



# Designing a Touch Based Application Game to Recognise Gujarati Script for Children

**PROJECT - 2**  
Report

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**IDC IIT Bombay**

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# Approval Sheet

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The project titled **'Designing a Touch Based Application Game to Recognise Gujarati Script for Children'** by **Vishnupriya Kaulgud**, is approved for the partial fulfilment of the requirement for the degree of **'Master of Design'** in **Visual Communication**.

Guide: .....

Chairperson: .....

Internal Examiner: .....

External Examiner: .....

Date: .....



# Declaration

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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/ fact/ source in my submission.

I understand that any violation of the above will be cause for disciplinary action by the institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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**Vishnupriya Kaulgud**

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IDC IIT Bombay

2012-14



# Acknowledgement

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I would like to express my special gratitude towards **IDC, IIT Bombay** for giving me this opportunity and encouragement to take up this subject as my project and always being a support.

My sincere thanks to my **Guide, Prof. Mandar Rane** for all the attention and time, which helped me in every step for going towards this project.

For providing Appropriate Data, I am thankful to:  
Principal and teachers of '**Kendriya Vidyalaya Kindergarten School**', IIT Bombay teachers of **Daycare 'Shishuvihar'**, IIT Bombay Management Committee, Principal, teachers of '**Abhinav Shikshan Prasarak Marathi Medium Pre Primary School**, Goregaon East.

I am thankful to all my users who helped me for valuable feedback. And my sincere thanks to: Prof. Uday Athavankar, Prof. Santosh Kshirsagar, Mangiri, for providing me correct inputs.

I thank to my parents and Harsha who always supported in my decisions and software Adobe Master Collection Suite.



# Abstract

India is a country rich with 22 official spoken languages, 13 official and 10 major scripts.<sup>[1]</sup> In multilingual environment like India, people travel from one state to another in couple of hours. When one travels to a different state, there is a new language spoken and supporting script used for reading and writing. But one is unable to identify these scripts. Apart from the languages and scripts taught in schooling, there is no exposure to a new language or a script.

Many times, people speak the language but the associated script is not recognised. It would be beneficial if one can recognise at least one new script apart from what is taught academically (schools, college). Previous researchers have shown that the best age for learning new things is early childhood.<sup>[2]</sup> With the base of *Devanagari* script as a native script for the users, a new script will be taught.

This project aims to provide a solution for easy learning through a touch base game for recognition of *Gujarati* script. The users will be age group of 7-9 years old who knows *Devanagari* script. Currently my aim is focusing on recognition of vowels, consonants and numbers of *Gujarati* script and not conjuncts and writing of the script.



*“Early brain development sets the foundation for lifelong learning, behaviour and health.”*  
- (Mustard, 2006)

[1] PAPER: A Journey from Indian Scripts Processing to Indian Language Processing BY: R. Mahesh K. Sinha, IIT, Kanpur, WEB: <http://www.hindustantimes.com/India-news/NewDelhi/IIT-prof-s-pan-Indian-script-for-languages/Article1-1099940.aspx>  
[2] PAPER: Wisconsin Council on Children and Families Brain Development: The Early Year

# Introduction

The task is to make children recognise *Gujarati* Script.

## Context:

India is a multilingual, multi-script country. Many students, adults now a days, live in different parts of India and their origins are different. They thus can speak the language but face a problem to read their native language. This is a crucial problem according to me and if one could learn this, it would always be beneficial.

## Purpose:

The official and regional languages of India play an important role in communication among the people living in the country. India is a vast country with people belonging to various religions and communities. Due to this reason, diversity in languages across India is a special feature of the nation. My effort is to teach at least one new script among these. Learning these languages will always be beneficial.

## Scope:

This project will help a child to get exposed to an additional Indian language script. That additional script is *Gujarati* script.

## Objective:

To create an alternative fun way by which a new script is taught to children. How this alternative way to learn a script can be more beneficial than learn by rote learning method.



*Learning is best done when one is a kid. One learns the most at this age. So if a child gets exposed to these new scripts, when she/he will grow up it would be easier to learn the whole script.*

*"The more languages you know, the more you are human."  
- Tomáš Garrigue Masaryk*





# Defining the Problem

A child should be able to identify and recognise *Gujarati* script. The task is to only make kids recognise *Gujarati* vowels, consonants and number and not conjuncts and writing of the script.

## The Importance of Alphabet Recognition:<sup>[3]</sup>

The phonemic awareness is a very important component while pursuing literacy, but it is not sufficient. Another essential component is alphabet recognition, which involves:

- Letter shape recognition,
- Letter-name knowledge,
- Letter-sound knowledge,
- Rapid-letter naming.

Letter recognition will lead to word recognition and pronouncing in future.

## Benefits:

As with phonemic awareness, all children can benefit from alphabet recognition instruction. Children must become expert users of the letters they will see and use to write their own words and messages (Lyon, 1998). After growing up, it will when you travel to our native state, it will not be much difficult to understand the script. As it is taught in early age, children can learn it better and remember it lifelong.



- Apart from the languages and scripts taught in schooling, there is no exposure to a new language
- Many times, people speak the language but fail to identify the associated script
- It would be useful if one can identify and read at least one new Indian script apart from what is learnt in schools

[3] PAPER: Sound & Letter Time: Building Phonemic Awareness And Alphabet Recognition Through Purposeful Play BY: Michal Rosenberg, Ph.D.

# Choosing Script

For the project concerned considering the time, it would be difficult to understand and learn script of every language. The best way is to develop a technique for one script in such a way that the same technique can be used for recognition of other scripts too.

## Why Devanagari script?

Since the 19th century, in India, the most commonly used script is *Devanagari*. It is used to write standard *Hindi*, *Marathi*, *Nepali*, *Awadhi*, *Bodo*, *Bhojpuri*, *Gujari*, *Pahari*, (*Garhwali* and *Kumaoni*), *Konkani*, *Magahi*, *Maithili*, *Marwari*, *Bhili*, *Newar*, *Santhali*, *Tharu*, and *Sindhi*, *Dogri*, *Sherpa*, *Kashmiri* and *Punjabi*. Because it is the standardised script for the Hindi language, *Devanagari* is one of the most used and adopted writing systems in the world.<sup>[4]</sup>

I stay in Maharashtra, and *Devanagari* script is very well know to me. *Marathi* and *Hindi* is commonly used language here which *Devanagari* as its script.

## Why Gujarati script?

*Devanagari* was hence chosen as a native language script of the users. To choose one among nine major scripts, four scripts were short-listed which were *Bengali*, *Gujarati*, *Tamil* & *Kannada*.

As *Gujarati* script letter-forms are more similar to *Devanagari* script, it would be beneficial yet challenging to start with. Hence, *Gujarati* script was selected for this project.

[4] WEB: <http://en.wikipedia.org/wiki/Devanagari>



# Users

A language can be best learnt by a child from parents and teachers. By observing the adults, children learn the most. Senses of sight, feel, sound and smell is developed the most during childhood period.

## Age Group:

The age group selected initially for was pre-primary school kids. By this age, a child start speaking and they know few things around them, but many a times, their phonemic awareness has not completely developed. For this project, it is necessary for a child to know *Devanagari* script completely. *Devanagari* is known to them but not learnt completely by heart. So the age group is increased to 7-9 years old children who knows *Devanagari* script completely. All children in this group may know or may not know *Gujarati* language to speak.

## Age Cues for 7-8 yr, 8-9yr:[5]

In this age, children are as active as they are verbally. Maximum occupation of their time goes in expression, physical activities, verbal, physically actives, etc.

In schools in Maharashtra, by this age, they are familiar with *Devanagari* script. By this age, letters, numbers, formation of words in *Devanagari* is very well know to them. Hence, my users are of age group 7-9 years.



## How children are different from adult?

- They are more open, less analytic
- They are always eager to learn new things
- They have short attention span.
- They need practical, activity based teaching
- Teaching should be more specific  
no abstract thinking

[5] BOOK: Designing For Children By: Catharine Fishel

# Data Collection

## Letter Recognising Activities:

### Letter and Number Lacing Tags:

A child has to identify and lace letters one after the other. These lacing tags are perfect for developing fine motor skills as well and letter and number identification and sequencing skills.

### Pocket Chart Matching:<sup>[6]</sup>

Place the first set of cards in the pocket chart and then the children match the second set to the first set by placing the individual cards directly in front of the card it matches in the pocket chart.

### ABC Sorting Tray:<sup>[7]</sup>

Use a dividing tray, label each section by writing a letter on a sticker and place a letter in each section of the tray. Place the letters in a bowl and children sorted and matched the letters into the sections of the tray. It is tried to use letters that are similar, so that children are challenged and use visual discrimination skills to find the differences in the letters. For example, use Q, O, D, C, and G since those letters are similar in shape, or I, T, J, or W, V, U.



[6] WEB: [www.childcareland.com](http://www.childcareland.com)

[7] WEB: [www.prekinders.com](http://www.prekinders.com)

### Letter Matching Upper-case to Lower-case:

Each pair of children choose a coloured letter box. Children work in pairs to match the letters that are the same.

### Playful activity:

Have a handful of foam or paper letters, throw them into the air. Find all the A's...etc. Tell a child to collect the letter told to him to collect. By hearing it, child observes all letters and try to find the correct one.

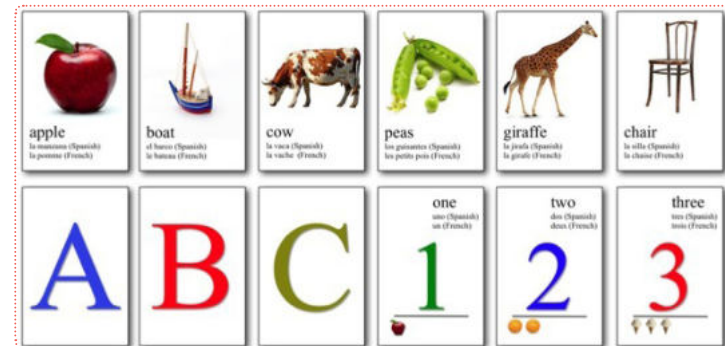
### Flash Cards:

Big size letters are printed on cards. One letter and related picture are kept aside to associate them with each other. Simplified drawing of the objects or the picture are made. By simplified drawings, child does not get confused and thus feel more familiar and comfortable.

### Aksharit:<sup>[8]</sup>

Aksharit is the World's first Hindi word game for adults & children. The game is played with tiles. It is similar to English 'Scrabble'. With the patented *Akshara* and *Matra* tile design you can spell any and every word of *Hindi*. It increase your vocabulary and word construction is also improved.

[8] WEB: [www.madratgames.com](http://www.madratgames.com)



<http://itotapps.com/Site/Welcome.html>



[www.madratgames.com](http://www.madratgames.com)



# School Visit

## Devanagari Script Teaching:

A child observes things in the environment. They are asked to pronounce those words and those are written on board too for remembrance. By this they related to forms quickly and remember letters.

## Use of flash cards:

One letter and related picture are kept aside to associate them with each other. Here it is *Devanagari* letters. Simplified drawings, like in picture we can a picture of a kite or a house is drawn. By this, child does not get confused and thus feel more familiar and comfortable. The learning starts with Vowels first. Then two letter words are taught to them following with three letter words. After this activity consonants are taught.

## Physical activities:

Large size letters are worn by a child. Teacher calls the letter, that child comes in front. In this way, simple words are also constructed. By various drawing activities, like drawing in sand or drawing with rangoli, child gets more familiar with the form and the construction of a letter-form.

For teaching English as well as *Marathi*, same meaning words are stuck on the object to relate them. By this they know the words in other language too. By large visible prints, letter-forms also becomes more visible. Redundancy is used here.



Abhinav Shikshan Prasarak Marathi medium Pre primary School, Goregaon East (Marathi medium School teaches only to recognise Devanagari)

# Learning through Play

## The Importance of Play:<sup>[9]</sup>

Young children learn best when they are actively participating in the learning process and are encouraged to explore, interact, create, and play. Play is an especially effective way of gaining knowledge.

As children engage in play activities relevant to their interests they are building knowledge, and are more likely to understand and remember relationships, concepts, and strategies. Research into the effects of play has linked play to improving creativity and critical thinking; attention, planning skills, and attitudes, memory and language development and literacy skills.

Play allows children to use their creativity while developing their imagination, dexterity, and physical, cognitive, and emotional strength. Play is important for healthy brain development too.

- Its a creative learning process
- Through play children: Socialize, Interact, Perform, Learn
- It will Develop: Physical skills, Cognitive concepts, Language skills, Social Skills
- Design Opportunities: By Tactile, By Sound, By Gesture, By Sight
- Different Designing medium: Storybooks, Board Games, Toys, Puzzles.

[9] PAPER: The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds BY: Kenneth R. Ginsburg, MD, MEd, and the Committee on Communications, and the Committee on Psychosocial Aspects of Child and Family Health

# Initial Concepts

- **Learning Charts:**

Two same letter-forms but in different scripts side-by-side are drawn to make them understand and associate the form as it is done in flash cards. But here it is two letters instead of a picture. Making the print in larger size will have a better visibility and with one letter on a single chart will reduce confusion. This can be used for the introduction of a letter-form, the initial teaching activity for children.

- **Book Design:**

Book will teach you two languages simultaneously. May be will have some similarity, some differences, pictures or a storytelling related to letters which will help to learn letter-forms of a new script.

- **Game Design:**

A game which will teach *Gujarati* is easiest and playful way. By game-play children will not get bored compared to reading or just memorising. By playing this game a child would learn to recognise *Gujarati* script in a playful manner.





# Intended Goals

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## Scope:

This project will help a child to get exposed to a additional Indian language script i.e. *Gujarati* Script.

## Objective:

To create an alternative fun way by which *Gujarati* script can be better taught. How it can be different from

Learning *Gujarati* script.

Learning about its form, shape.

Sequence of each letter-form.

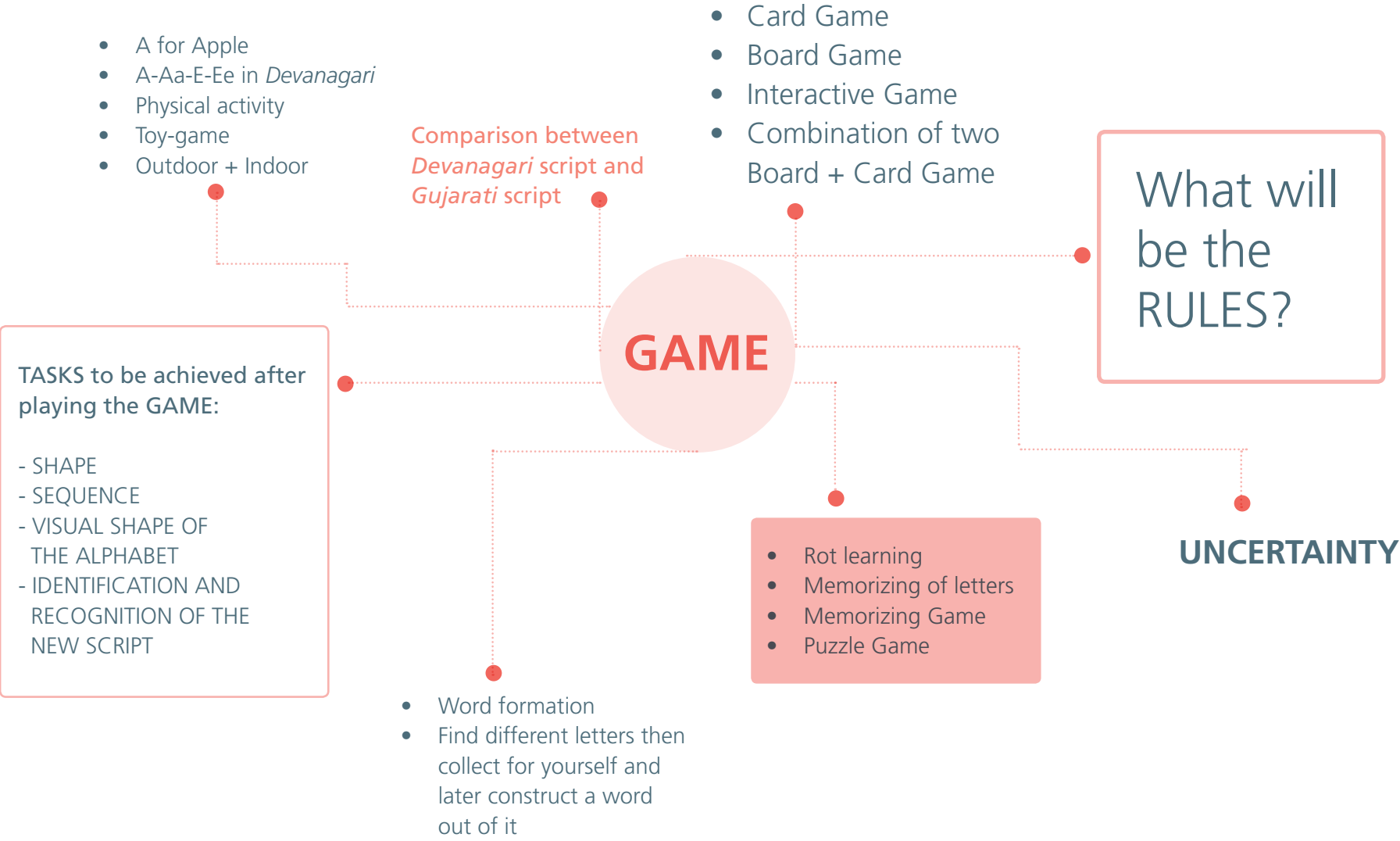
## At the end of the experiment, a child should be able to know:

- Alphabet Recognition
- Letter Shape Recognition
- Letter-Name Knowledge
- Letter-Sound Knowledge
- Rapid-Letter Naming



A child should  
IDENTIFY and RECOGNISE  
'Gujarati' Script

# Mind Map



# Concepts

- **Game Design:**

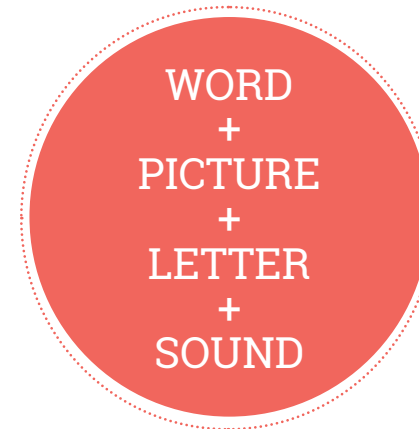
A game which will teach *Gujarati* in easiest and playful way. By this game children should not get bored and by play itself they would learn something new.

- **Existing learning methods:**

In schools, as I have mentioned earlier, picture and letter is the most associated to make a child learn a new letter-form. A child sees things in the environment and in the school by showing and letter-form and pronouncing it again and again. Then to learn to relate these names to visual shapes (letters) and then it is taught the correspondences between sounds and letters.

- **Board Games:**

Board games involves pieces, boards, dice, which moves in a specified rules. Rules is a major part in any game. On the basis of rules, the whole game-play is decided. Games can be based on pure strategy, chance (e.g. rolling dice), or a mixture of the two, and usually have a goal that a player aims to achieve. It increases socializing of the players and by interaction players can learn the most.



## MEMORY GAMES

### Scene memory:

Position of the object is shown, then changed we have to remember it & correct it.

<http://www.primarygames.com/puzzles/memory/scenememory/>

### Path memory:

A path will be drawn, then we have to remember the path and join according to our memory.

<http://www.primarygames.com/puzzles/memory/pathmemory/>

### Pattern memory:

A pattern is shown, we have to remember it and create the same pattern again.

<http://www.primarygames.com/puzzles/memory/patternmemory/>

### Sequence memory:

Sequence is shown of different shapes we have remember and arrange it sequentially.

<http://www.primarygames.com/puzzles/memory/sequencememory/>

### Applications:

- "Memory"- Memory game
- Match-up: Exercise your Memory
- Mahjong Solitaire
- Kids memory game: animals
- Coach memory! Brain trainer
- Princess memory game for kids

<https://play.google.com/store/apps?hl=en>

## Concept 1-2

- Card Game:** 'Ka' will have clue as Lotus in pictorial form formed by *Gujarati* 'Ka' for visual clue cards. *Devanagari* 'Ka' will be seen to the child. Player will only see *Gujarati* letter on that picture. By the help of clue cards, they have recognise the picture say the word and observe the and tell the correct pair.
- Conclusion:** Letter-form is not seen properly. If the name of the picture is not known to the player, they will get stuck at that point and game-play will not happen.
- Content:** Block divided into two parts which has *Gujarati* letter-form on it. Clue cards, which has *Devanagari* and *Gujarati* letters on it.
- Block Game:** A letter is written on a block. The block is divided in two. All letters will be written respectively on block. Blocks will be scattered, players have to look in the clue cards, have to look for correct match and for the new letter. Each player will built their own tower of correct *Gujarati* alphabets formed. After collecting the letters to test the correct letter-form, the next task will be to form a word without conjuncts.
- Conclusion:** Broken letters may create confusion in orientation of the letter-form. This can misguide the player as different combinations of letter may form a new letter which appears to be correct but are not correct as shown in Fig.1

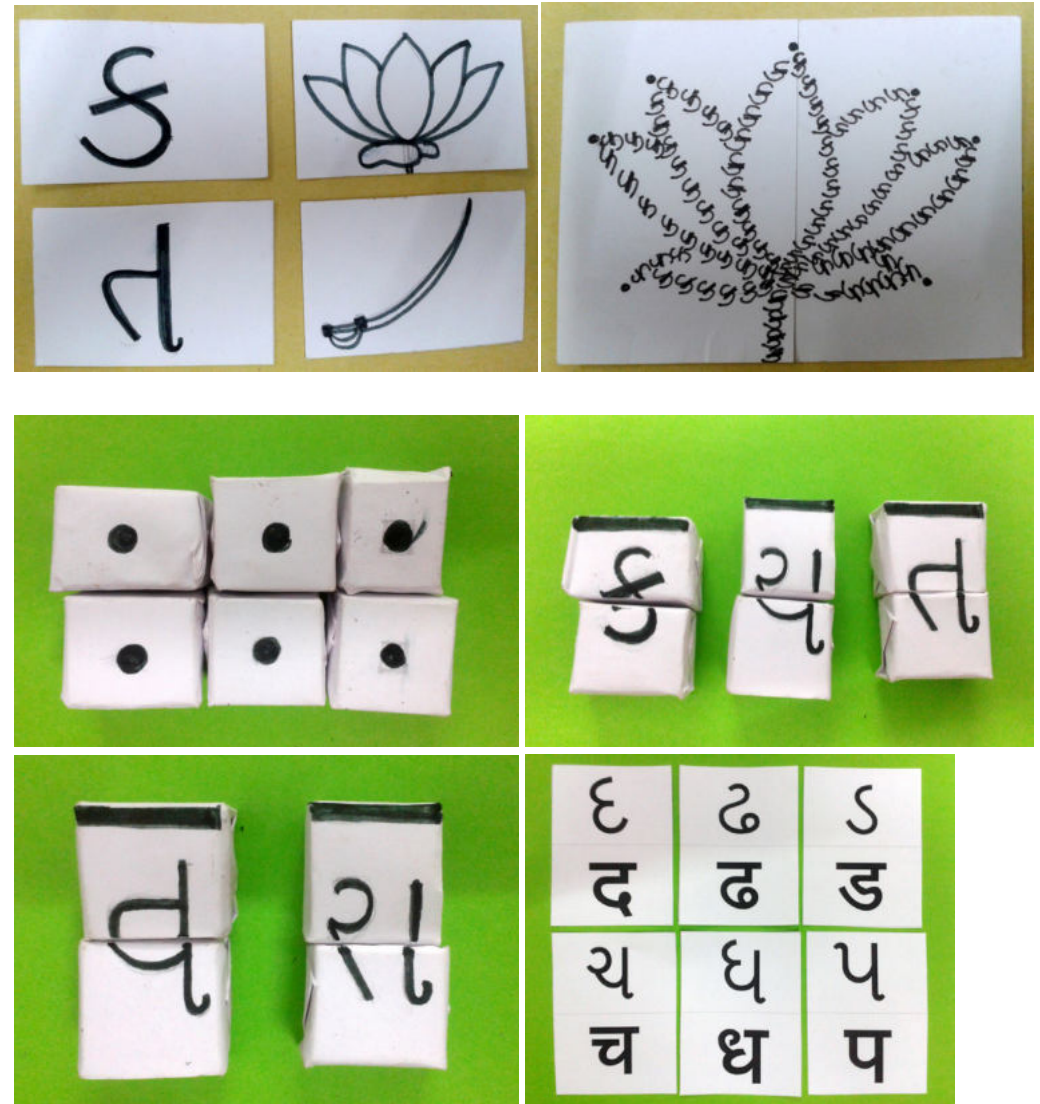
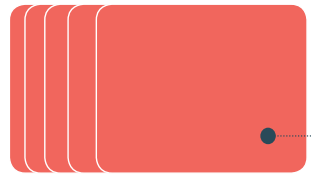
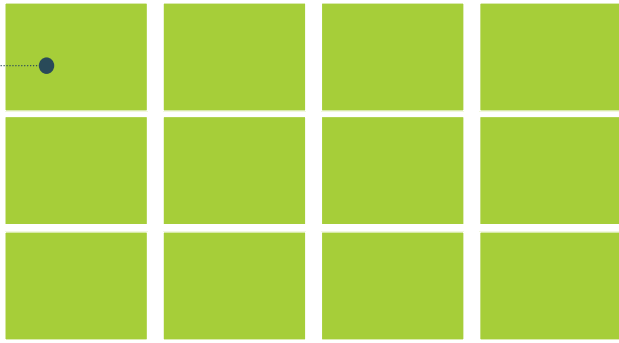
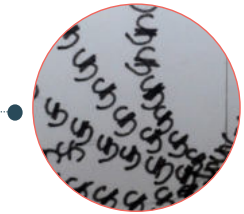
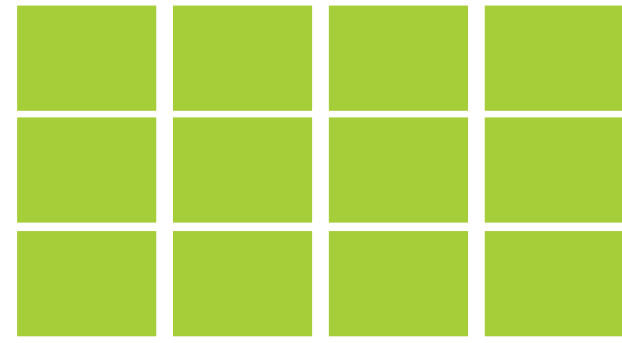


Fig. 1

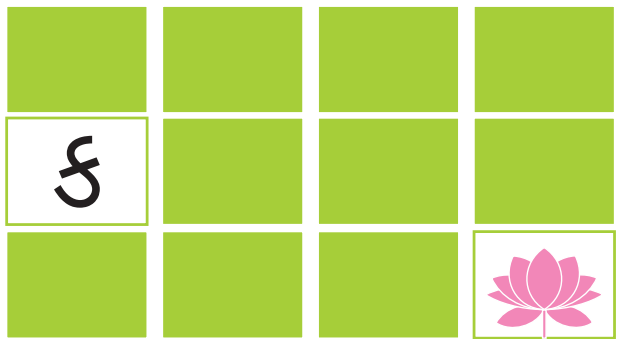
Playing Cards



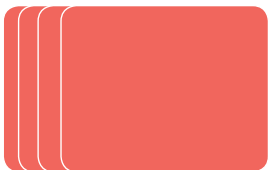
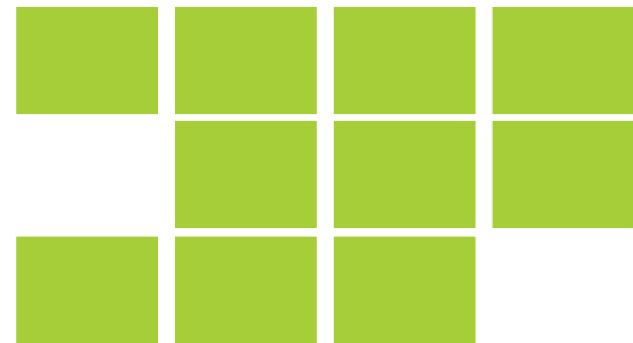
Clue Cards



STEP 1:  
1 Clue Card opens



STEP 3:  
Another Playing  
Card opens



STEP 1:  
1 Clue Card opens



STEP 4:  
When they matches,  
they will come out  
of the game



STEP 2



STEP 1

STEP 3



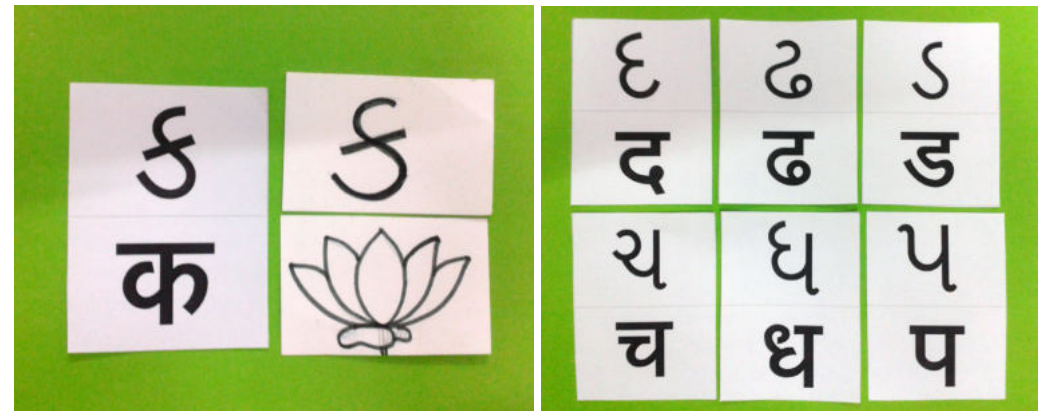
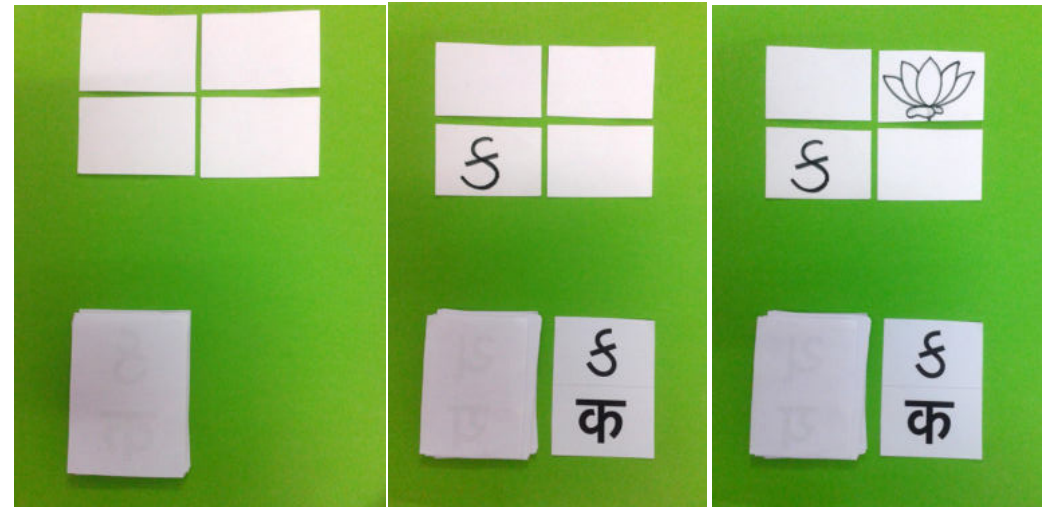
Line clue to indicate upside of the letter



STEP 4

## Concept 3

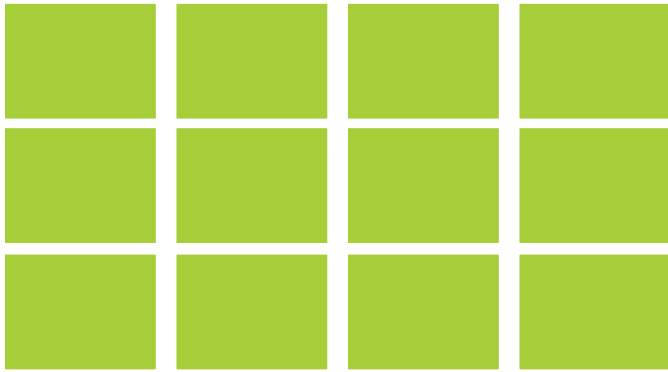
- Content of the game:** A board, scrabbled pieces of paper which has *Gujarati* alphabets and a picture representing each letters, set of clues cards which has *Gujarati* letter and its same *Devanagari* letter written on that same card.
- Game-play:** A player will start opening of a piece of paper, there will be *Gujarati* 'Ka'. Player then has to open the bunch of the clue card. On that clue card, *Gujarati* and *Devanagari* letter 'Ka' will be visible. By taking that clue, in the main playing pieces of paper, the player has to find the picture related to that letter, here 'Kamal' is the picture turned. So the answer goes correct, the pieces are taken out along with that clue card. In this manner, taking support of that clue cards, and pictures, player has to find out the correct answer.
- Conclusion:** Player is expected to pronounce the word of the picture, then only he may know the correct answer. If the picture is only not know, then it is difficult to play ahead. They may get stuck. If the name of the picture is different in different languages and this is not known to a player who is new in game. So, picture supporting failed the game-play to learn *Gujarati* letters.
- Challenges:** Make the new script recognisable without the referring any picture. A new game-play by which better *Devanagari* and *Gujarati* script can better be associated.



Clue card with picture which has starting letter 'Ka'

Different clue cards.

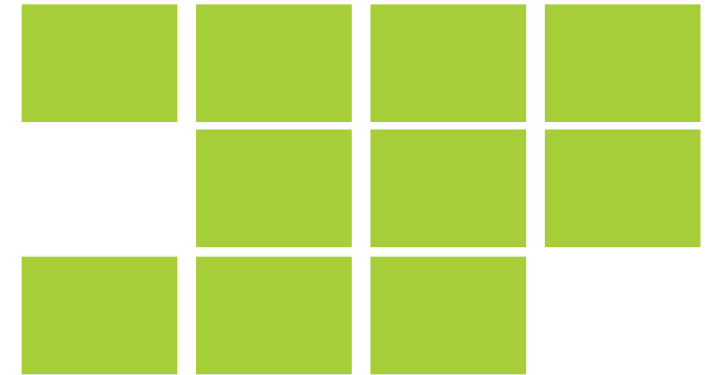
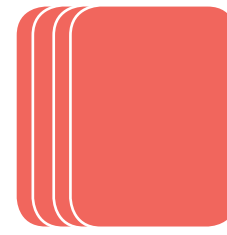




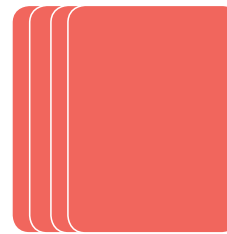
STEP 2:  
1 Playing  
Card opens



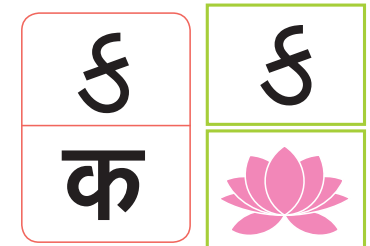
STEP 1:  
1 Clue Card  
opens



STEP 3:  
Another Playing  
Card opens



STEP 4:  
When they matches,  
they will come out of  
the game



# Concept 4

## Touch based application:

### Sound:

As we have seen earlier in research, sound plays an important role in learning process. When a letter-form is shown, and it is supported by sound of that letter-form, a child can associate to the sound and visual shape of the letter in a better way.

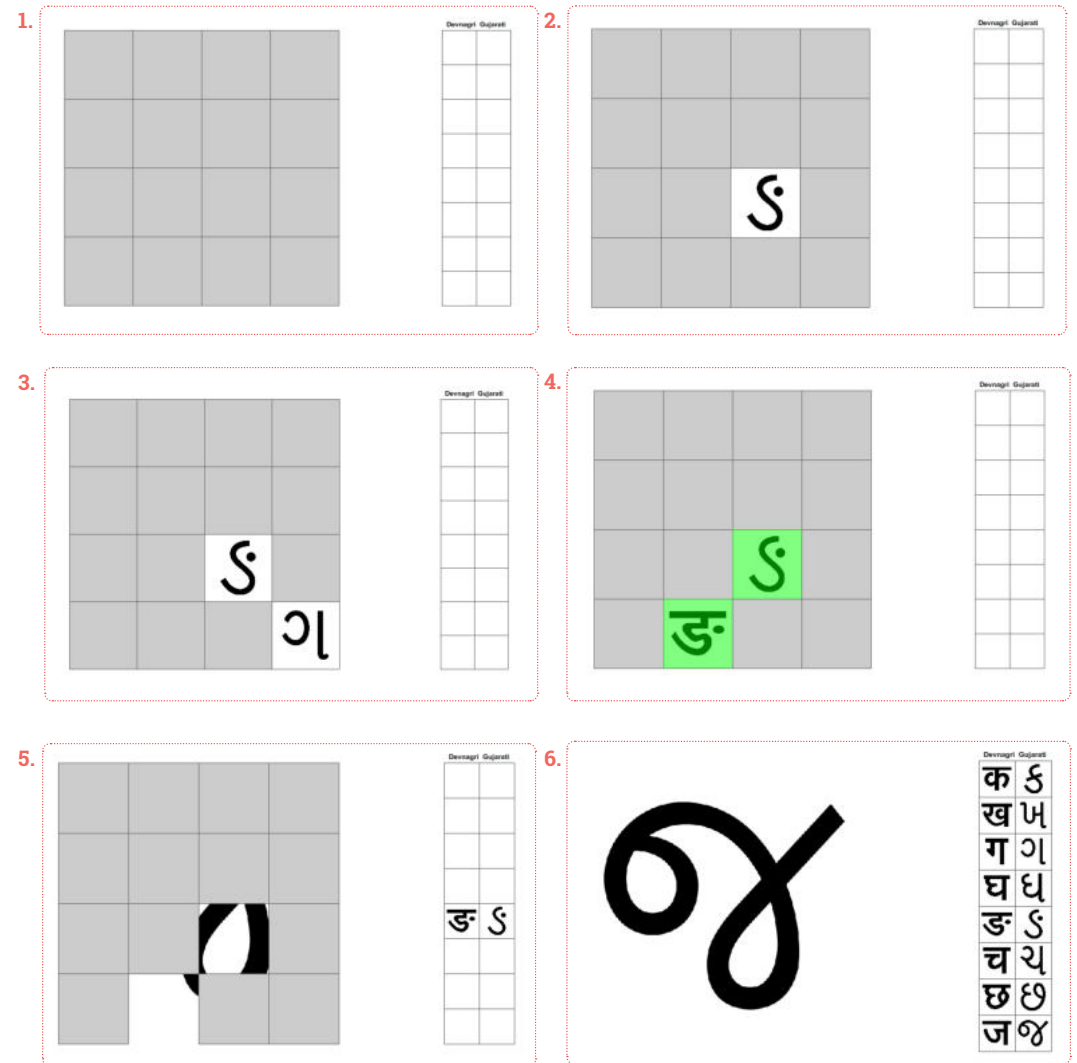
### Judging:

Judging is a important aspect in this game. How and who will tell the player whether the answer is right or wrong is the judgment to be done in the game. As the script is new to players, so in the game if the answer is right or wrong is very important part. In interactive system, we can program the right answer, so in the game it would be easier and faster to move ahead. In interactive game, the system will tell by itself the correct answer. The system will be playing the role of judge.

One can carry it anywhere. Parents, children young, anyone could play it whenever and wherever they want. It will hardly consume any space compared to a board game.



- **Game:** Interactive memory game for learning eight *Gujarati* letters. This is a touch base game.
- **Content:** Right-hand side panel which has *Devanagari* and *Gujarati* as a title. Sixteen grey tiles on left-hand side.
- **Game-play:** There will be sixteen tiles closed which will have random scattered letter-forms beneath, both *Gujarati* and *Devanagari*. Player has to touch on any one tile. A letter will appear, along with the sound of that letter. Player then has to touch another tile. If the answer is wrong, the tiles will close again. If the answer is right, they will become green and they will sit in side panel respectively which are *Gujarati* and *Devanagari*. Alphabets will be arranged in their sequence format in the side panel. Challenge is player has to remember the visual shape and sound of the letter-form when its open and match it correctly. In this manner, all the tiles has to be solved. After solving all tiles, a big letter-form will appear and the player has to guess that letter to enter next level.
- **Conclusions:** After testing, children takes maximum support of sound to match the letters. In this way visual shape of the letter-form is a bit side tracked. When asked to redraw the new letters, children could draw some of them. When a question is asked at the end, letter is known to the player, concentration at the visual shape of the letter is also given.
- **Challenges:** What are the other methods which gains more concentration to the visual shape of the letters? How many letters should be taught at a time? Can it be played without sound?



# Final Solution

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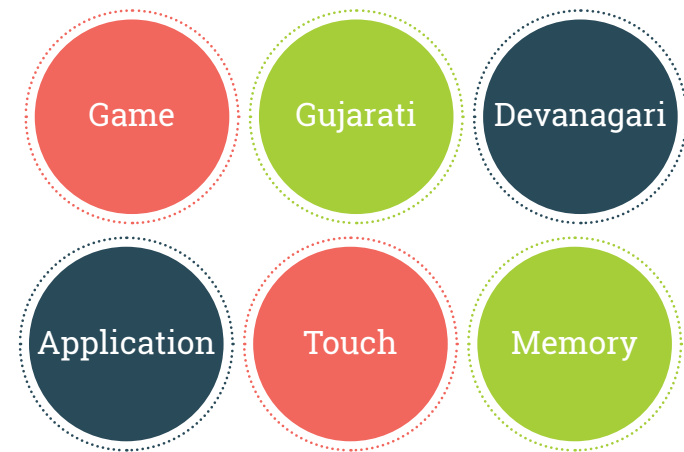
## Final Game:

Interactive Memory game to identify *Gujarati* script by taking *Devanagari* script as a supporting script. As we have seen earlier in research, repetition of letter-form and memorising it again and again is done. So therefore, taking base of memory game, a child would be learning *Gujarati* script in a playful manner.

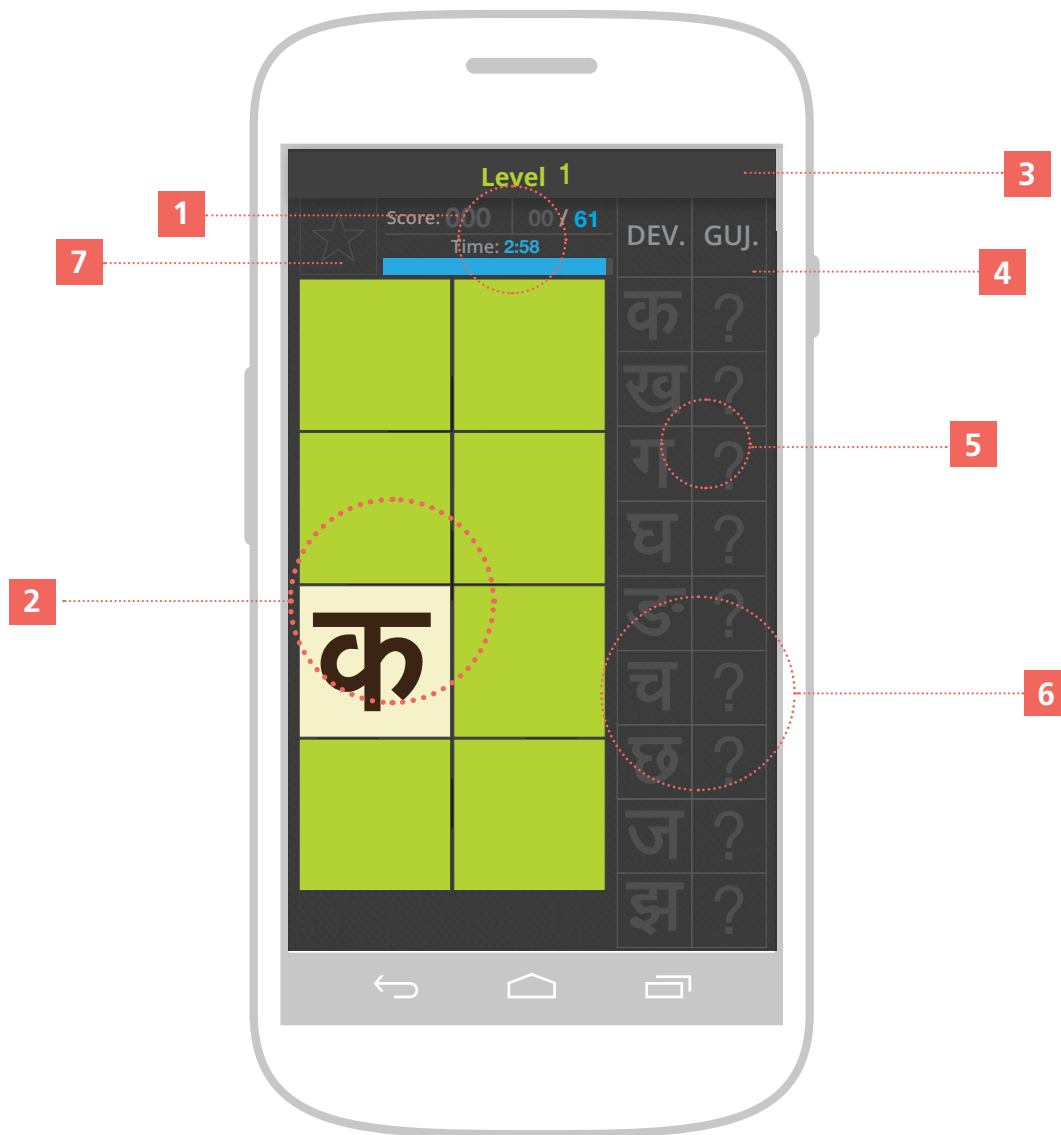
## Interaction:

Mobile application game is the medium for the execution of this game. This game will be an android based application. An application can easily be downloaded and the game can be played anywhere on an android device.

**Next few pages will have wire-frames and game-play of the game:**



# Wire-frame



## 1. Points, Solved letters, Timer:

Number of tiles solved out of 61, score board (points), time will start reducing as the game begins.

## 2. Main tile panel bar:

The main game-play will happen here. These tiles are click-able.

**3. Level:** Level number states here out of 3 levels.

**4. Script title:** To know the script name for letter bar.

**5. Letter bar:** To associate two scripts and for reminder.

**6. Devanagari letters in grey:** They are in sequence for the reference of players to check on how many letters are played and in what sequence?

**7. Star button:** It will be only active in level 2 and level 3.

# Game-play

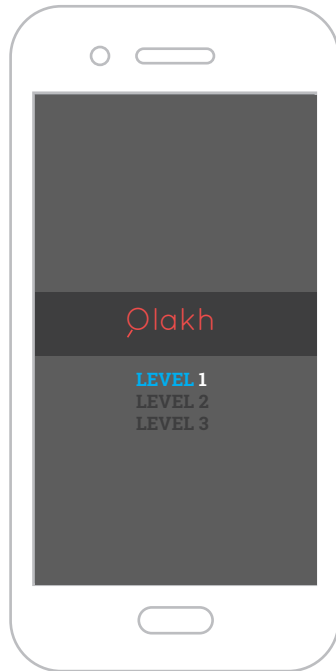
## Content:

Game will have 3 levels. A right hand side panel which has *Devanagari* letters and *Gujarati* letters panel. Main tile bar which consist of 8 tiles in level 1. Upper bar which has points, level number, name of the game, number of letters solved count.

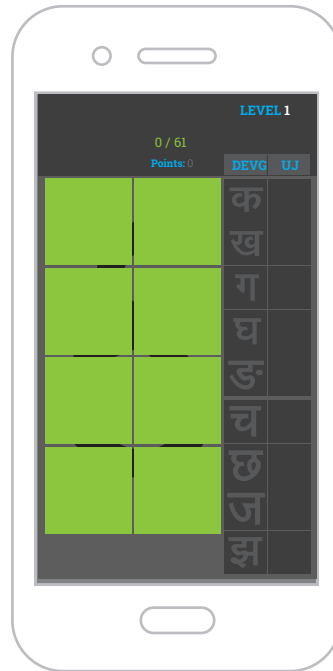
### Level 1:

- Player has to touch a single tile on the green tile bar. A letter will appear. It can be *Gujarati* letter or *Devanagari* letter. Player could hear the sound of that revealed letter.

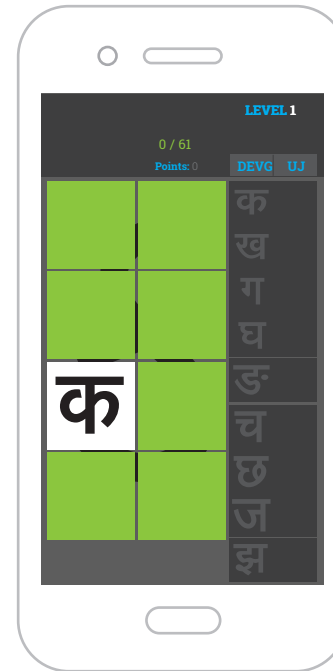
- Then the player has to touch one more tile. Then we will hear the sound of that letter.
- If the letters opened, and does not match each other, the tiles will become red and both the tiles will close.
- Players have to do the same again. At a time only a tile will be opened. And after two tiles are open and the answer is correct they will become green.



Start of the game, it indicates start of level 1.



Right-hand bar is letter bar which has deactivated Devanagari letter-forms. Main tile bar on left-hand side in light green.

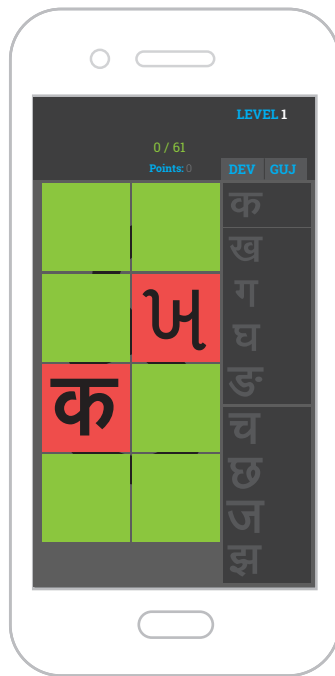


One letter is opened



Two letters are opened

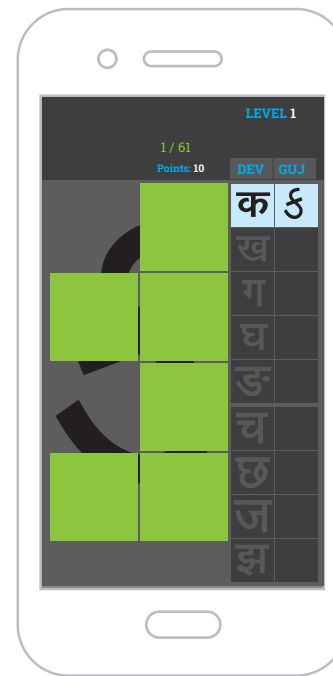
- After the answer is correct, both the letters will go in right-hand side panel in the sequential manner. They become blue in colour to indicate they are solved.
- Player will get 10 points for each correct answer.
- After the correct answer, in the tile bar, there would be blank tile. A letter would be somewhat visible.
- In the same manner, after solving all 8 letters, a huge letter-form hidden at the back will be visible. The letter would be somewhat visible.



The letters don't match hence the answer is wrong. Red colour on the tile indication that answer is wrong.



The Gujarati 'Ka' and Devanagari 'Ka' matches to each other hence the answer is correct. Green colour on the tile indication that answer is correct.



The correct answer goes to the letter panel on right-hand side. They become blue in colour to indicate it is solved. 10 points are achieved.

- In the same manner, after solving all eight letters, a huge letter-form hidden at the back will be visible.
- To go to the next level of the game, player has to identify the huge *Gujarati* letter-form.
- The *Gujarati* letters from letter bar will disappear while solving this task.
- Players will get three chance to solve this task. If the answer is wrong, the tile will get red. If the answer is correct, it will get green.

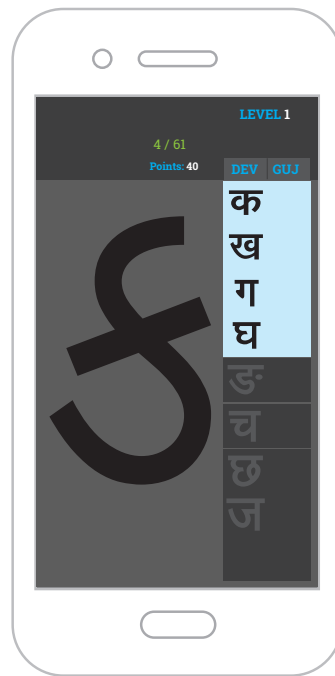
- If in three chances, the answer is not correct, the game will start again from beginning. Again the player will have to play the game from the start. The tiles will get shuffled.

### Conclusions:

- The last task is for the remembrance of the player. By solving this last question, the player will have to remember the visual shape of the letter while playing with the tiles. It is done to recall the visual shape of a new taught script.



Last question to solve to go to next level.



Gujarati letter-forms are disappeared from letter bar.



If the answer is wrong it will show tile in red colour.



When the answer is correct, the tiles becomes green and the correct letter-form will be appeared.



## Level 2:

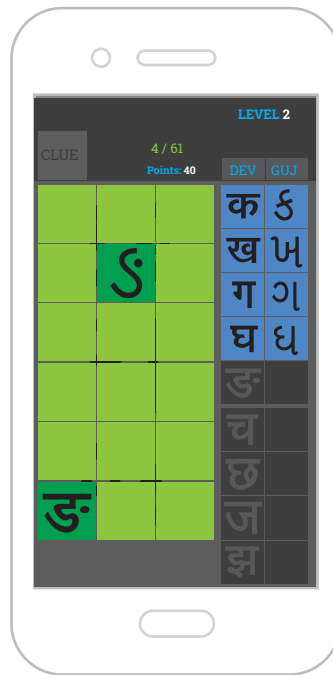
- Number of tiles to be played is eighteen.
- As four letters are already solved in level 1, those letters are in solved mode and will be in deactivated mode. To indicate this they are in dark blue colour.
- Upper panel will have a 'Clue' button deactivated. It only gets activated when six letters are solved in total. All letters in letter

bar will get activated after solving six letters. Same game-play of matching letters, in tile bar will continue in this level too. Only number of tiles will increase.

- Clue button will change its colour to indicate its activate. Once the clue button is activated, timer will start in the game. Player can take a clue only when a tile is opened in tile bar.



Level 2 screen with 18 tiles.



Same game-play of remembering and matching the letters.



Clue button gets activated as 6 letters are solved. Timer starts here.



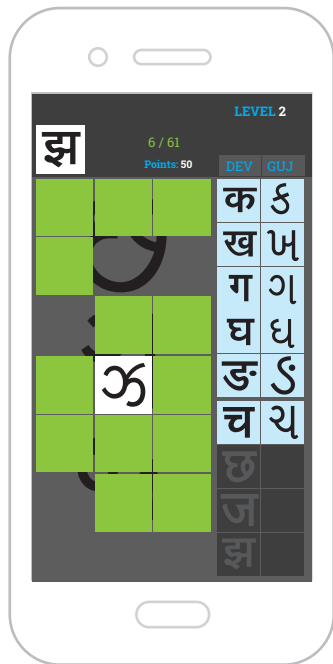
Help of clue can only be taken when one letter is opened.

- When the clue button is opened, the matching letter in that clue will appear.
- As a penalty, one of the played letter will go back again in the tile bar. The player has again have to play for that letter. No point penalty is here.
- As there is time constrain, clue button will help to solve the answer quickly or else game stars again from level 2.
- The letter bar will have scroll so all the letters solved will sit in letter panel according to the sequence.

- After solving tile bar, three letters will appear to solve to go to the next level.

**Conclusion:**

- As a penalty, a letter will go back in tile bar, and player has to play it again, it is important for a player to remember what has solved. Remembering the visual shape of the letter-form solved letters in earlier level becomes important here.



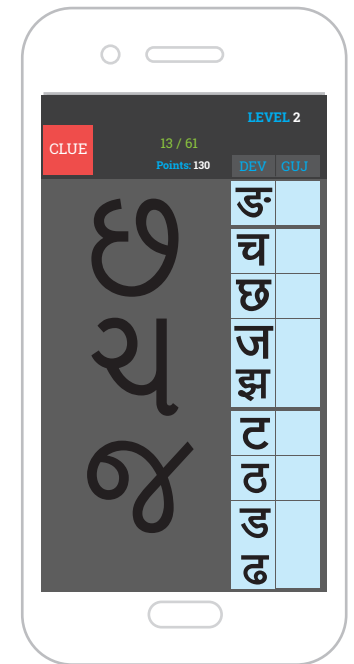
Answer of the matching letter appears in clue box.



As a penalty, letter 'Kha' goes inside again in tile bar.



All letters are solved. Three letters will appear to be solved.



Letters disappeared in letter bar.

- Three letters will appear in tile area.
- Player has to select the letter first and then click on the letter panel for the correct answer.
- Player will get six chances to choose the three correct answer or else again the player will have to play level 2 from beginning.

**Conclusion:**

- Difficulty level increases with level 2. There are three letters to be recognised so it becomes more important to remember the visual shape of the letter-form while playing the tile bar.



Letter-form 'Chha' is selected to match the correct answer from letter bar.



Correct answer is indicated by green colour.



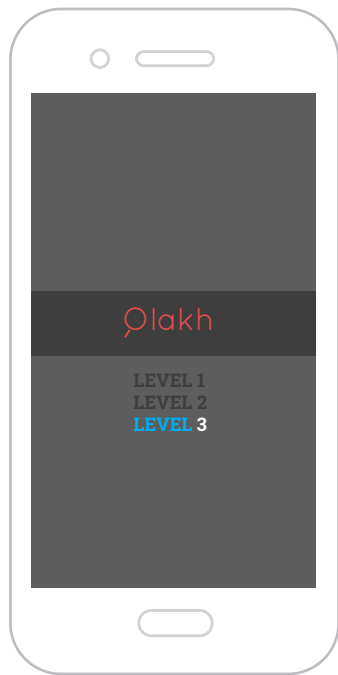
Letter-form 'Chha' is solved and Gujarati letter-form 'Ja' is selected to be solved.

### Level 3:

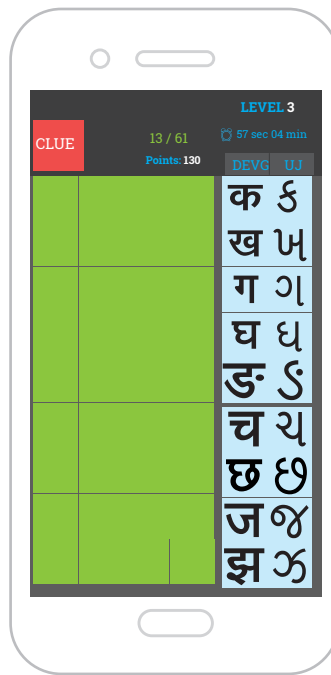
- Number of tiles to be played is thirty-six. In this task eighteen new *Gujarati* letters will be learnt.
- Game-play is same as in level 1 and level 2.
- For the difficulty in level, number of tiles are increased.
- Time to solve this level will reduce.
- The tile bar too has a scroll. After thirty-six tiles are played completely, the next 32 tiles will get activated. Till then they will be in deactivated mode.

### Conclusion:

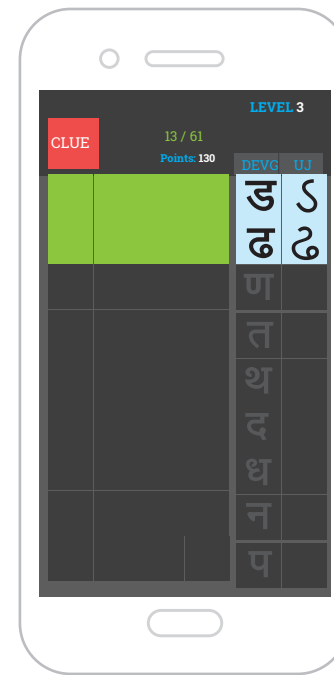
- Game-play should be done only in visible areas of the screen. If one letter is in a corner and other is down the scroll, player will lose the connection and it will be difficult for him/her to remember the visual shape of it.



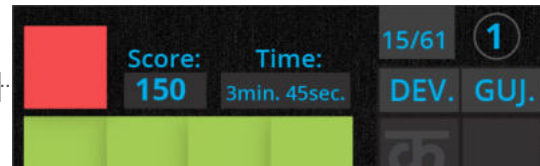
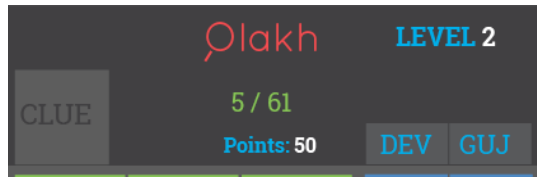
Start of Level 3



32 tiles to be played in this level. Letter panel will have already played tiles in before levels.

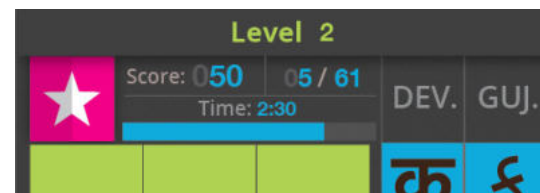
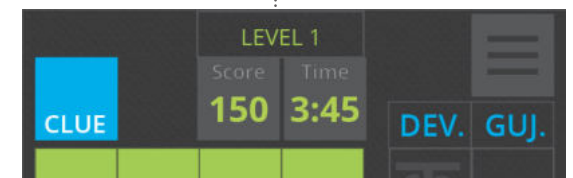


Deactivated panel of tiles and letter bar.

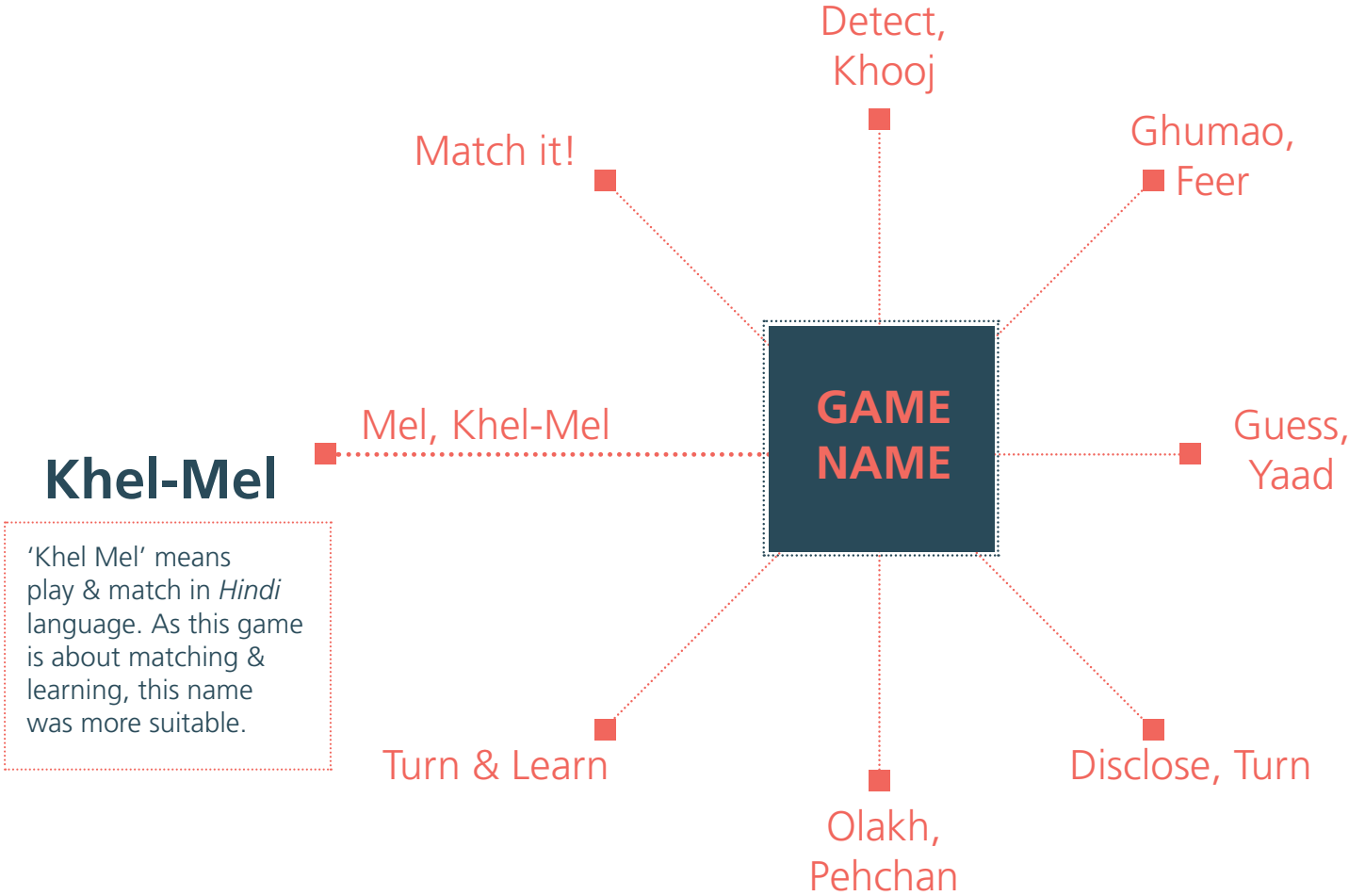


## Features

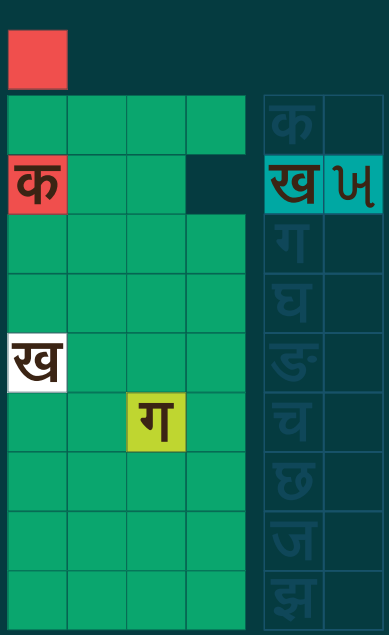
- Size of the clue button = Smallest tile size
- Score Card in numerals
- Time Duration bar to see added time
- Number of Letters solved count
- Level Number
- *Devnagari & Gujarati* script indication



# Game-Name



# Colour Palette



### Level 1

Score: 030 03 / 61  
Time: 0:50

DEV.	GUJ.
ક	ક
ખ	ખ
ગ	ગ
ઘ	?
ઙ	?
ચ	?
છ	?
જ	?
ઝ	?

### Level 2

Score: 050 05 / 61  
Time: 2:40

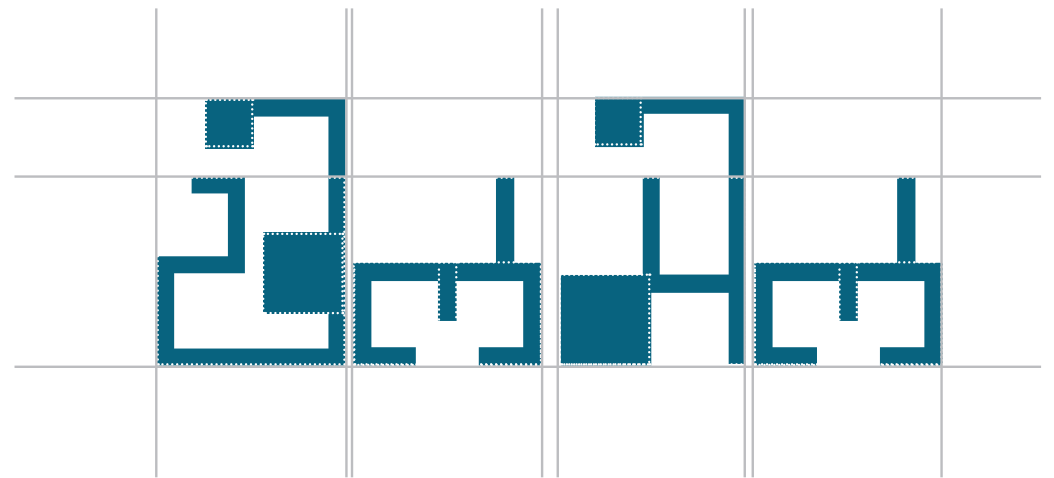
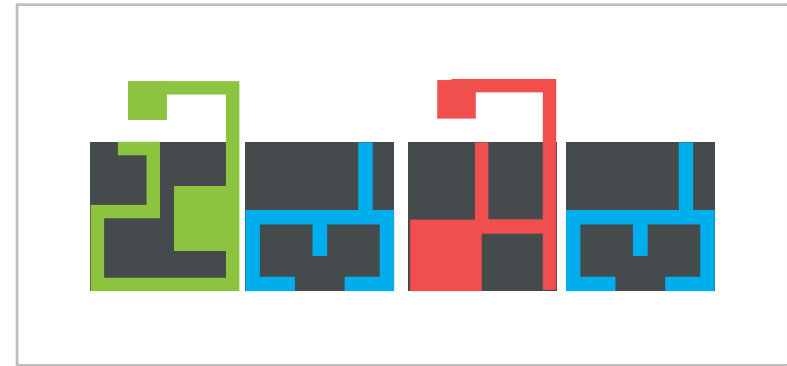
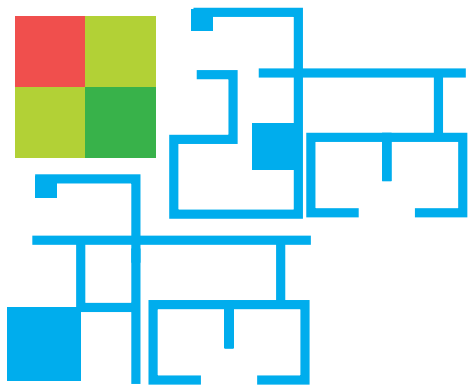
DEV.	GUJ.
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ઙ	ઙ
ચ	?
છ	?
જ	?
ઝ	?

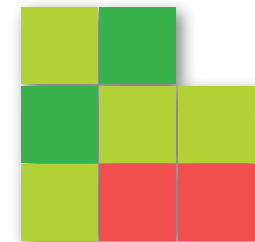
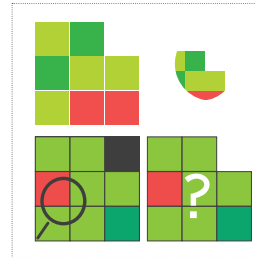
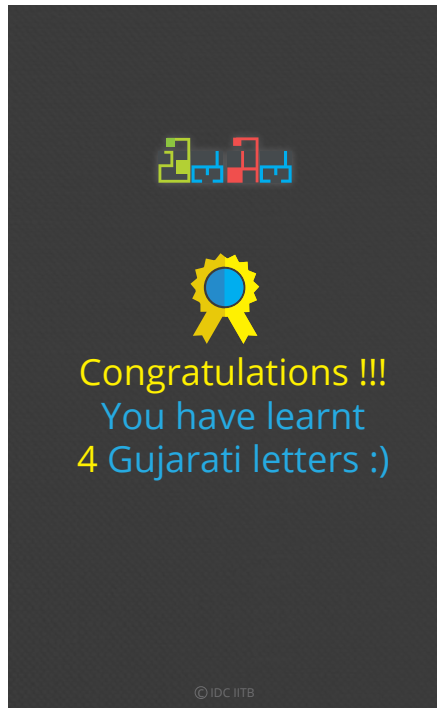
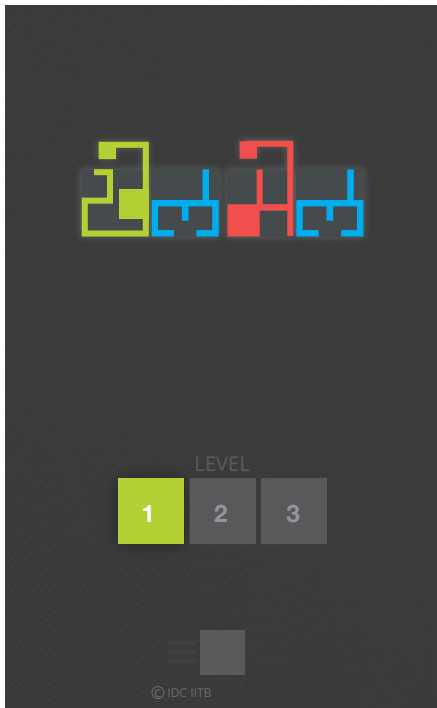
R13 G177 B75	R59 G36 B20	R64 G64 B64
R178 G210 B53	R39 G170 B225	R88 G89 B91
R255 G242 B0	R236 G0 B140	R145 G148 B150
R245 G242 B201	R240 G78 B76	R255 G255 B255



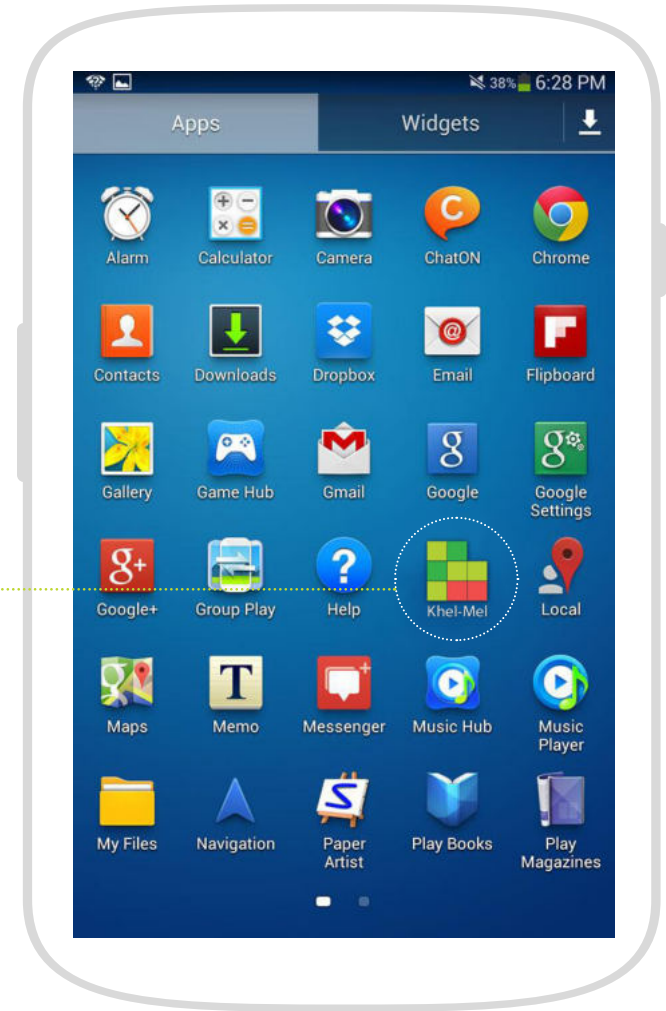
# Logo

खे मे

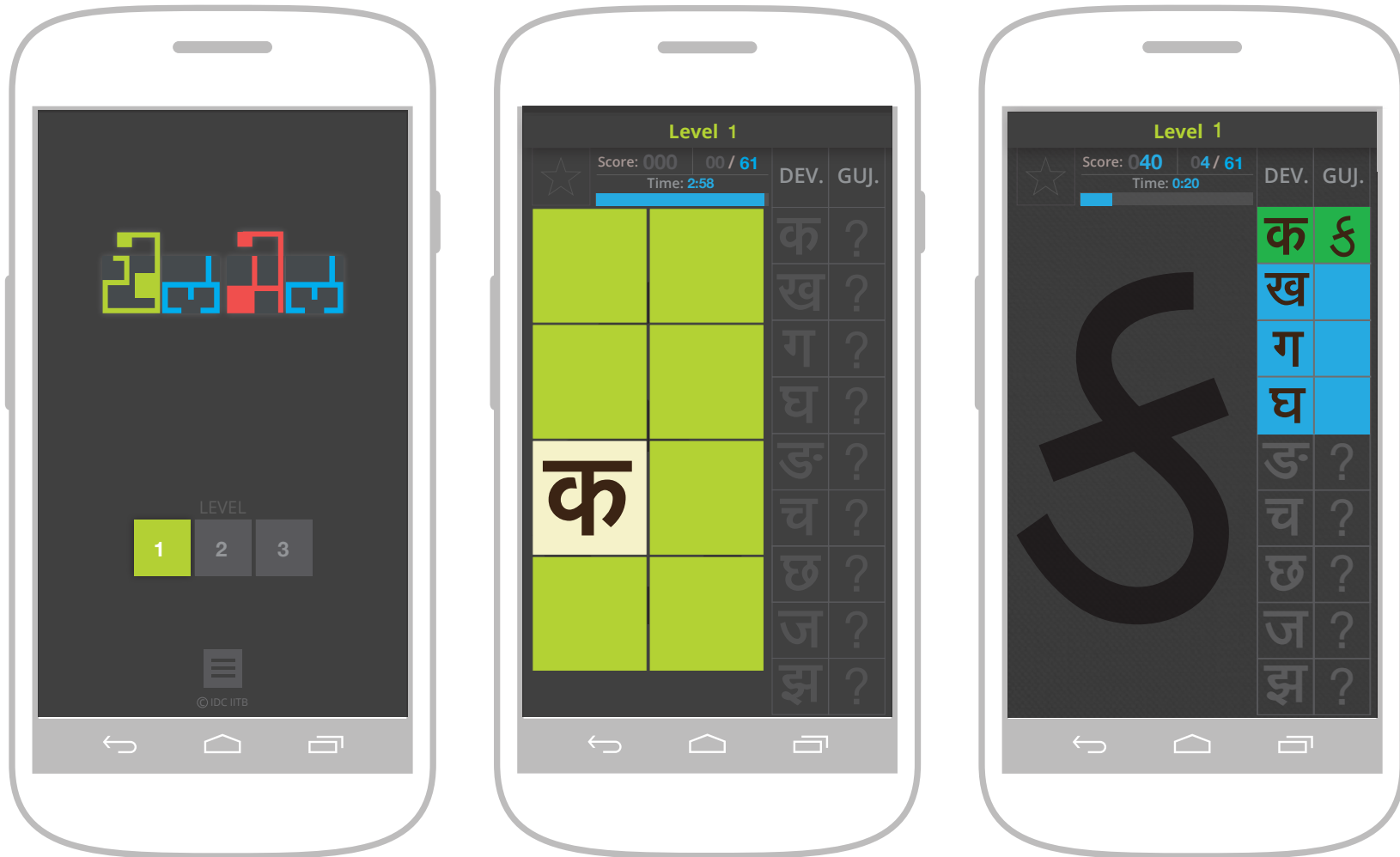




Khel-Mel



New look of 'Khel-Mel' which includes Visual Design:



# Results

- Clue button functions:**  
Initially when clue is taken, player could see the correct answer in the box but then too he/she has to find the correct answer in the tiles. This didn't help the game play. So, the change was made in such a way that the answer is solved, and goes into letter panel.
- Time duration:**  
Total time given was five minutes in total. But while testing we found out, time was either less or more in some cases. So to benefit the game-play, when the clue is taken, a grace time will be added to the total time. So that the player gets more interested in the game-play. Game starts with three minutes.

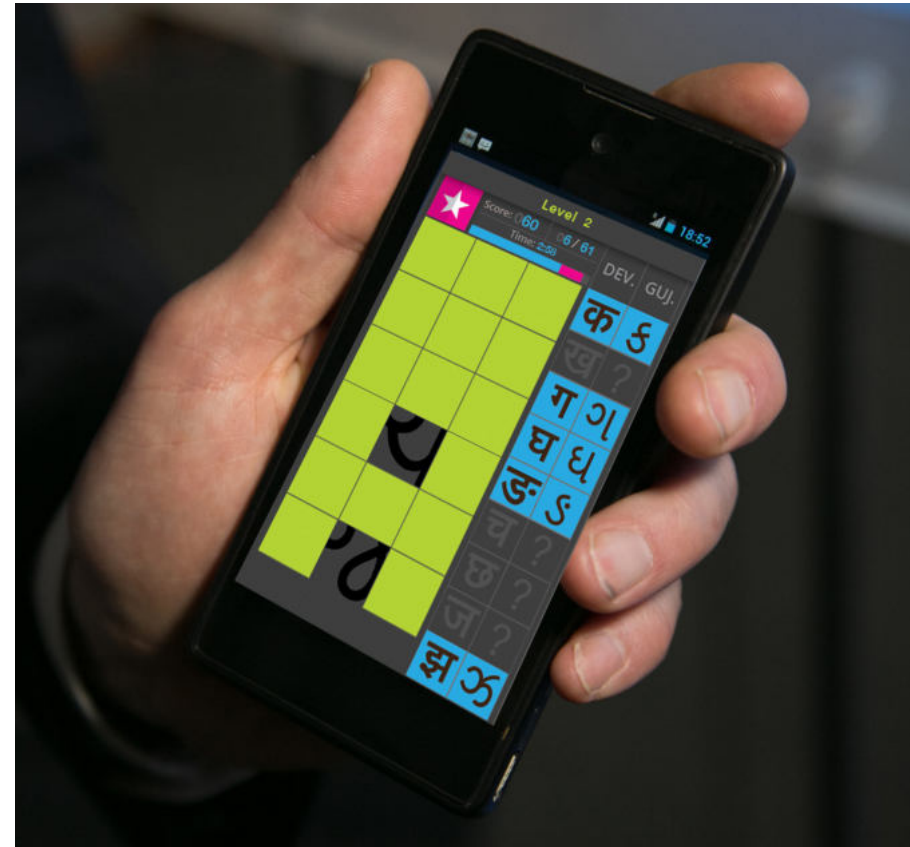


Time: 2:58



# Learnings

- Recognition of *Gujarati* script
- Application design
- Application design for a Game
- User interface design of the Game
- Interaction of the application for the best results of the game-play
- A child's perception and thinking while playing a game
- Visual design by which game can be better understood



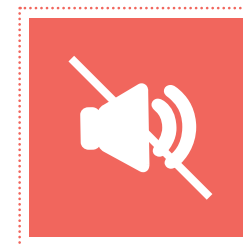
<http://www.digitaltrends.com/wp-content/uploads/2013/03/EVST2263.jpg>

## Future Plans

This game can be used to recognise **any two Indian language script**. By taking support of sound, if the game played in this manner, it would easier to learn any Indian script.

Not only children but **adults** too can play this game to learn *Gujarati* script. For a **typographer, who wants to design a Gujarati font**, this game can be a guideline for them to learn the script and then design.

As there is repetition of sound & letter-form included in this game, a **partially hearing impaired person** too can play and learn a new script similarly. This game can be used to recognise any two Indian language script. By taking support of sound, if the game played in this manner, it would easier to learn any Indian script. Thus in this same manner this game can be executed to learn other Indian scripts like *Kannada, Bengali, Tamil*, etc.



Thank you