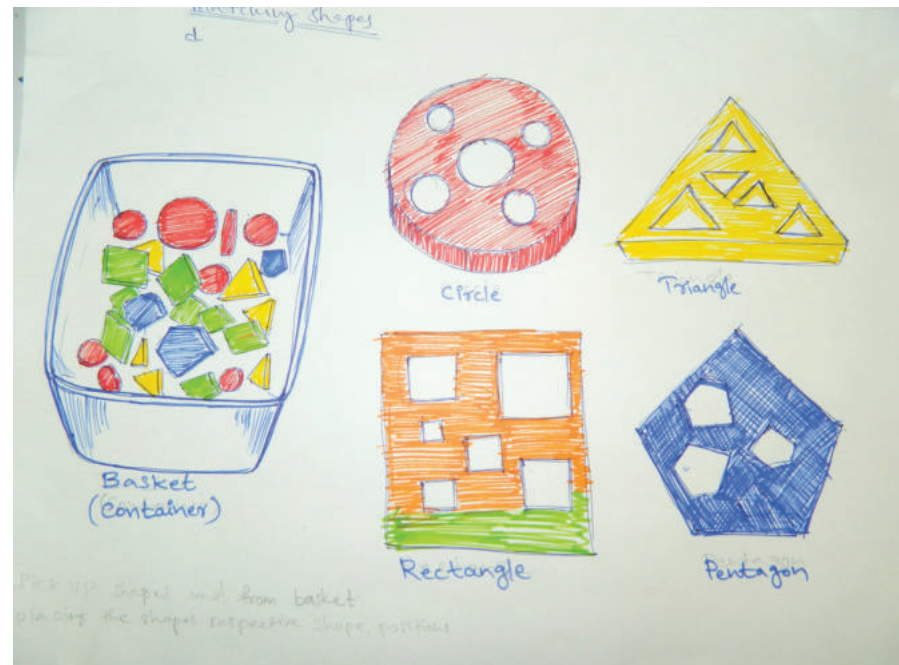


## Concept 1

### Matching shapes

The geometrical 3-D forms of squares, triangles, circles in different sizes with different colours were placed in a box. The teacher will explain the children about the shapes, what is the colour of each shape and how to pronounce it.

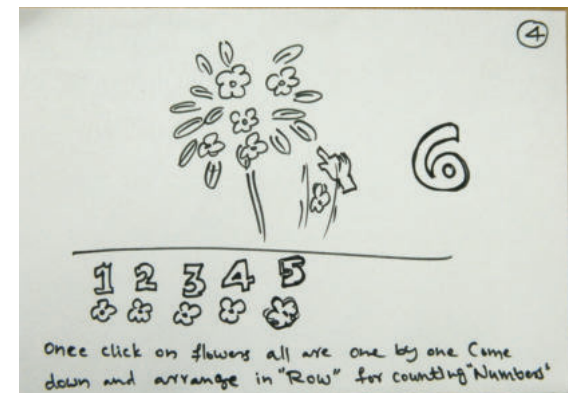
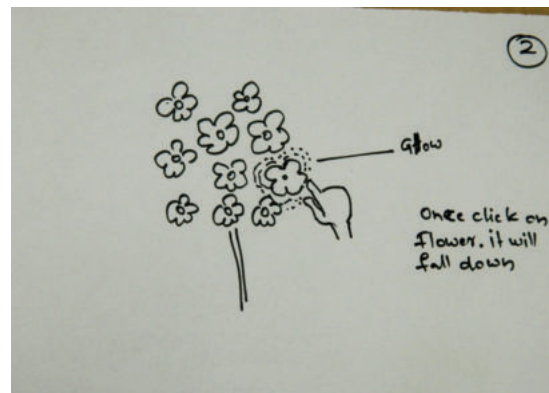
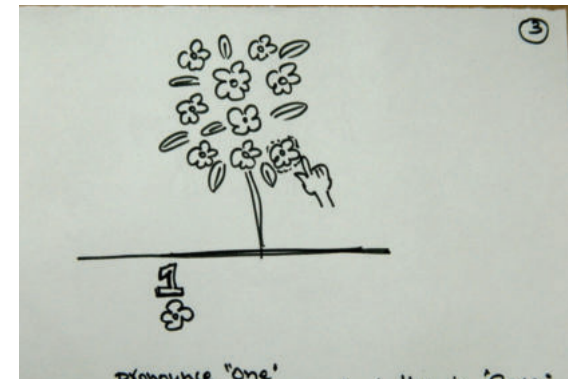
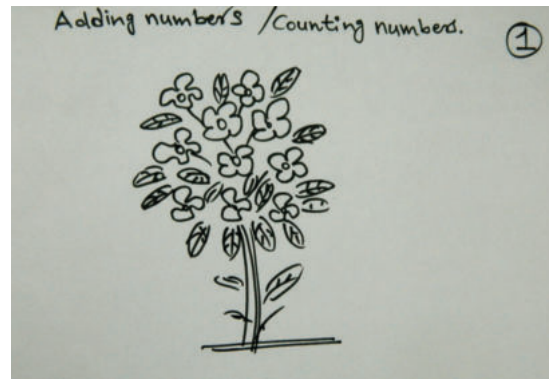
Later, the children are asked to place/match the shapes in respective shape holders. The shape holders are designed similar to same shapes, so that children can easily understand all shapes and match together.



## Concept 2

### Counting flowers

There is a flower bouquet it has 10 flowers can see in computer / tablet screen, Teacher will explain to children the how to do the game. Click on any flower it will fall down/ disappear to place in bottom of bouquet flower will arrange in row, Display the one number on screen and sound will come pronounce the “one” same in Telugu “okkatee”, children can here sound of one by playing click the flower, in next step again click any one of flower it will fall down/disappear to place in bottom of bouquet flower arrange in row, Display the 2 number on screen and it can pronounce “Two” (in telugu “Rendu”) same way by the clicking all 10 flowers it pronouns the one to ten numbers arrange all flower in row at bottom of bouquet in the screen. This game encourage to children can hearing (audition) the numbers understand the number concept.

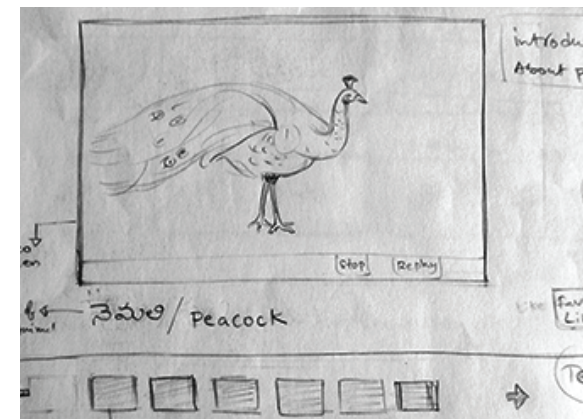
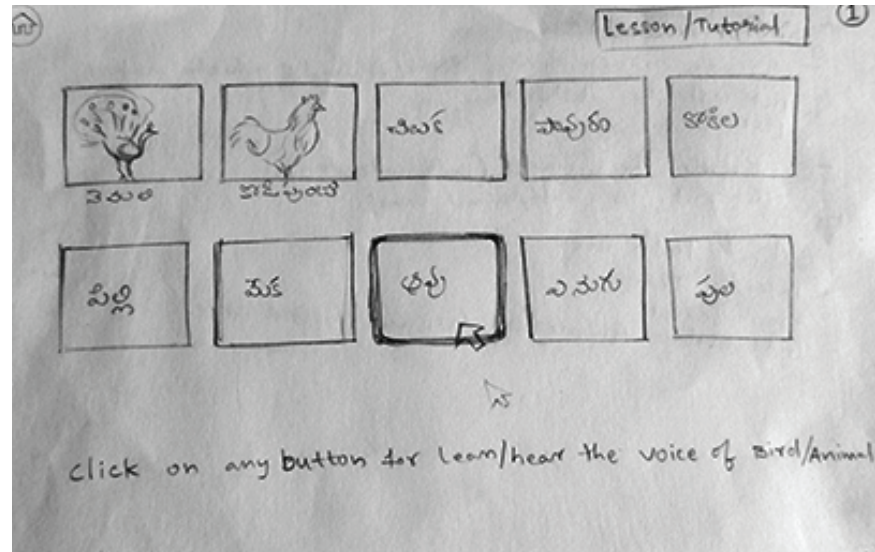


### Concept 3

There are pictures of birds and animals displayed which are visible on computer/ tablet screen. Once clicked on any of the picture its goes to next level screen display. Here, the name of the animal / bird is displayed in Telugu. The child can hear the sound on how to pronounce the bird/ animal name.

After that a respective animal/bird video is played, which teaches the children how respective bird/animal makes certain sounds. Children can see the animal/bird how it appears in real time and by watching all videos they can hear the name of animal/ birds. These videos this encourages the children to hear the sounds.

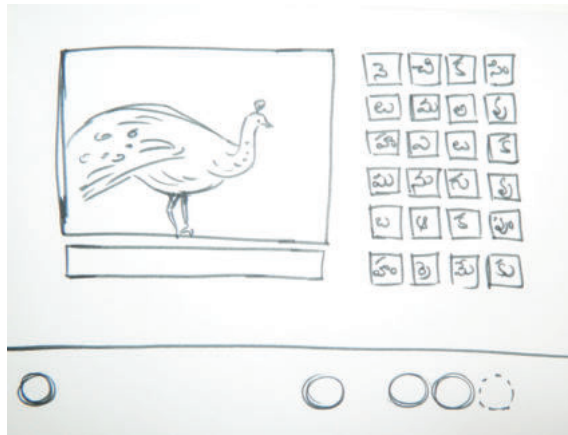
After watching all the videos, the children go to next level-1. Here a visual of animal/ bird appears on screen in right side and the other side a group of Telugu letters (glyph) are arranged in a row and column.



Upon clicking on each letter, the pronunciation of the particular word will be heard. The child has to match the word with the visual by dragging the right word in to the fill box, after listening to proper letter. Once the task is completed, the children have to practice the same methodology for the remaining puzzles.

In level-2, the picture of animal and bird appear on the screen. Below the visual of animal/birds the names are arranged in rows and columns. The children have to observe the pictures and the name, and then select the name to match animal/bird. The selected letter has to be dragged into the fill-in the box. If it matches with the picture, a right mark will appear on the picture. If the name is wrong it will disappear.

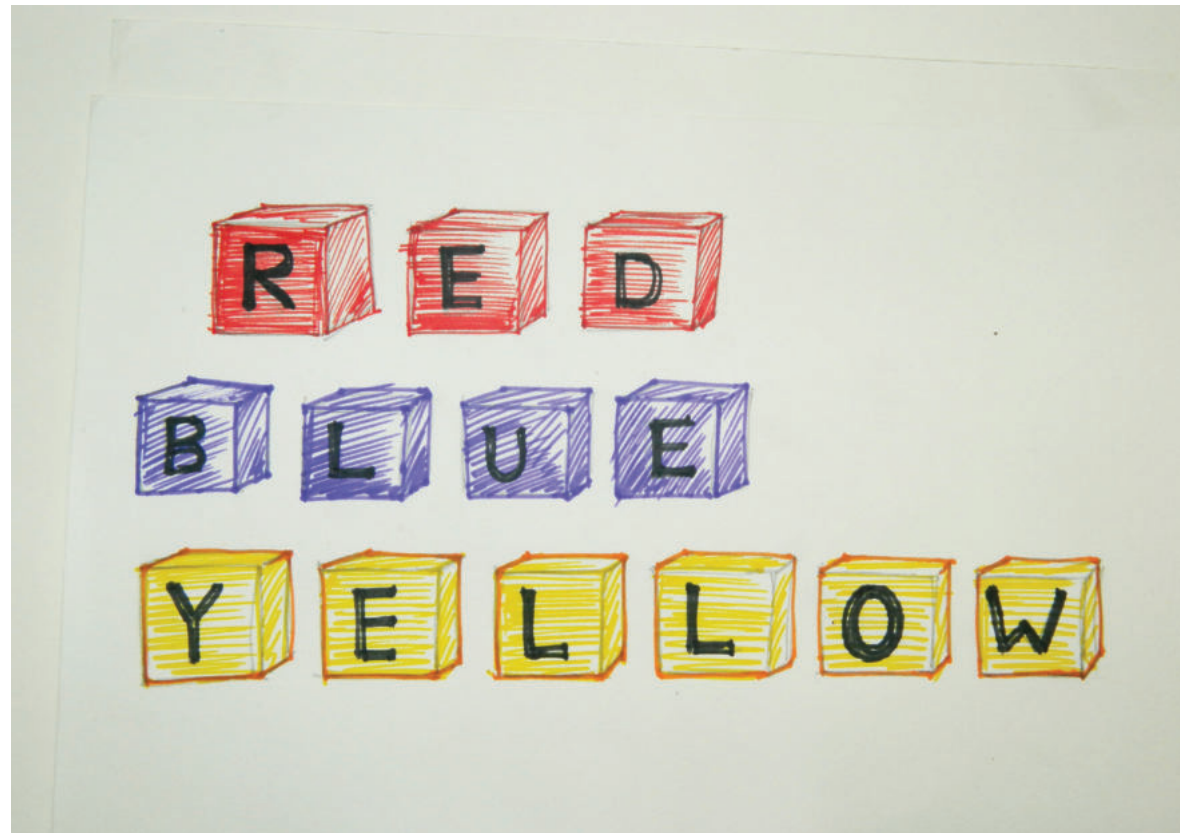
This game is playful to children as they have to hear the sounds and watch videos. The children can connect the sound and visual to remember names and visuals of animals and birds.



## Concept 4

### Match colour Name

Here different colour cubes scattered on table or placed in box, there is primary colour name's letters written on cubes, here game is find out letters and arrange the colour names in order on table. Suppose is arrange the RED word of red colour cube, find the R letter cube, E letter cube and D letter cube then arrange RED together. Such manners find the individual letters and arrange colour name in order. In this game play children learn find colour and colour names, how it pronounce.



## Concept 3 prototype

Among all the concepts, animals and birds game is very interactive and exiting to children, who love to make fun & play while learning. The children are exposed to sounds and visuals. My intension was to give the audition through hearing, learning language nouns of animals, birds and how

they make sounds.

Children can play these games individually at home without assistance of teachers and parents. Self learning occurs by practicing names, hearing sounds and recognizing the sounds of animal and birds.

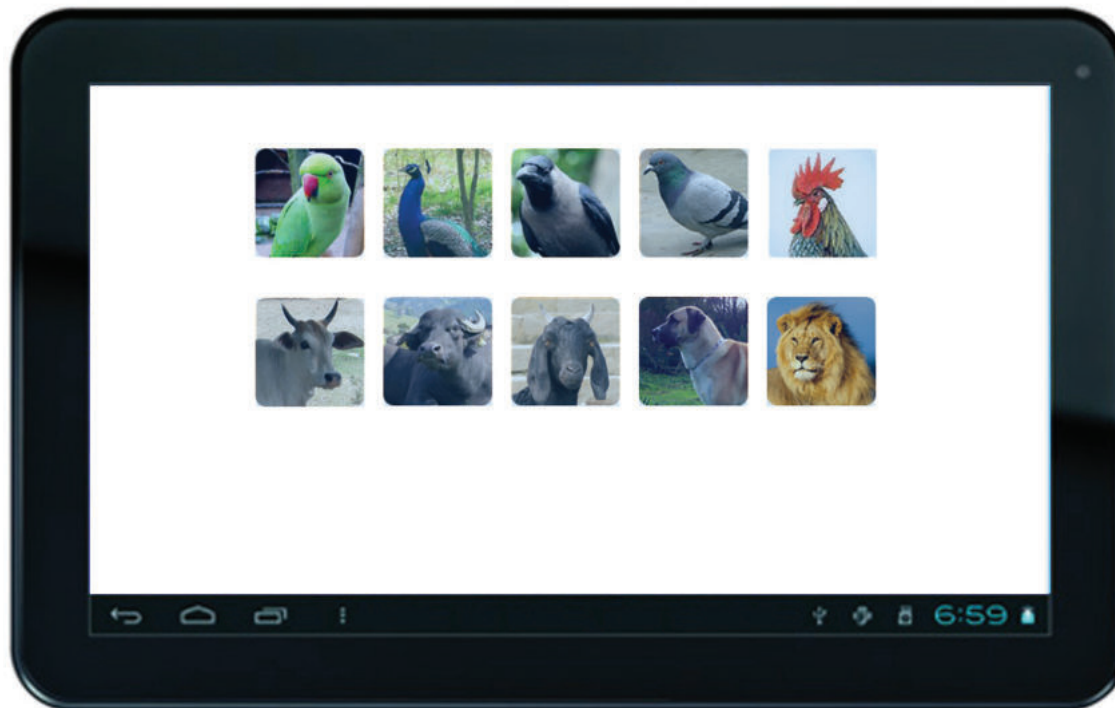
I have developed these games after discussing with my guide and developed paper prototypes. For ease of navigation, I visualized the scenarios of children on how they think while they play and how it is fun making. Later I fine tuned in the paper prototypes before developing in flash software.

### Scenarios

#### Scenario 1

##### Login to game:

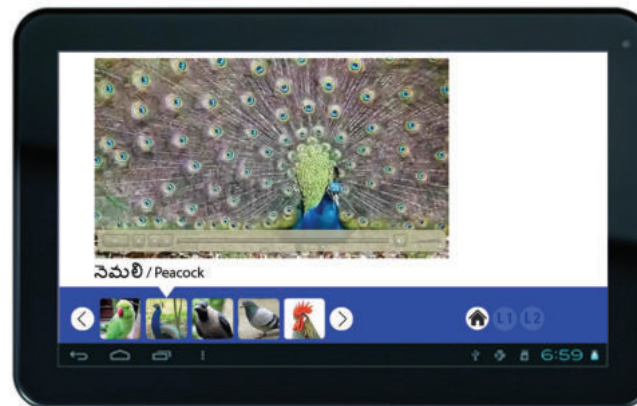
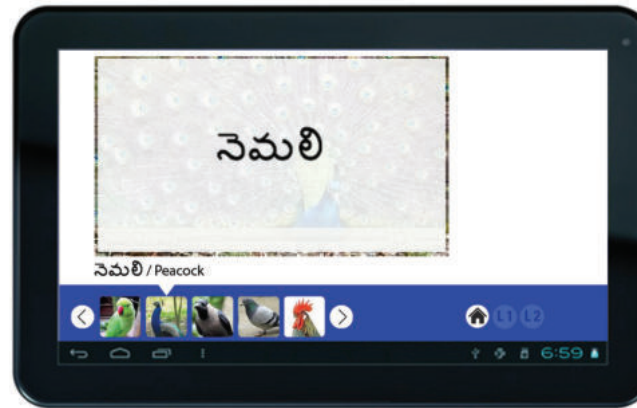
In the game, the starting page has pictures of five birds and five animals. The names of the pictures are arranged in two rows and five columns. When clicked on peacock picture its goes to next level screen display.



Here, the peacock name is displayed in Telugu as “Nemali”.

The children will hear the pronunciation of Nemali and a video is played on how a peacock makes different sounds. The peacock has a crested head and very large fanlike tail marked with iridescent eyes or spots. The children can see the peacock how it appears in real time and enjoy while watching the video.

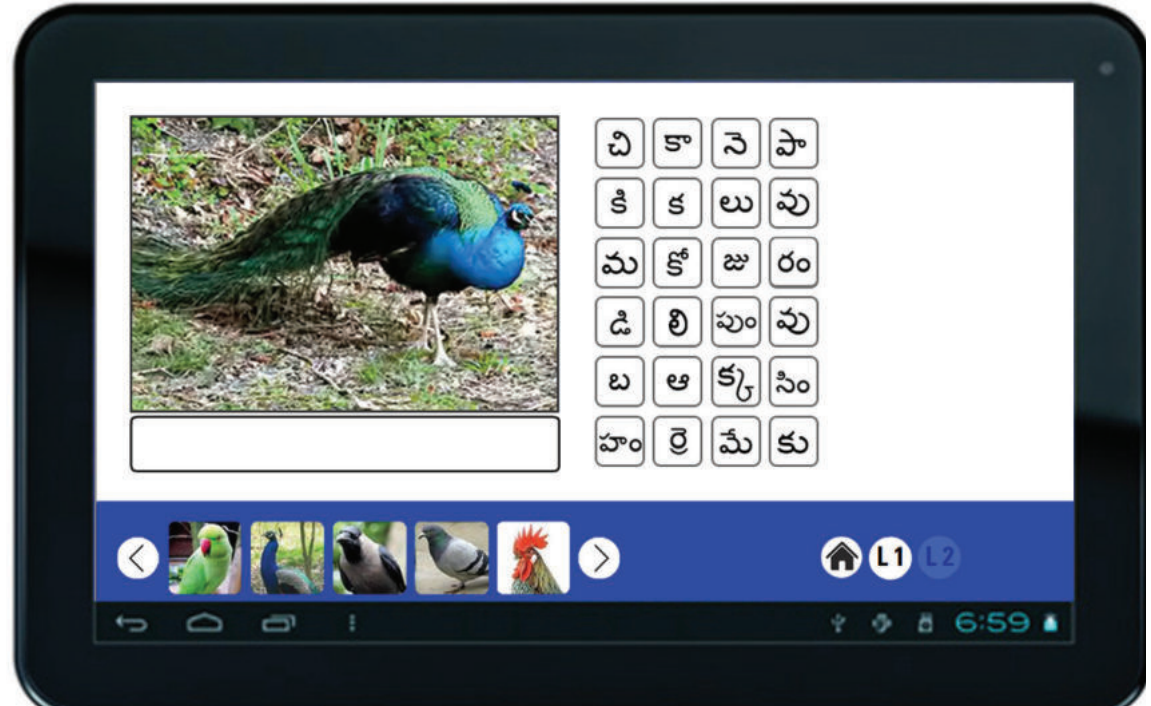
After each scenario, next video is played automatically or the children can chose the other bird from bottom of button. By playing all the videos, children can hear the name of all animals, birds and can hear their sound. A navigation bar indicating to forward to the next level will appear after all the videos are played.

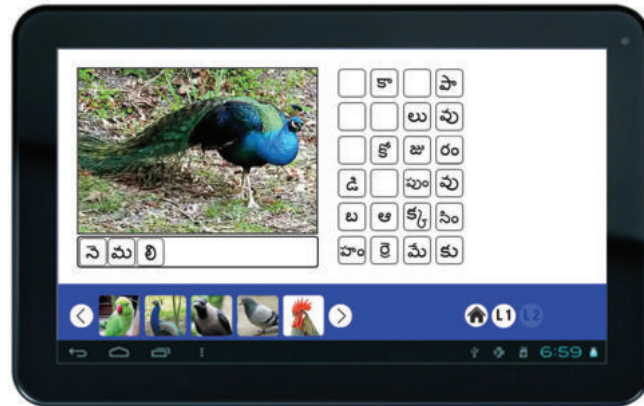
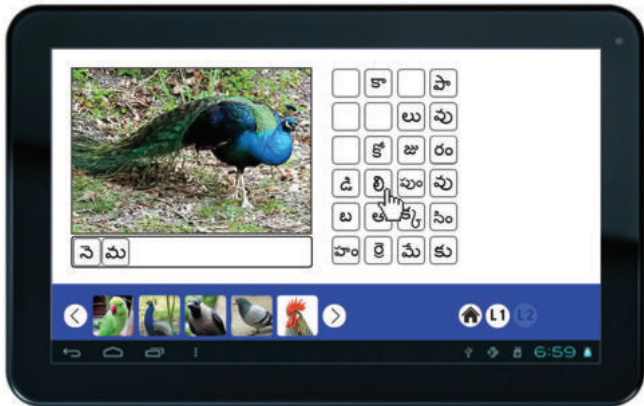
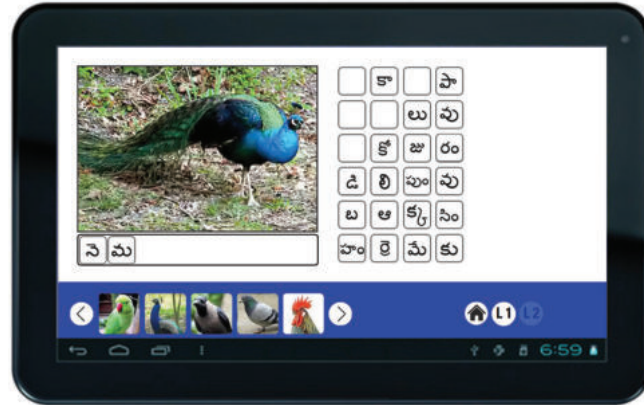


## Scenario 2

### Level 1:

Level 1: In level-1 screen, if peacock is visible on the left side, right side a group of Telugu letters (glyph) of animals, birds' names in single letters are displayed in rows and columns. When clicked on the letter a sound will be heard with the pronunciation of each letter. Here the children have to listen to the sound of each letter and find out the name of bird by clicking letter one by one letter and arrange the name by dragging all those letters in to the fill box. Once completed, name of letters appear like "Nemali" (Peacock name in Telugu). If answer is wrong the dragged letters will disappear when dropped in fill box. If not matched, the children have to repeat the exercise. If answer is correct then screen will change to next picture of animal/bird.





## Scenario 3

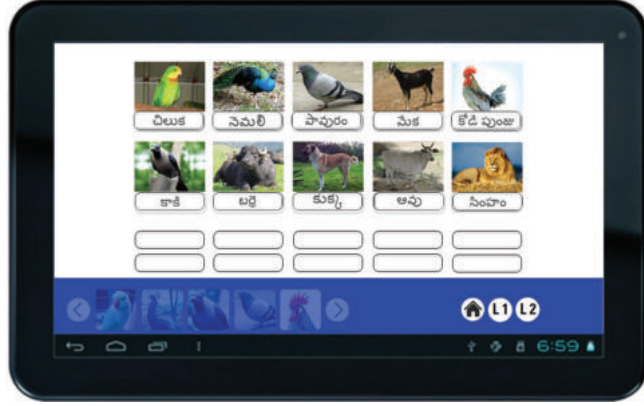
### Level-2:

Once completed the level-1 game, the level 2 button will be activated on the navigation bar. When clicked on, names of animals and birds are visible on the screen. A matching fill box is seen below each picture of the animal and bird. The Children have to observe the pictures and names then selected the name to match with animal and bird, by dragging the name into the fill box. If the dropped name matches with the picture then a right mark will appear on the picture. If the name is wrong, it will disappear.

Conclusion: This game creates a funny environment to children by hearing the sounds and watching videos. They can connect the sound and visual to remember the names and visuals of animal and birds. The aim is to encourage them to learn the language, audition to 4years to 7years. Hearing impaired children can play this game at home also after school or audio verbal therapy training. It supports self-learning and no need of teacher or mentor. By practice and several attempts



of playing game level by level, the child can say animals and birds' names and pronunciation.

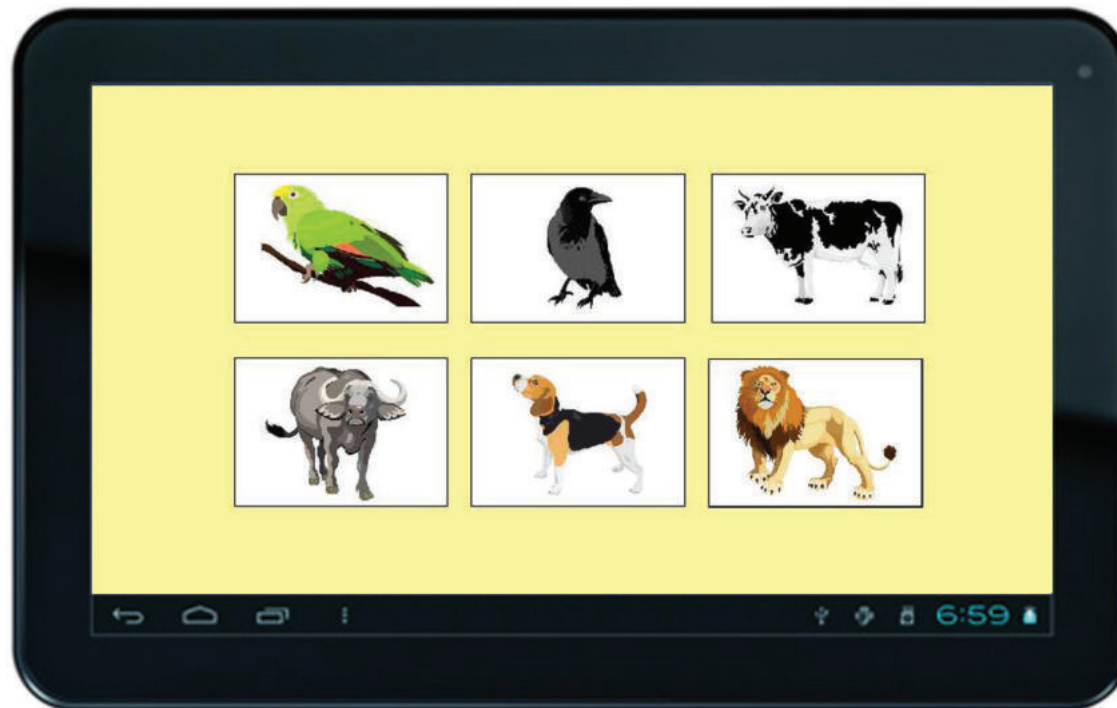


# Final prototype

After many discussions with my guide few changes done in concept 3 removed all videos, Instead of videos added illustrative pictures and given introductions of each animals, birds names for encourage the hearing, My intension was to give the audition through hearing, learning language

nouns of animals, birds, Playing game of matching name of animal/bird. Children can play this learning method individually at home without assistance of teachers and parents.

Self-learning occurs by practicing hearing sounds of individual letters (pronunciation of glyphs), Names and recognising the sounds of birds/ animals names match with the animal/bird pictures; I visualized the scenarios of learning method step by step entire flow.

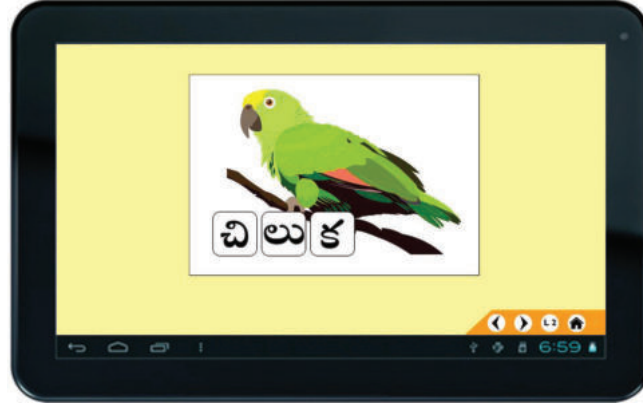
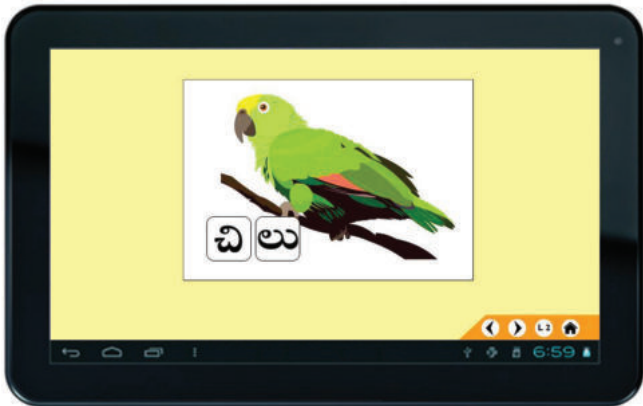
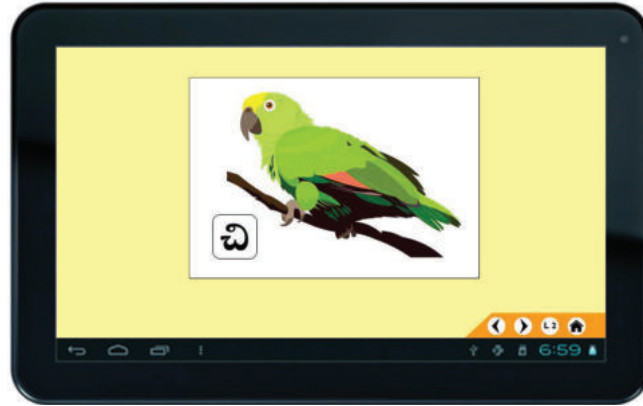
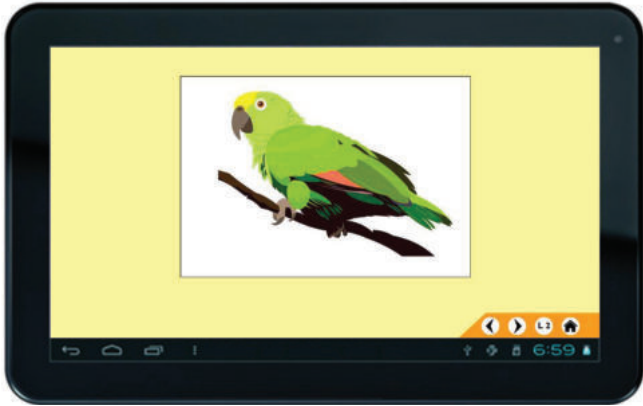


## Scenarios

### Scenario 1

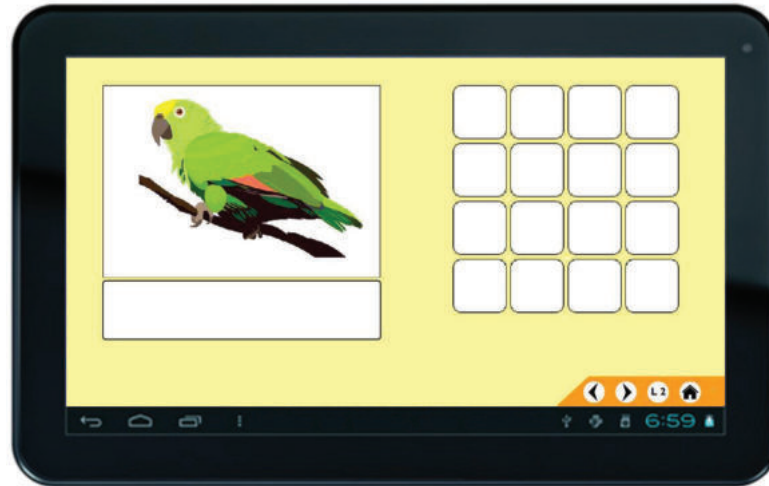
#### Login to game:

In the game, the starting page has pictures of Birds and Animals. The pictures are arranged in two rows and three columns. When clicked on parrot picture it's goes to next level screen display. Here, the parrot picture is displayed and parrot name in Telugu as "chiluka" displayed on parrot picture one by one letters with



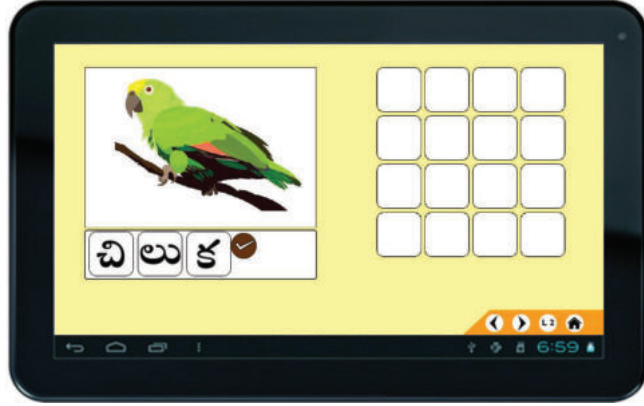
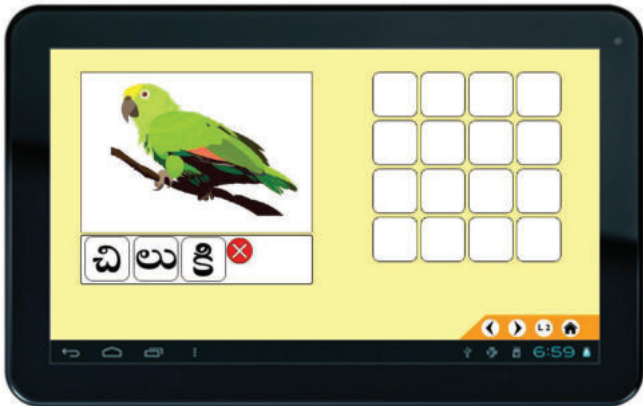
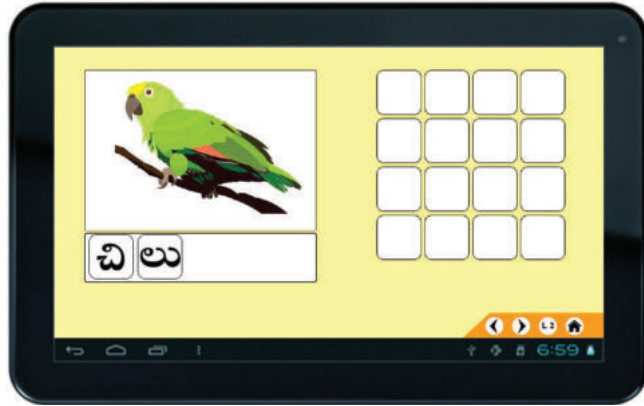
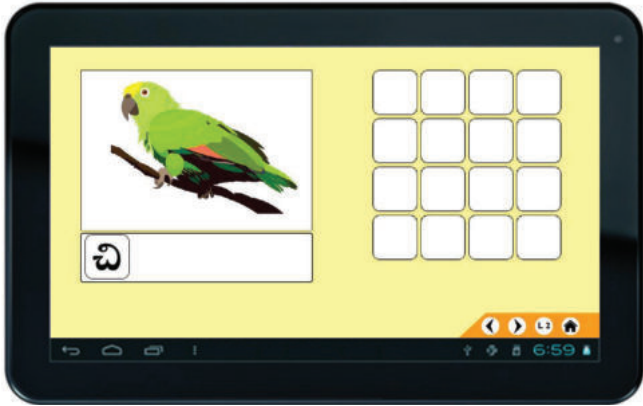


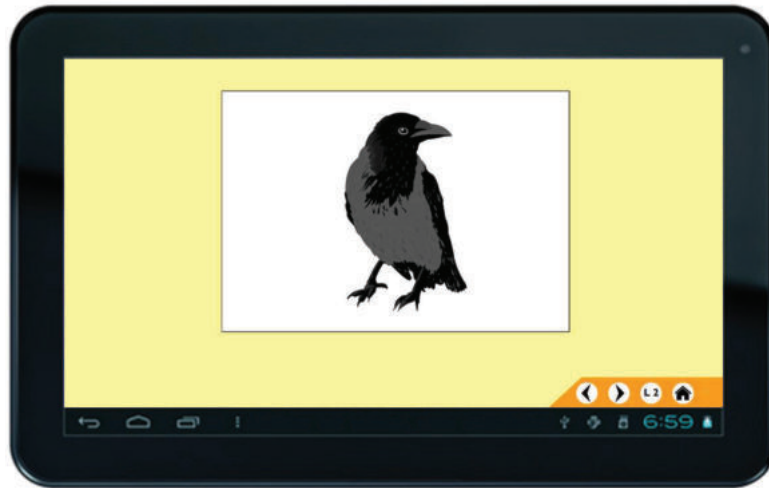
pronouncing “chi”, “lu” and “ka” Then disappear the individual letters, Later slowly appeared whole name of word with pronunciation(sound) children will hear the pronunciation of “chiluka” and see the name of word . The children can see the parrot picture how it appears and hear the name of word, individual letters sounds. Once complete introduction of parrot then its goes next level screen to matching the word “chiluka” name of parrot.



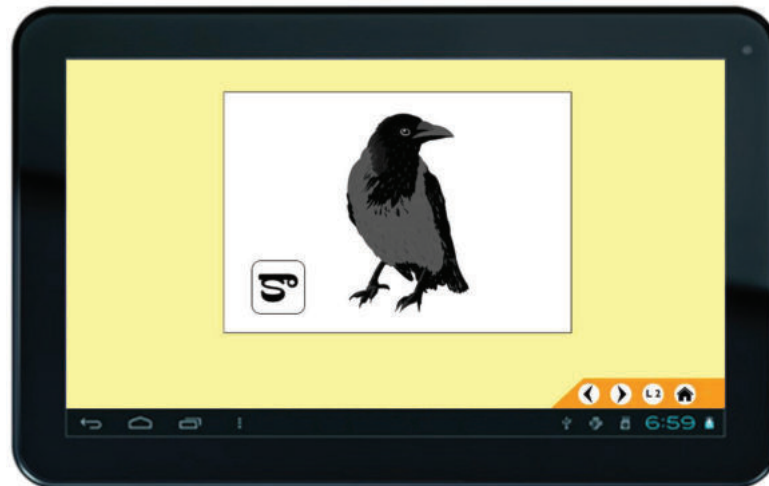
**Word matching game:**

In this screen parrot is visible on the left side, right side the group of rounded white colour rectangle buttons(sound of glyph) are arranged, It represent the single letter sounds part of animals/birds’ names. When clicked on the white button a sound will be heard with the pronunciation of letter (glyph). Here the children have to listen to the sound of each letter by clicking the buttons one by one, Drag and drop the respective buttons in fill box for match the “chiluka” word if find out the parrot name in Telugu language “chiluka” to match whole word (name of all letters) it appear right mark on fill box beside the word chiluka.



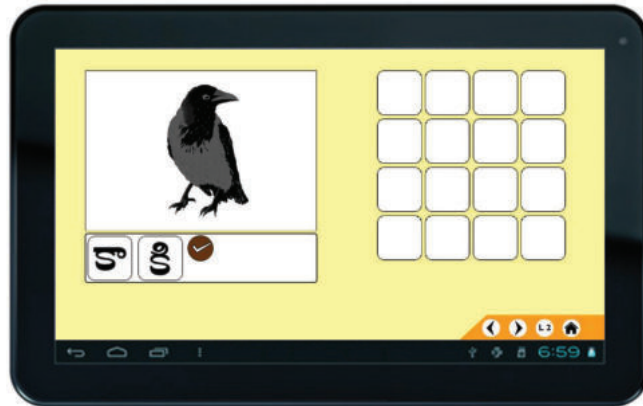
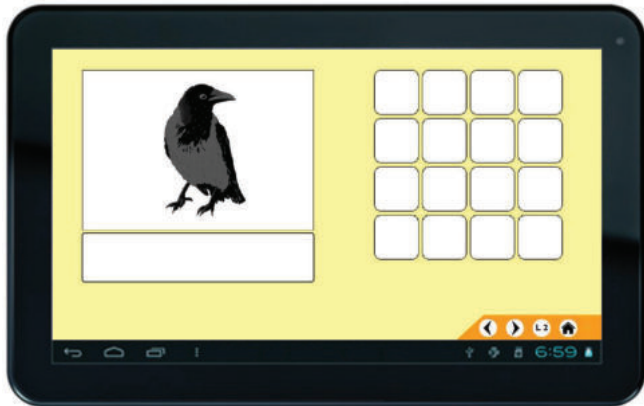
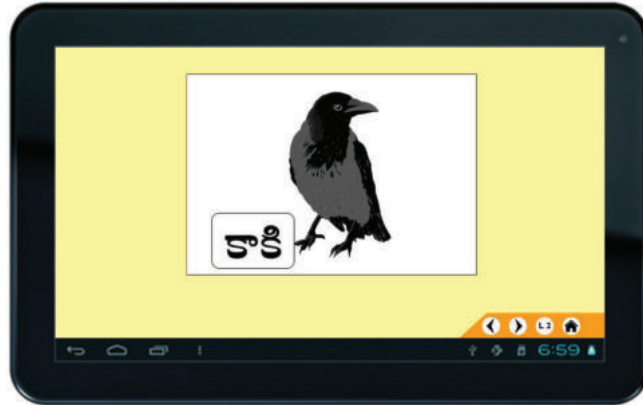
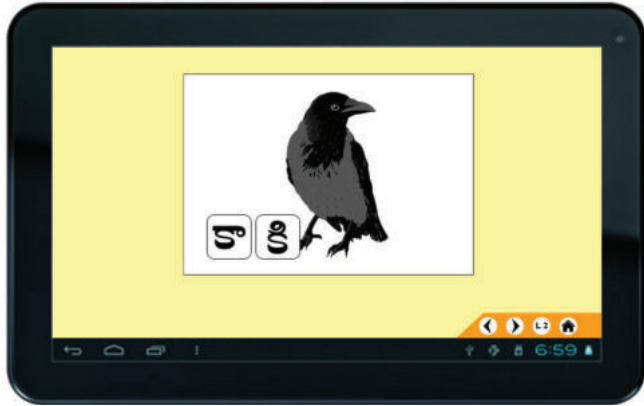


Once completed, name of all letters appear like “Chiluka” (Parrot name in Telugu). If answer is wrong the dragged button will disappear when dropped in fill box and appeared the respective letter along with wrong symbol on letter and slowly disappear on fill box. If not matched whole name of word the children have to do hear the (letter sound) sound of button carefully. Select right button drag and drop in to fill box then it's appear respective letter symbol along with right mark one complete the whole name of word. If matched word answer is correct then screen will change to next picture of animal/bird automatic



### Next Screen

After each animal/bird introduction and game, next animal/bird introduction is played automatically by playing all the animal/birds introduction and word match game children can hear the names of all animals, birds and individual letters, words pronunciation sounds.

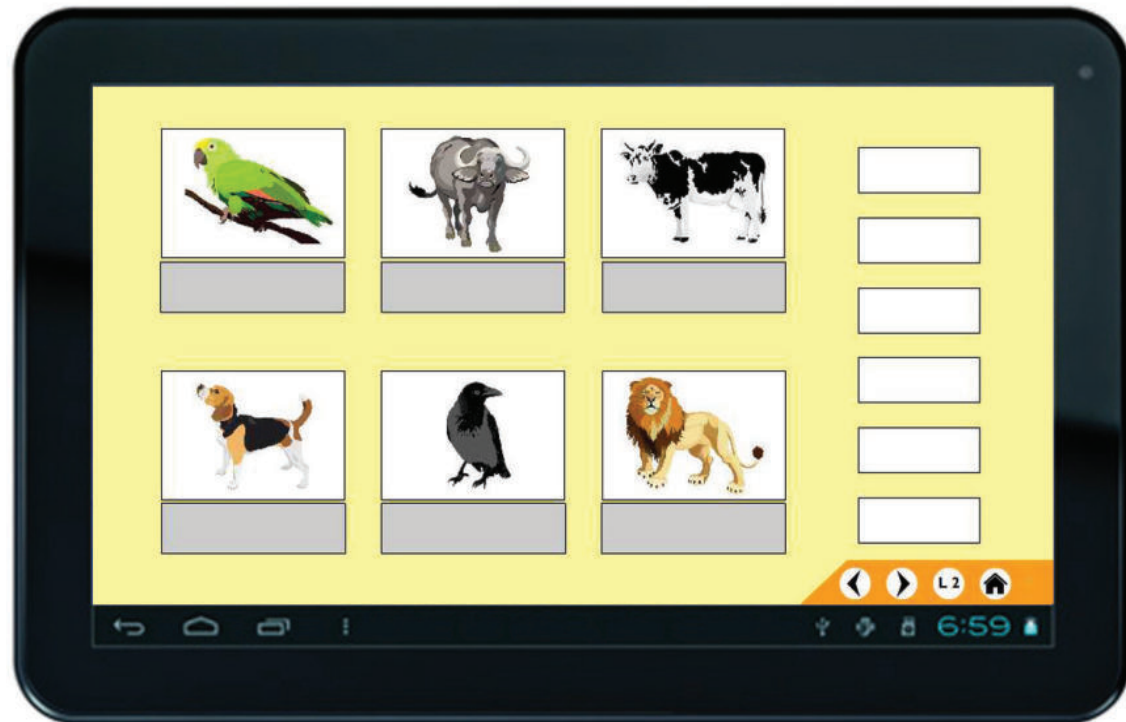


## Scenario 2

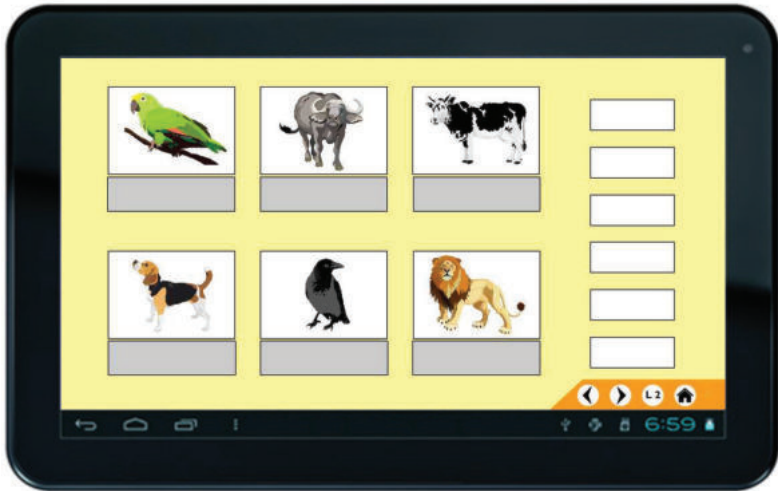
### Level-2:

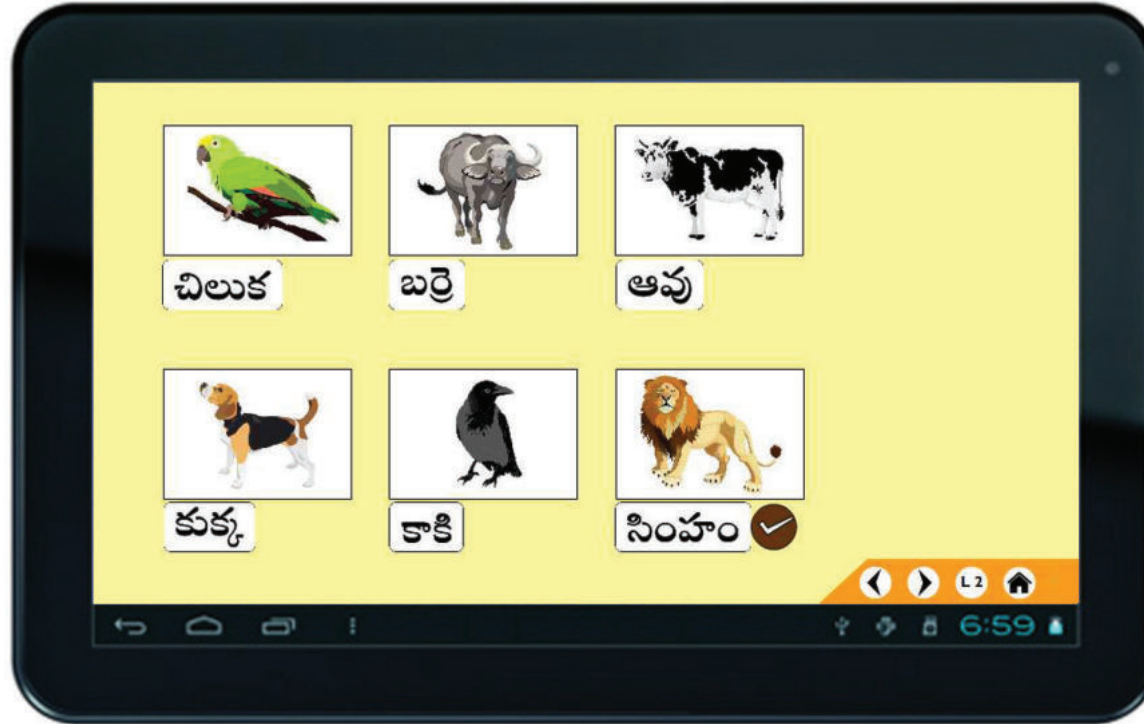
Once completed the entire animal, birds' introduction and word matching game (level-1) game, the level 2 button will be activated on the navigation bar in right side bottom. When clicked on L2 button it goes to Second level game, in this screen animals and birds pictures are visible on the screen arranged in two rows and three columns starting from left side of screen. A matching fill box (grey colour rectangle) is seen below each picture of the animal and bird. White colour rectangle buttons are arranged in one column extreme right side of screen for match the animals/birds names by hearing their names of sounds by clicking buttons.

The Children have to observe the all pictures and hear the names of animals/birds by clicking the white buttons. Then select the button to match with animal/bird name by dragging the selected button into the grey colour fill box bottom of the respective picture. If the dropped button (name of sound) matches with the picture then a right mark will appear and name of word also appear on the bottom of the



picture the grey fill box disappear. If the matching button is (name of sound) wrong placed then a wrong mark will appear on grey fill box try to next picture or hear the name of sound proper and recognise right picture.





#### Conclusion:

This game creates a funny environment to children by hearing the sounds and observing the illustrative pictures. They can connect the sound and visual to remember the names, letters and words, visuals of animals and birds. The aim is to encourage them to learn the language, audition to 4 years to 7 years. Hearing impaired children can play this game at home also after school or audio verbal therapy training. It supports self-learning and no need of teacher or mentor. By practice and several attempts of playing game level by level, the child can say animals and birds' names and pronunciation.

# References

## **Websites:**

<http://www.cochlear.com>

<http://ayjnihh.nic.in/aw/awareness/audiology.html>

<http://www.asha.org/public/hearing/How-We-Hear>

## **Hospital:**

ENT department Apollo Hospital, Hyderabad

Audio Verbal Therapy Lab Apollo Hospital, Hyderabad

## **Books:**

Listen, Learn and Talk Cochlear Ltd Book

(which is collected from Apollo hospital AVT department)

## **Videos & Images:**

<http://footage.shutterstock.com>