
संयुक्ताक्षरे

Project: 3

Game Design to form

Conjuncts & Word Construction

in *Devanagari Script (Hindi)*

for Children

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Visual Communication: 126250002

IDC, IIT Bombay 2012 - 2014


इंडेक्स


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अप्रूवल शीट

The project titled '**Game Design to form Conjuncts and word formation in Devanagari Script (Hindi) 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: 10/06/2014 _____

डिक्लरेशन 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/ 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.



Vishnupriya Kaulgud

126250002

IDC IIT Bombay

2012-14

एकनाँलेजमेंट

ACKNOWLEDGEMENT

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 Management Committee, Principal, teachers of '**Abhinav Shikshan Prasarak Marathi Medium School**', Goregaon (E), Mumbai, , '**Jog Primary School**', Pune, '**Balshikshan School**', Pune, '**Shree Saraswati New English School, Mit School**', Pune, '**Pragati Deaf School**', Dadar (W), Mumbai, '**Gyanganga English Medium School**', Pune, '**New English School**', Pune.

I am thankful to all my users who helped me for valuable feedback.

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

India is a country rich with 22 official spoken languages, 13 official and 10 major scripts.^[1] 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.^[2]

While learning words, conjuncts play an important part. Many times, consonants take completely new form while they are formed in conjuncts. All such things are taught in the same rote learning format. If these things are taught in a playful manner, children will enjoy as well as learn.

This project aims to provide a solution for easy learning through a touch base game for learning conjunct and word formation in Indian language script. I have mapped this game on the *Devanagari* script (*Hindi*). With the combination of sound and letter-form, a script will be taught. The initial part will be before recognition of *Devanagari* script to children and then conjunct formation through a story. The target audience would be 8 years and above where they know recognition of the *Devanagari* script and some prior knowledge of conjuncts.

“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

इंट्रोडक्शन INTRODUCTION



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 task is to make children understand Conjuncts and word construction in an Indian language script. For this project I have mapped it on *Devanagari* script (*Hindi* language).

Context: India is a multilingual, multi-script country. When a new script is taught, it taught by a method which is called rote learning. In this method a child is taught a script by the help of sound and visual. Till now a new script is taught by rote learning. Repeatedly a child is told to speak and write.

Purpose: To teach a script conjunct and conjunct formation in a playful manner.

Scope: This project will help a child to learn conjuncts in a script in a much entertaining form.

Objective: This game would be the next step of the script recognition game *KHEL-MEL*. Conjunct formation and word construction method in *Devanagari* script (*Hindi*). *Devanagari* is just a script on which the game will be mapped on. The game will be designed later in such a way that it can be implemented for any Indic script.

प्रोजेक्ट - २

PROJECT - 2



Script Recognition Game for Gujarati script

- India has 22 official languages and 13 official scripts in which 9 are major scripts.
- Languages are taught in early schooling period of a child. Children are aware of only those languages which are taught to them in schools.
- Very few Indians can read more than three different language scripts (first language, second language, regional language).
- People speak the language but fail to identify the associated script.
- This is a crucial problem and if one could recognise a script in early childhood, it would be beneficial.

फाइनल कॉन्सेप्ट FINAL CONCEPT



Interactive Memory Game to identify Gujarati script by taking Devanagari script as a supporting script. As we have seen earlier, 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.

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



Touch based application:

Sound: When a letter-form is visible, and it is supported by sound, a child could associate them both in a better way.

Judging: To tell the player whether the answer is right or wrong is the judgment to be done in this game. As the script is new to the players, in the game if the answer is right or wrong has a very important part. In interactive system, the system will be playing the role of judge.

खेल-मेल फॉर हिंदी

KHEL-MEL FOR HINDI



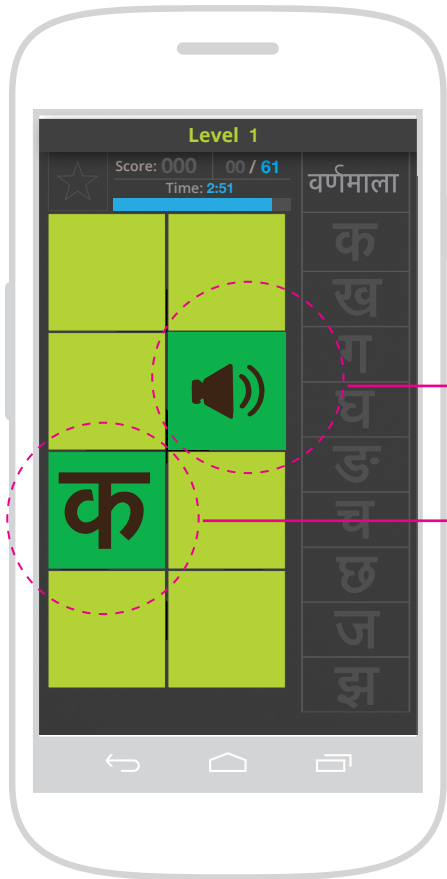
As proposed earlier, this game is the solution for knowing any Indian language script. So if it has to be played only for knowing Hindi language i.e. Devanagari script, sound will play an important role here.

Game-play:

STEP 1: Click any green tile. A letter-form will be visible (here it is 'Ka'). A picture and a sound will be heard. (Here picture of letter 'Ka' and sound of 'Ka' will be heard)













STEP 2: Click on another tile. Another sound will be heard. (Here only sound of 'ka' will be heard) The letter-form and sound matches, the letter will indicate correct in green colour and sit in right-hand side bar.

If the answer is wrong, it will indicate wrong in red colour and the tiles will close back again. In the same manner, the game has to be played. As the level increases, the number of letter-forms to be solved will increase.



Letter Sound

Letter Sound
Letter Picture

Tile 1	Tile 2	Redundancy
Letter Picture 	Letter Sound 	} Low
Letter Picture Letter Sound  	Letter Picture Letter Sound  	} High
Letter Picture Letter Sound  	Letter Picture 	} Middle
Letter Picture Letter Sound  	Letter Sound 	

स्क्रिप्ट लर्निंग सीक्वेंस

SCRIPT LEARNING SEQUENCE

Any script when taught to a kid in early childhood, it is taught by a sequence. Directly if one teaches words in a script, it is very difficult to a child to learn the script. Hence, a manner is followed.

First letter recognition, its form, its sound, form-sound relation this everything is taught. Then once she/he knows the recognition, words forming out of combinations of those letters is taught. It includes joining of letters too that are called conjuncts. If consonant join to a consonant it is called conjunct. After this, sentences constructed by formation of words are taught.

Letters	Words	Sentence
स र ज	सूरज निकल	सूरज निकल आया है

व्हाई कंजंक्टस?

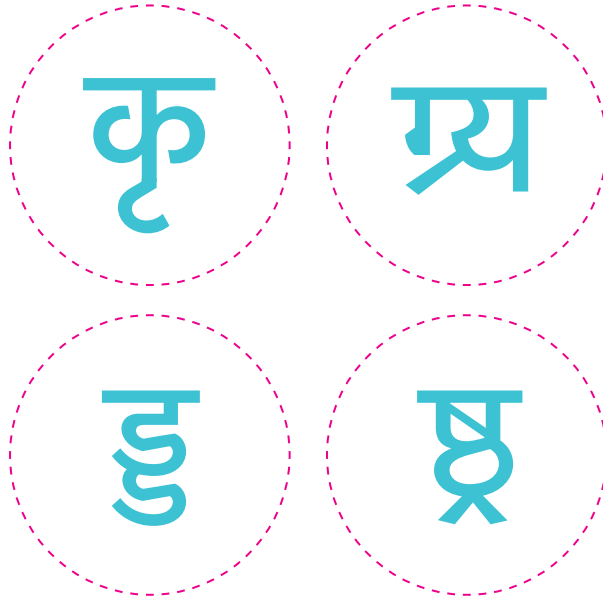
WHY CONJUNCTS?

- Conjuncts and conjunct using words are learnt by rote learning in schools. They are mostly taught by applying them in a word.
- Many children are confused and make mistakes while adding conjuncts to a word. By this, it has been observed that formation of conjuncts is difficult to understood by a child.
- Some of the conjuncts are converted completely into different form while formation. So, in this process how they are formed and what the exact pronunciation of that letter is important.

गुट्टी = गुट्टी

- सुनो और दोहराओ :
गुड्डा, बिट्टू, विद्या आओ ।
- चित्र के बारे में चर्चा करो ।
- पढ़ो : हल् लगाकर जुड़ें हम ।

Hindi Balbharati Textbook- 1st Standard



A child should be able to form conjuncts and form words in *Devanagari* script (*Hindi*).

This game would be the next step of the script recognition game *KHEL-MEL*. Conjunct formation and word construction method in *Devanagari* script (*Hindi*).

Devanagari is just a script on which the game will be mapped on. The game will be designed in such a way that later it can be implemented for any Indic script.

- It will NOT be a replacement for teaching methods in school
- To encourage practice in rote learning
- It can be a homework which will be playful and educational too
- It will concentrate on comprehension of learning conjuncts

By this project, things that a child must know:

- Conjunct formation
- Different types of conjuncts in *Devanagari* script (*Hindi*)
- How words are formed by conjuncts
- Use of conjuncts in words

व्हाट आर कंजंक्टस (संयुक्ताक्षरे)?

The basic *Devanagari* characters can be combined to indicate combinations of sounds. Conjuncts means joined together; united, each of two or more things which are joined or associated. (Dictionary meaning)

In Indic language, any sound can be represented by forming conjuncts. It helps to form words in a language. A conjunct is a combination of two or more consonants. It means a letter-form representing combined consonants.

CONSONANT + CONSONANT

च् + च = च्च - बच्चा

क् + ऋ = कृ

In Indic scripts and scripts derived from them a consonant character carries with it an inherent vowel.

CONSONANT + VOWEL

घ् + अ = घ

क् + अ = क

24 out of the 36 consonants contain a vertical right stroke (ख, घ, ण etc.). As first or middle fragments/members of a cluster, they lose that stroke:

त् + व = त्व

ण् + ढ = णढ

स् + थ = स्थ

श् appears as a different, simple ribbon-shaped fragment preceding व, न, च, ल, and र, causing these second members to be shifted down and reduced in size:

श्

व-श्च ल-श्च च-श्च

न-श्च र-श्च

The combination of 2 or more consonant letters without the 'Aa' sound in the middle. Sometimes this can change the shape of the letter and therefore makes conjuncts.

CONSONANT + CONSONANT 'अखंड' (AKHANDA)

क् + ष् + अ = क्ष

श् + र् + अ = श्र

त् + र् + अ = त्र

ज् + ज् + अ = ज्ञ

Nasal conjuncts:

These are the conjuncts which are replaced by a dot

VOWELS + SPECIAL CHARACTERS

CONSONANT + SPECIAL CHARACTER

ङ - अंग ज - पंजाब

ण - मंडल न - हिंदी

म - लंबा

र

'रफार'
(RAFAR)

Has three different conjunct form:

1. As a first member takes the form of a curved upward dash above the final character

धर्म

'रकार'
(RAKAR)

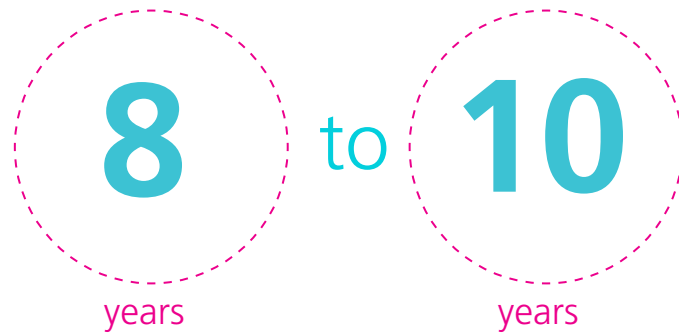
2. As a final member with ट ठ ड ढ ङ छ, it is two lines below the character, pointed downwards and apart

ट्रेन

3. Elsewhere as a final member it is a diagonal stroke extending leftwards and down

प्रेम

ऋ
'अर्धा'
(ARDHA)



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

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. In early childhood, children are more capable of learning. They try to apply their knowledge whenever they have the opportunity even if it is not well used.

Age Group:

For this project, it is necessary for a child to know *Devanagari* script completely. Some prior knowledge of conjuncts should be there it can be from anywhere, learnt from books, schools, etc. So the age group is 8-10 years old children who knows *Devanagari* script completely and some prior knowledge of *Devanagari* conjuncts. In schools in *Maharashtra*, by this age, they are familiar with *Devanagari* script. By this age, recognition of letters and word formation is taught. Hence, my users are of age group 8-10 years.

Age Cues for 7-8 yr, 8-9yr:^[3]

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.

[3] BOOK: *Designing For Children* By: Catharine Fishel

डेटा कलेक्शन

DATA COLLECTION



Hindi Balbharati - 1st Standard



Hindi Balbharati - 1st Standard



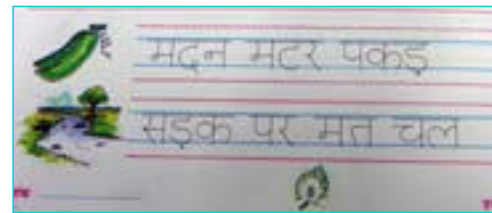
Bhasha Parichay -2



Morpankhi - Hindi Sulekhmala

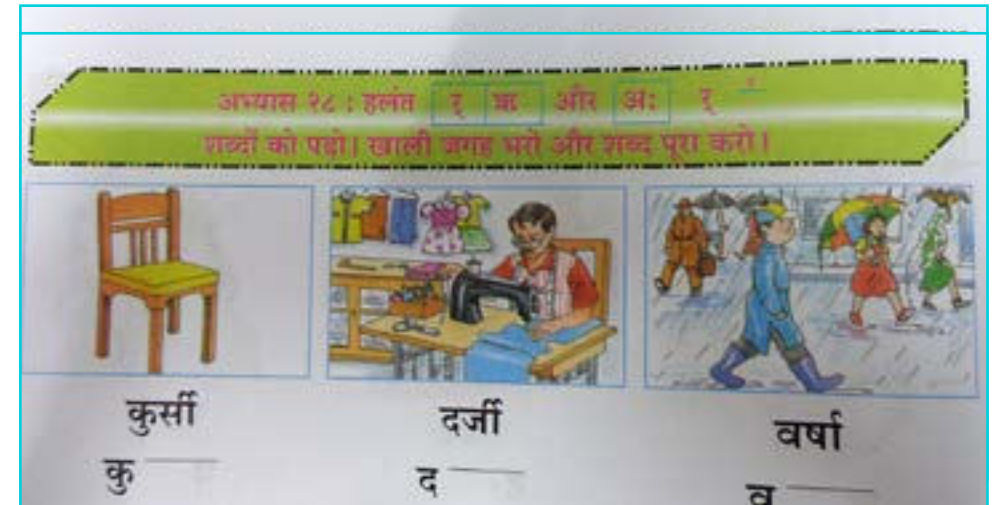


Hindi Balbharati - 1st Standard

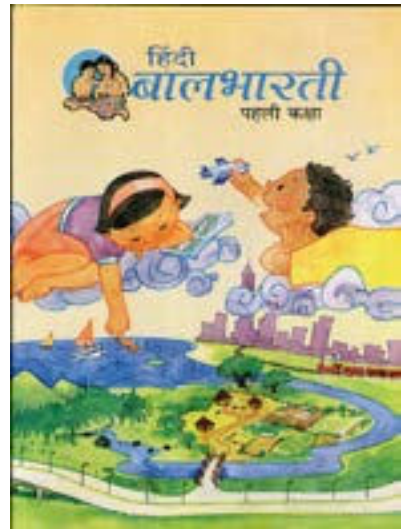


A child sees various things around her/his environment. In the school, many such things are drawn and pronounced and make association with words and picture. This is repeatedly done.

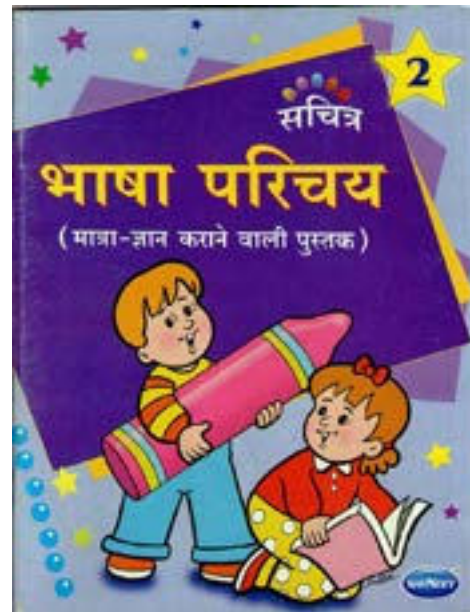
Words are written and copied several times to make child understand the word formation. Children are told to write and discuss the conjuncts when they are new to them. Formation of those conjuncts is very less know.



Rashtrabhasha Rachana



Hindi Balbharati Std. 1:
By reading and discussing about the picture containing conjunct, guess and tell activity.



Bhasha Parichay - 2:
Different kind of conjuncts are shown and their use in a word





Rastrabhasha Rachana: Children have to look into conjuncts and write them by copying it. Here the activity is to only copy and write the above seen word.

संयुक्त अक्षरों को पहचानें और लिखें।

 डुम्री डु	 बच्चा ब	 कुत्ता कु
 रस्सी र	 अम्मा अ	 बिल्ली बि

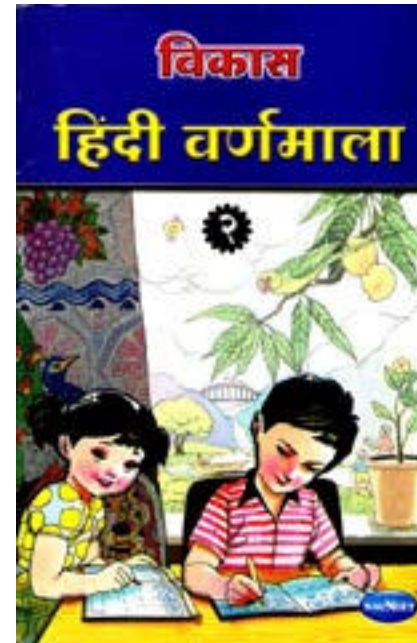
शब्दों को लिखें :

सम्परा	डुम्री	रस्सी	रस्ता	कुत्ता	बिल्ली
अम्मा	बच्चा	कच्चा	पप्पू	कित्तूर	कश्मीर

देखो और लिखें :

म	म्	प	प्	त	त्	थ	थ्	द
---	----	---	----	---	----	---	----	---

कुल 10 अक्षर - 10 (10)



Vikas Hindi Varnamala - 2: Look, learn and writing activities

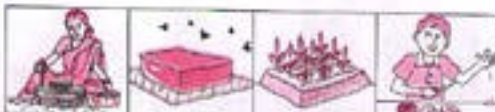
संयुक्त अक्षर

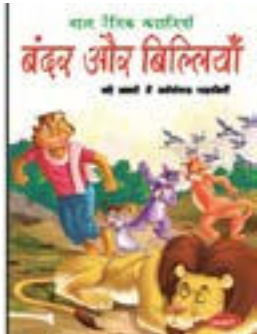
सीखो और लिखें :

क + क = कक	कक	
क + ख = कख	कख	चकड़ी
क + ल = कल	कल	मकड़ी
क + श = कश	कश	भक्ति
क + र = कर	कर	कटो
क + थ = कथ	कथ	शुक्र
क + त = कत	कत	शमा
क + म = कम	कम	गकरी
	कम	जकम

पढ़ो :

(१) मैं मकख पीकरी है। (२) ककरी में कपड़े हैं।
 (३) मकखन पर मकखो जकरी है। (४) कतने से कत मिककता है।





Through telling stories
Looking at books and discussions

Word cards: By making word cards with
word & picture - word picture relationship

On signs in environment.



Use body language in songs, stories &
in everyday activities.



Online games for learning English language:

Falling Clouds:^[4]

The words fall down in the form of cloud, and there is a timer running. Player has to pick a word and arrange them grammatically correct to make a correct sentence. If the arrangement is correct they will disappear, if they don't, there will be a pile of clouds. As the pile increases and reaches the top, you lose the game. Every-time player has to pronounce the sentence and check if it is correct and arrange accordingly.

[4]<http://gamestolearnenglish.com/big-describer/>
www.quick-n-ez.com

School

Insights

KENDRIYA VIDYALAYA, POWAI, MUMBAI
Mrs. Gulbahar Ma'am

Similar sounding words are taught together, when a conjunct come across a word, then and then only it is taught. No new specific teaching method. Sound plays a very important role while teaching a new script. When a new letter or word is taught, it is pronounced many times so that the child remembers it well. Repetition, reading aloud each and every word and letter in that word, writing them by copying are the activities frequently practiced in schools.

ABHINAV PRIMARY SCHOOL, GOREGAON,
MUMBAI

Similar sounding words are taught simultaneously as the child can associate them well. Wrong conjunct construction are important too. Use of different words to tell what is wrong and what is correct.

JOG PRIMARY SCHOOL, PUNE
Ms. Manisha, Ms. Ashwini

Writing conjuncts again and again is practiced, letters are taught according to sequence of '*Varnamala*'. When a child learns a conjunct, if wrong and correct conjunct is compared with each other, then only a child understands it better. We make children read aloud each and every letter in a word. And when a conjunct comes across the word, they get jumbled at first but we teach them the pronunciation of that letter along with its visual form.

BALSHIKSHAN SCHOOL, PUNE

Use of correct and wrong flash cards to choose correct conjunct used in a word.

SHREE SARASWATI NEW ENGLISH SCHOOL,
MIT SCHOOL, PUNE, Mrs. Sonali Singam

No specific new method, writing, reading them aloud, they only taught when they come across a lesson.

PRAGATI DEAF SCHOOL, DADAR, MUMBAI
Mrs. Shubhada

It is taught as it taught in textbook, after teaching children are told to read it aloud repeatedly.

GYANGANGA ENGLISH MEDIUM SCHOOL, PUNE.

Wrong conjunct construction is important too to teach correct ones.

NEW ENGLISH SCHOOL, PUNE
Mrs. Mugdha Umarg

Writing conjuncts again and again is practiced, this increase redundancy and make a child remember a conjunct in long term memory.

Conclusions:

"Currently NO NEW METHOD for teaching Conjuncts"

90% Conjunct teaching is done by writing and pronouncing them repeatedly.

70% Wrong conjunct construction is important too to teach correct ones. They are taught only when they come across in a lesson.

40% Similar sounding words are taught together, when a conjunct come across a word, then and then only it is taught.



**Abhinav Shikshan Prasarak Marathi Medium
Pre primary School, Goregaon East**

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.



Prof. Mukund Gokhale

Devanagari script follows 5 by 5 matrix pattern in a 'Varnamala'. According to which, every letter has a specific sound. They are grouped in 'Varnamala' according to sound. Hence, each letter is pronounced in a specific way.

Conjunct 'Ra' has four forms when it converts into conjunct, each has its own peculiarity. When it is pronounced firstly, it takes the form of 'Rafar', another is 'Rakar'.

Currently children hardly know correct information about different conjuncts, their formation, how they change form when they combined together to form conjuncts. To give correct knowledge is very important. In current school textbooks, if one conjunct is not used, it is directly excluded, and if one conjunct is frequently used, it is added with no history. So because of this, a child many not know the proper know knowledge of letters and conjunct in a language.

Sound plays a very important part while learning any kind of letter, language or conjunct. When a child is born, he first hears a sound. Then later a script associated with that sound, is taught.

This tells me, there should be some introductory level or information or practice level which gives me some introduction of few conjuncts at least.

Pragati Deaf School - Dadar (W) Mrs. Shubhada ma'am

There is no specific activity or exercise specially conducted to teach conjuncts to children in deaf school. As a lesson proceeds in teaching, if some conjuncts come across, it is them taught to them by dividing them.

There are two thing that are taken into consideration which are speech memory and visual memory. In speech memory, a child is taught a letter or a word by make her say it repeatedly. By saying it again and again, the child remembers it. In visual memory if a letter or a word is drawn and shown to her again and again, then she creates a visual memory in her brain and tries to remember that form. So when in future if again that form is shown to that child, she remembers it from by visual memory.

Story which will be built for this game should be constructed should be interesting, some story which engages kids and make them feel more to play. If the thing are used that exists in reality, then a child would relate it more.

Mistakes:

A child do make mistakes when a conjunct like 'ra' comes in use. As there are three forms of conjunct 'ra', they apply it according to their understanding, proper form is very used.

- 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.

The Importance of Play:^[5]

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.

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

इनिशियल कॉन्सेप्ट

INITIAL CONCEPT

1. By different category names like Fruits, Flowers, Animals, Birds, Vehicles, etc.
2. Similar sounding names,
3. Number of consonants in a conjunct word,
4. In sequence of letters 'Varnamala',
5. By constructing a story,

Level: 1

Select one of the categories among the 4 categories. These categories will be names of fruits, flowers, vehicles names, colour names. At the end of the game, player will know a specific number of fruits, etc. As the player will select one category, he/she has to play to complete that task. For e.g. if fruits is selected, the aim is to make a complete basket of fruits. We will see one example as below:

1. Four categories will appear for which the game has to be played. Inside those more names of those categories will appear. Player has to select any 1 category to proceed in the game.
2. Select the category for which the game has to be played. Here 'Fruits' is selected.





अ	ए	क्
ल्	आ	इ
ऐ	ले	ओ



अ	क	
ए		
ल्	आ	इ
ऐ	ले	ओ

- Letter-form chart option will be visible and a blank box below the picture will appear. Letters will have addition sign on top left of the box to indicate addition when two letters come together.
- Player has guess the name of the picture and start forming the word. For this, he has to pick any one letter drag and drop in the blank box above. Sound will be heard of that picked letter.



क

अ	ए	
ल	आ	इ
ऐ	ले	ओ


5. If the answer is correct, the letter will sit in that box and will indicate blue in colour.



क आ

अ	ए	
ल		इ
ऐ	ले	ओ


6. If the answer is wrong, when it will come near the blank box, it will indicate red and sit back again in the panel below.



क ए

अ		
ल	आ	इ
ऐ	ले	ओ

7. In the same manner, the rest of the game has to be played. Moves can be restricted..




के

अ

ल् आ इ

ऐ ले ओ

8. The answer here is correct so indicated in blue colour. In the same manner, the rest of word is formed.



केला

अ

इ

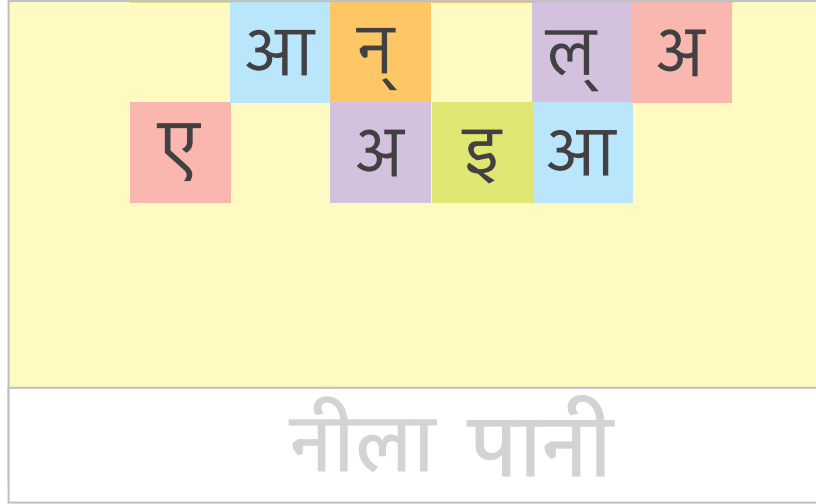
ऐ ले ओ

9. When the word is complete, it is indicated by yellow border around the picture. And complete word will be heard.



केला

10. It gets fit in the fruit basket. And thus, as the game proceed into completion, the basket gets filled.



Level: 2

There will be a story which the game will be built. According to the story, some words will be blank or grey and player had to complete those words and complete the story.

STEP 1:

Letter-form will start falling in a specific duration from above. A word has to be constructed by choosing these letters.

STEP 2:

Start picking correct letters and drop in the box below. In the same manner the word will be formed. Picture related to that word will be shown. Thus when the sentence is completed, the whole picture in the story gets revealed.

ई	न्		ई		ए
	आ	न्			अ
ए		अ	इ	आ	

नीला पानी

	न्		ई		ए
					अ
ए		अ	इ	आ	

नीला पानी



नीला पानी



नदी का नीला पानी था |

पेपर प्रोटोटाइप टेस्टिंग



रस्सी



नीला
केला
गुलाब
रस्सी

राष्ट्रभाषा

User: Abhinav, 8years, 3rd standard, KV School IITB

8 years old kid

- Sound played an important role. Every-time which playing, he pronounced each letter, and then piked the letter.
- Sometimes, picture name was know to him of difficult words, word reference was given to him to solve the task.

- This conjunct was completely new
- Was difficult to pronounce
- Its formation was not know



टेस्ट फॉर चिल्ड्रन

TEST FOR CHILDREN

Task was given to children of Standard 2nd to standard 6th, i.e. age group of 7 years to 11 years.

**Three levels were designed:
Total number of children = 20**

This test was conducted to know how much knowledge do children have about Conjuncts? What difficulty they face? What are known Conjuncts to them and what are not?

Observations:

Kids from standard 2nd or 7 years old were hardly knowing anything about conjuncts. So which made me clear that the users for this game should be 8 years to 10 years old. As this game would not be a replacement for rote learning in the school, basic knowledge of conjuncts is necessary. In few schools, conjuncts are taught academically in 2nd standard but in most they are not.

There is always being confusion about the conjunct 'ra'. As it takes different form when it forms conjunct, children do gets confused while forming them. There should some activity or clue where his confusion can be sorted.

When there is conjunct of three letters, it is difficult to understand at the first place. So gradually, level-wise conjunct formation can be increased.





A test solved by a user

PART: 1

त्व = +

PART: 2

प + र् =

र् + म =

ट् + र =

क्ष = +

क्त = +

PART: 3

ष्ट्र +

क + ऋ =

अंग - ड न

PART: 1

Solved correctly by: 17/20

PART: 2

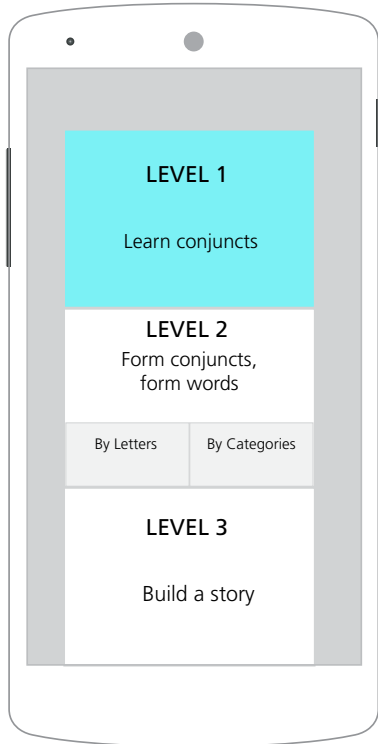
Solved correctly by: 10/20

PART: 3

Solved correctly by: 4/20

Conclusion:

- Conjuncts formed by letter 'र' created confusion. How forms changes in according to letter-form it is a confusion to them.
- 'Akhanda' were not solved correctly. Few forms looked like a single letter, for e.g. here form 'क्त' looked like one letter 'क'.
- Three letter conjunct was new to many users.
- When users get stuck at a point to solve, they tried to pronounced single letter and then try to solve them. By this, sound plays an important role was known.
- When conjunct takes new form (Akhanda) was very less known.
- By this test even wrong answers were known which confuses kids and so this formations later can be used for the game too.



Three levels to start with. Level 1 to learn conjunct. Level 2 to form conjuncts by *Varnamala* or by category. Level 3 to build a story.



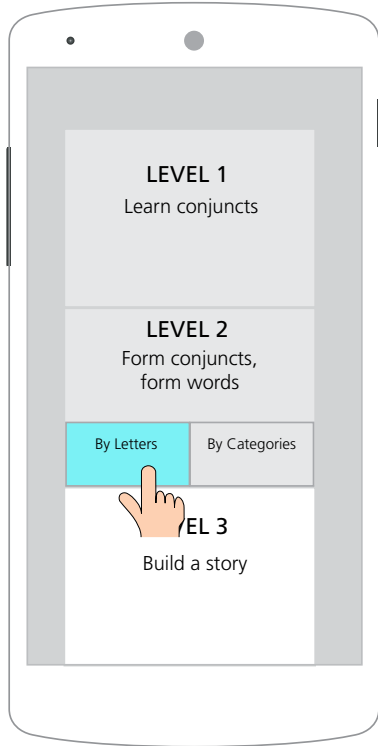
Level 1: User has to select one of the option to know correct answer. After clicking one, if the answer is wrong it will indicate.



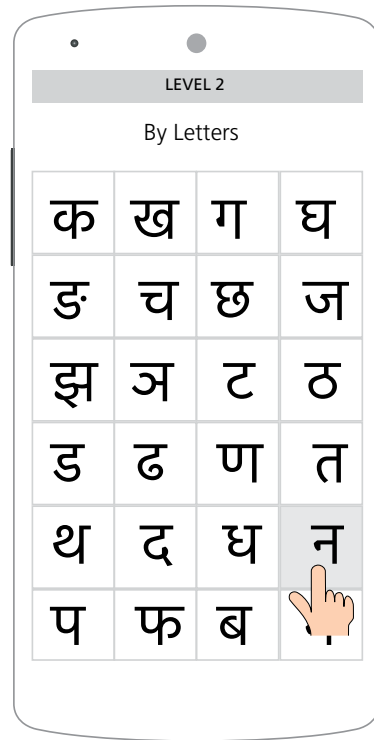
Level 1: If the answer is correct, it will indicate so. And even after two options, if the answer is wrong, it will automatically show the player the correct answer.



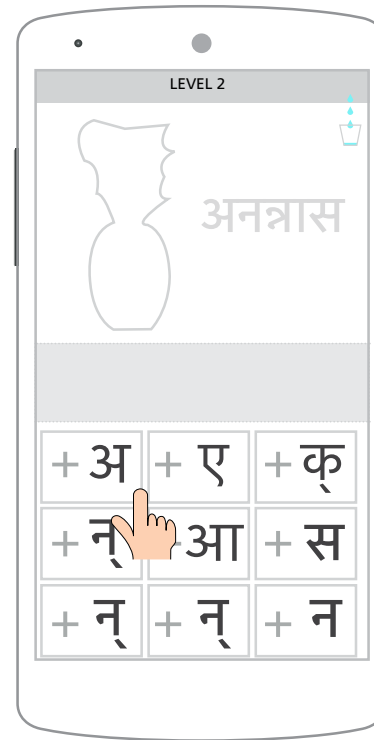
Level 1: Solved conjunct among six conjuncts. Selecting next conjunct to solve.



Level 2:
Form conjuncts by Letters



Level 2: Selecting one letter to play that conjunct related word. Letters are arranged according to *Varnamala*.



Level 2: Object for which the game has to be solved in outline. A panel in which selected word will appear and different letter buttons.



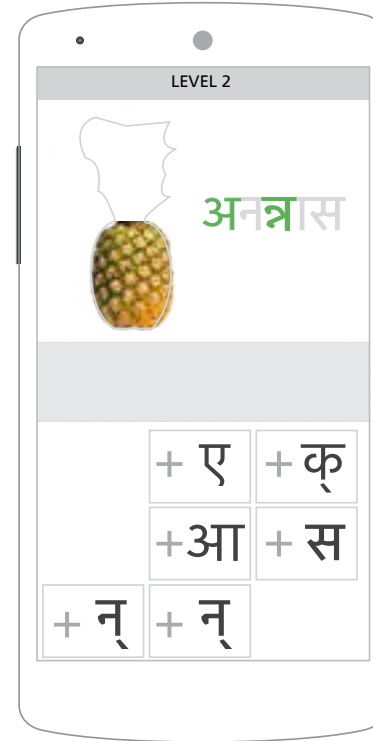
Level 2: If the selected letter is correct, it will indicate correct in the panel.



Level 2: A part of picture will be visible which will indicate a part of word is solved. As the word will be solved, it will complete the picture too.



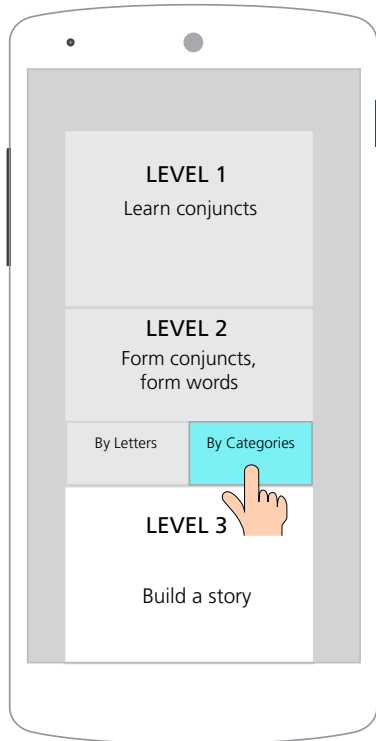
Level 2: Indication of wrong conjunct in the word. Even sound will be audible.



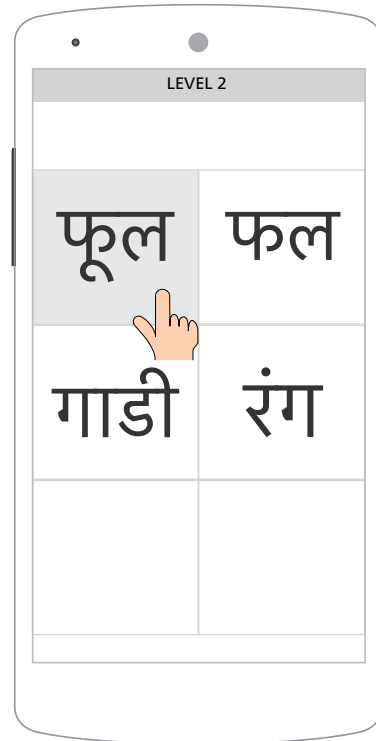
Level 2: Two letters are solved therefore, half the fruit picture is visible.



Level 2: Completion of whole word and the complete picture of pineapple is visible.



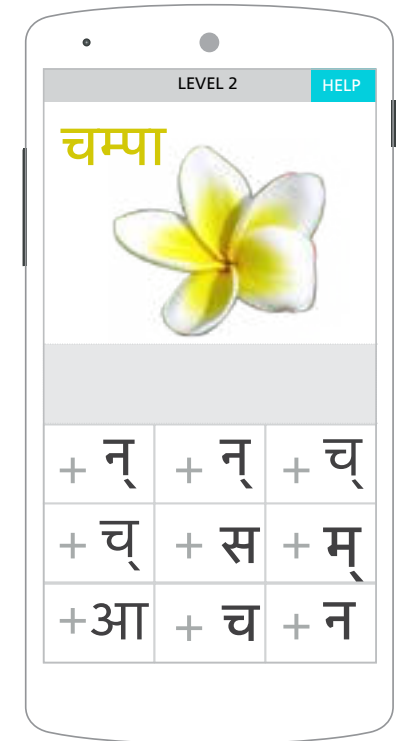
Level 2:
Solve letter by category



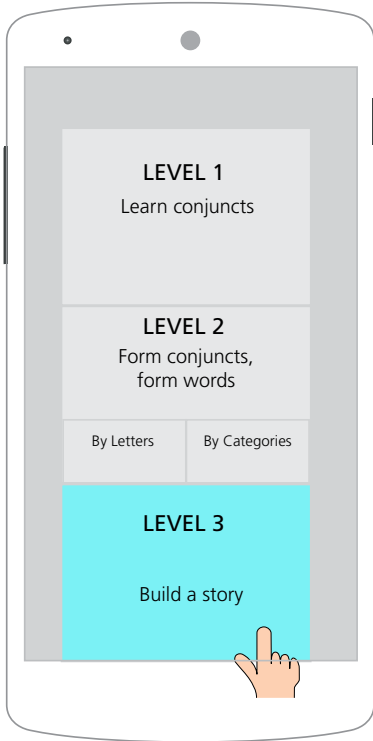
Level 2: Four categories will appear. Player has to choose among one



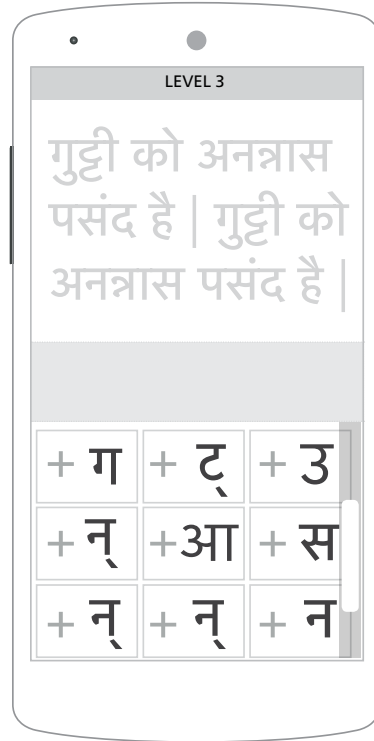
Level 2: The task will be to create a complete flowerpot. i.e. to solve all words of flowers to make flowerpot.



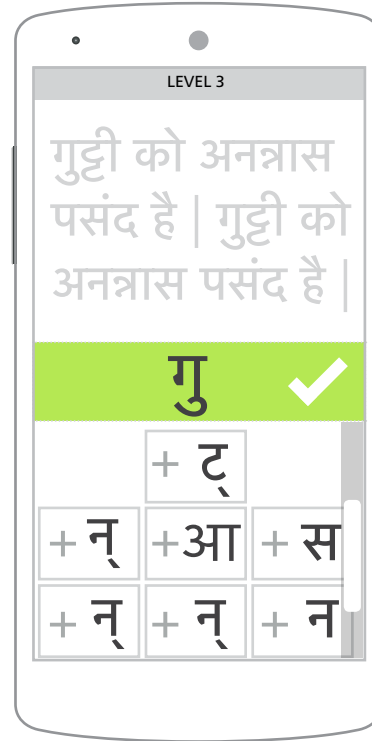
Level 2: Same panels and buttons as done in 'By letters' category.



Level 3



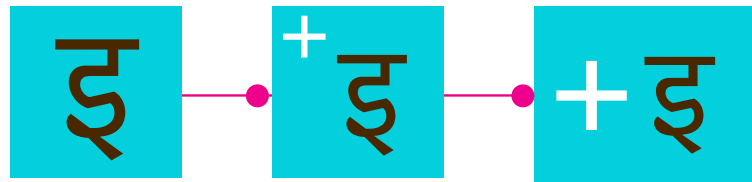
Level 3: A story will appear indicating unsolved. Only conjunct related words player has to solve to complete the story.



Level 3: Indication of correct solved.



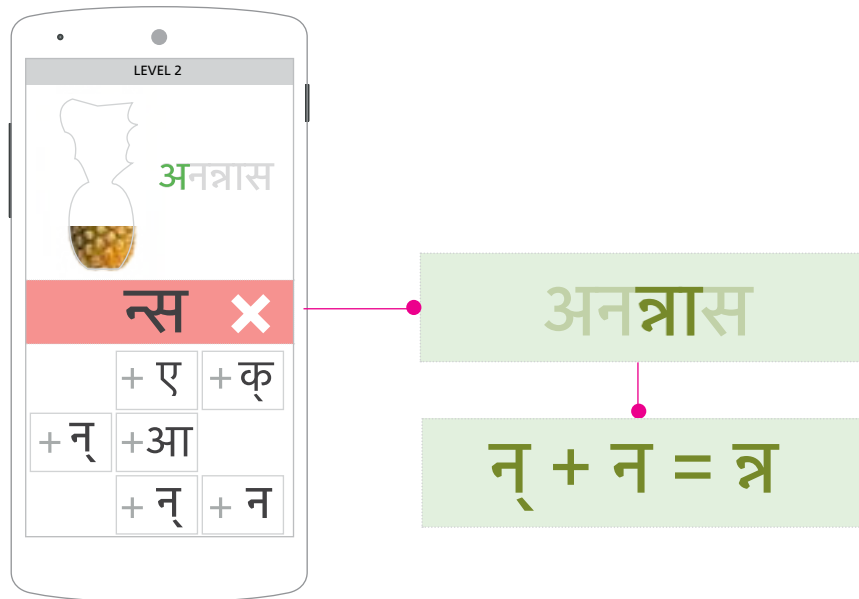
Level 3: After the words are solved, picture related to that sentence will appear.



Features

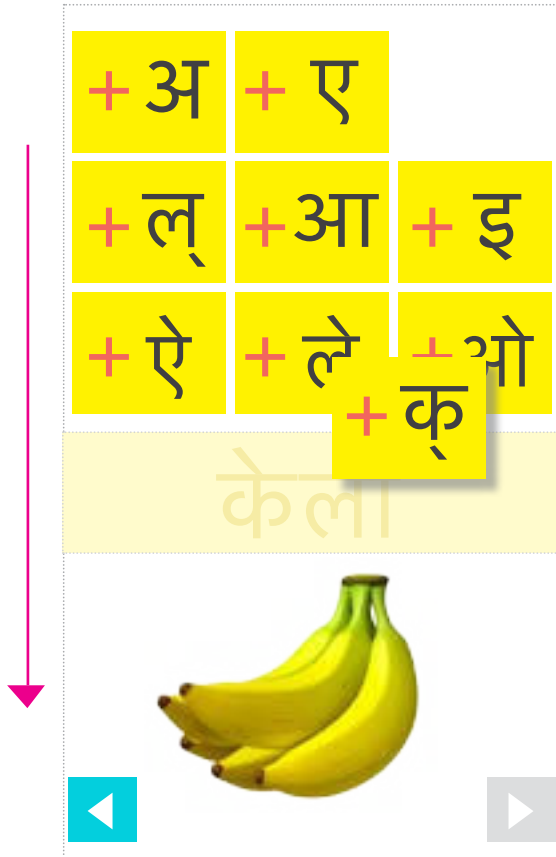
The button feature:

The button initially had only letter-form, but addition sign was needed because there would be always an addition to a letter-form to another. But in next step, the plus sign didn't gave a clear idea of addition. As the addition is important, the plus sign was given equal importance compared to letter.

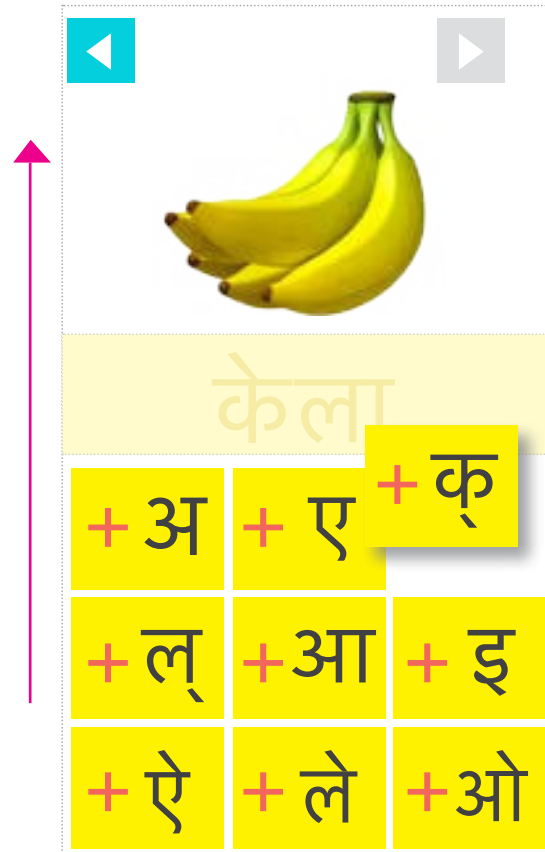


The Conjunct solving panel:

The panel first had only a word which has to be solved. It was denoted in light colour. So when a letter is solved, that letter will get coloured to indicated that it is solved. But here, the process of forming a conjunct was missing. How the conjuncts are formed should be understood is very important factor in the game. So the panel was modified and when a letter is selected, it will appear in the panel. As the letters will be selected, the transformation will appear here and conjunct formation will be visible. But when there are more conjuncts in a word, it needs to be solved, both the panels are important hence, later both were part of the game.



Before



After

Why the interaction is this way where the picture is upwards and letters are below it?

Before the interaction of the game was; the picture is down and the letters are up. In this layout, player has to drag and drop letters down to form in word forming panel. In this layout, the player reads letters first and then the picture. When the game starts, the picture may covered up so the reference of that picture becomes minimised.

The order of the game should be in this way where the picture identifying should come first then the picture word and the letter's panel in the last. Hence the change was made vice-a-versa.

फाइनल गेम

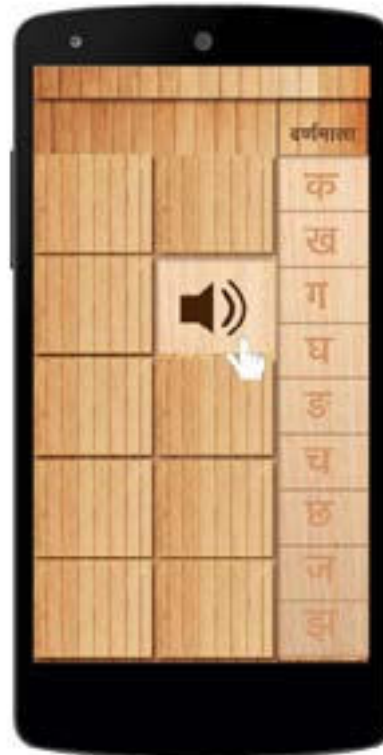
Version - 2

After iterating the game more, the final compilation of game is divided into three parts. In first, there will introduction of *Devanagari* script, in second conjunct formation and third application of the conjunct in words and words into sentence.

PART 1



PART 1: In this level, the tiles to the left are click-able. And letters to be solved on right hand side in sequential format.



When player clicks a sound will be audible.



Player has to tap on one more tile. A picture of a letter-form will be visible.



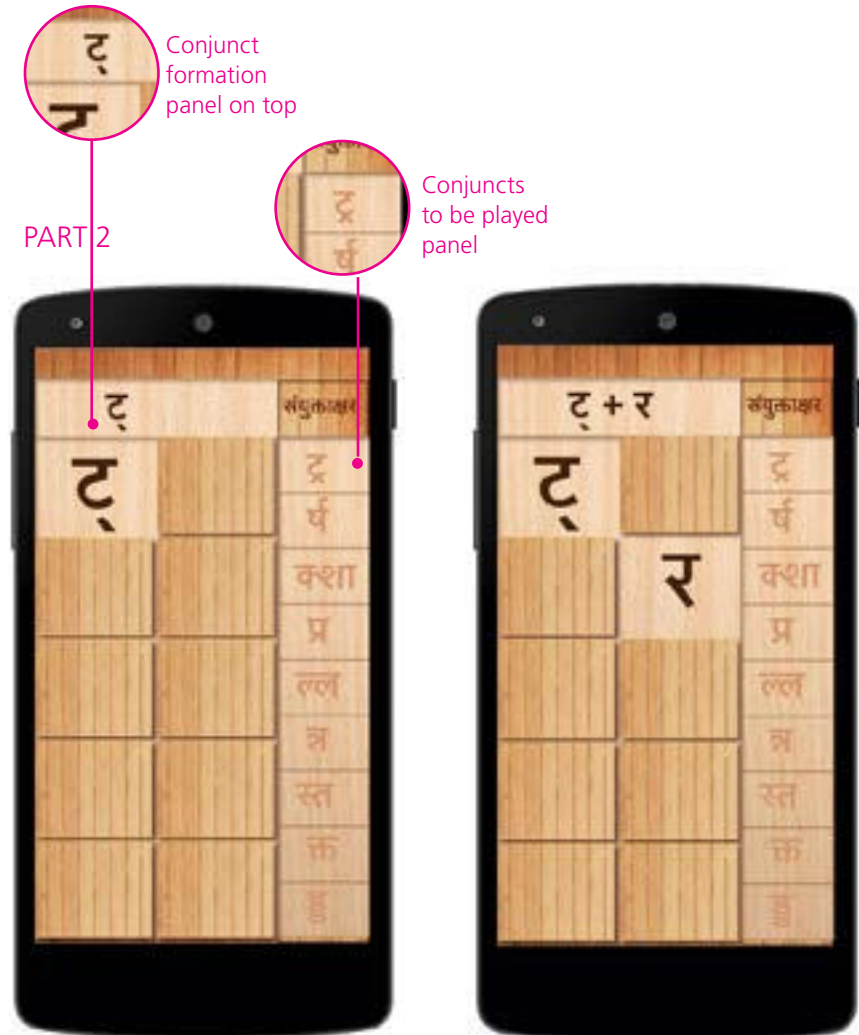
If both the sound and picture matches, it will indicate green.



After that letter is correct, it will sit in right hand side panel. And if the answer is wrong, after two clicks, it will indicate wrong the tiles will close back again.



In this same manner, player has to finish all letters, by memory player has to remember and select accordingly.



PART 2: As in part 1, player has to click on a tile, a letter-form will appear and sound too will be audible. As a letter is selected, it will appear in top panel.

The player has to click another tile. It will appear in top panel too.



Conjunct will form in top panel. If it is among one of the unsolved letters from right panel.



When the answer is correct, it will sit in side panel and indicate solved. Words related to that conjunct will appear in top panel.



On another two taps on tiles, those two letters will appear on top panel too.



It will try to form a conjunct. But if it is wrong, it will indicate it in red and tiles will close back again.



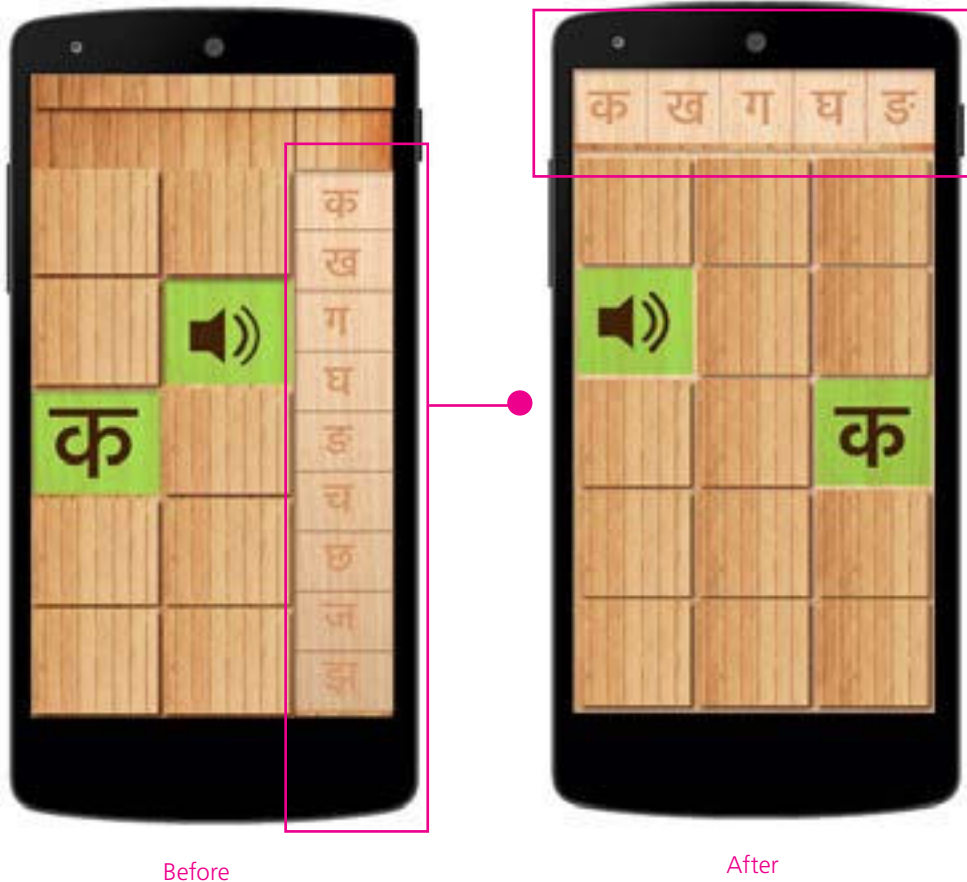
Option 1

Option 2

Transformation of part 1 of the Game from Option 1 to Option 2:

Option 1: In this format, a conjunct letter-form will appear, player has to choose the correct option. There will be four options below which will be clickable buttons. If the answer is correct, it will indicate correct by green and then next letter. If the answer is wrong, the answer will be vanished from that option. There will be only two chance to choose correct answer. If then too answer gets wrong, automatically the correct answer will appear.

But the problem here is child won't engage himself more in choosing the correct answer. Where as in Option 2, as we have seen the game-play earlier, he also has to remember the position, He will get to hear an individual letter-form. As sound plays an important part in learning conjuncts, it is very necessary to include sound here. The main purpose of this part of the game is to teach children unknown conjuncts. Many forms are not known to a child in conjunct format. These conjuncts will later be included in playing next part of the game.



Transformation of letters-to-be solved Vertical bar to Horizontal bar at above:

Initially the interaction of the game was in this way where the unsolved letter-form would appear in a vertical right-hand sidebar. The main tapping area was on left-hand side because of which, when the game is played that area may get closed and may be difficult to keep a track on what is solved and to be solved.

Where as in the new layout, all the letter-forms to be solved is on top bar. They are arranged in a horizontal manner. As the Devanagari script follows 5 by 5 matrix pattern. In this pattern, the letters are grouped as they are pronounced. There are different types of sounds which are grouped. For e.g. letter 'k', 'kh', 'g', 'gh', 'n' are pronounced from the sound made by the throat. In such ways, there are different categories which are sound made by: hard palate, soft palate/velum, teeth, lips, nose, etc. Hence, the change was made and it will be easier for a child to learn a script as it is originated.

After these five letters are solved, the next five will appear. The top bar would be letters-to-be solved and below is the tapping area. By this layout tapping area too gets a bigger area.



Solved letter 'Ka' sits in Top panel indicating in blue colour which denotes letter-form is solved.



All the five letters solved indication and five tiles extra below.



After solving first five letters, next five will appear below.



The letters panel will have a drop down after they are solved. Once every letter-form is solved, user will see the whole 'Varnamala'.



In the same way, the next part of solving conjuncts layout also has been changed. It will be easier for child to continue playing in the same interaction.



Features



Option 1

Option 2

Why the Word Panel in the game is above Conjunct Formation Panel?

The visual order in the game should be in such a manner that every element in the game should justify its function and the position in which it has been placed. Here, first the story should be revealed, then conjunct word among that story needs to be solved and what letter is selected currently comes after that i.e. Conjunct formation panel.

In option 1, it is placed one above the other so the order is according to preference wise. Where as in option 2, it is placed side-by-side which confuses in order. Selected word will go in left hand side and word needs to be solved in right hand side. And if word is long, the point size may reduce and hence the readability. So, hence the option was the layout of the game.

PART 3



Selection of letter-form 'La' to form word 'Gulli' and conjunct 'Lee'



Letter 'La' appears in Conjunct formation panel.



As the selected letter-form 'La' is a part of word 'Gulli' it indicates green and stays back in the panel as the conjunct is not completed.



Selection of another letter-form i.e. 'Ka' here.



Those two letter-forms form a conjunct but as it does not exist in word 'Gulli' it is indicated wrong by red colour.



Another selection of letter-form 'La'.



Those two letter-forms form a conjunct & as they are part of the word 'Gulli' it is indicated green and stays back till the completed letter is formed.



When 'Li' is formed in conjunct formation panel, it is indicated that part of the word is solved. In this same manner, the whole word needs to be completed.



Indication of word completed shown by green colour.



Wherever the conjunct word was there, it is then replaced by a picture i.e. meaning of that word. Here there is picture of 'Gulli'.



In the same manner, a part of the whole story should be completed.



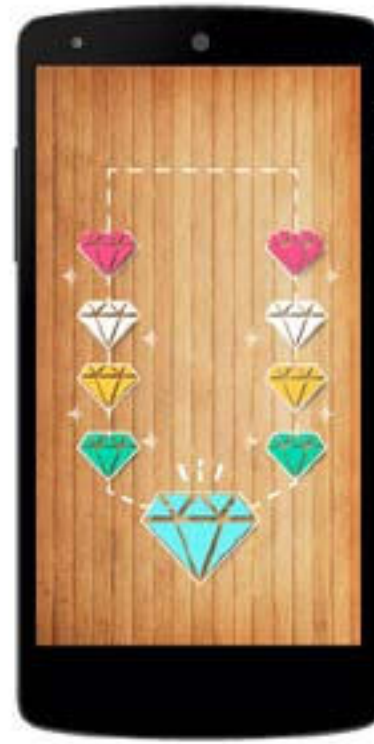
When a part is completed, a fairy will come and give a diamond. So the task is to collect all lost diamonds.



A diamond is added to the necklace. The task is to complete the whole necklace.



After one task is complete, the player goes to his next destination of the story.



In the same manner, the whole necklace is completed.



'Gulli' gets her diamond necklace and is happy and the game ends.

गुल्ली का हार

1. एक दिन गुल्ली के घर में हिरे की हार की चोरी हुई। गुल्ली रोने लगी। उसे रोते देख एक परी प्रकट हुई। उसकी मदत करने के लिए पारी ने हार के हिरे कहां कहां गिराये हैं उसका नक्शा दिया। गुल्ली खुश होकर आपने हार के हिरे ढूंढने निकल पड़ी।
2. उसे जंगल की तरफ जाना था। ऑटो रिक्शा में बैठके वो निकल पड़ी। ट्रैफिक सिग्नल लगाने पर गाड़ी रुकी। बाजू में देखा तोह क्या रस्ते के गड्ढे में मिले तीन हिरे।
3. वह जंगल पोहोची। चलते-चलते वर्षा होने लगी। तभी उसे एक ज़ोपड़ी नजर आई। वर्षा रुकने तक उसने विश्राम किया। जैसेही वो निकली उसके पैर में कुछ लगा, और उसको मिला एक हिरा।
4. आगे नर्मदा नदी आई गुल्ली को नाव से नदी पार करनी थी। पार करते ही उसे अनत्रास का खेत दिखे। चोरोने उधर से अनत्रास अधूरे खा कर छोड़ थे। उधर ही मिला और एक हिरा।
5. वो आगे चलते गयी। उसे एक रस्ता नजर आया। उस नक्शे के अनुसार वह रस्ता रेल्वे स्टेशन जाने वाला था। अमृतसर जाने वाली ट्रेन से चोर भागने वाले थे।
6. गुल्ली भागते हुए गई और पुलिस को फ़ोन मिलाया। पुलिस की मदत से चोरोको पकड़ गए। गुल्ली को सारे हिरे मिले और चोर को पकड़के राष्ट्र की सेवा करने के लिए पांच लाख रुपये इनाम भी मिला।

Story for the Game:

- The story is narrated in such a way that it engages a child and makes a child curious about playing.
- The task was to completed a diamond necklace by bidding all diamonds in the necklace.
- To collect each diamond, player has to complete a story. In that story conjunct related word will be missing.
- As the player will play and solve conjuncts, gradually story will complete and the necklace will be completed by diamonds.
- The story is divided into six parts. After each part is solved, there will some reward, and then the next part will appear.
- As the story ends, game ends.

फ्यूचर स्कोप

- As this includes sound, a hearing impaired child may also benefit from this game. 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.



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Rashtrabhasha Rachana
Devanagari Lipi: Chinhachi Shastri Olakh Aani Paribhasha,
---by Prof. Mukund Gokhale
Lihave Netake : 1 ---by Madhuri Purandare
Lihave Netake : 2 ---by Madhuri Purandare

Font Families

Kohinoor Devanagari
Frutiger LT Std
Fira Sans OT

थैंक यू :)