

Tool for  
**Foreign Nationals**  
to Learn  
Sentence Building in  
**हिंदी**

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# Declaration

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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.

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A handwritten signature in blue ink, appearing to read 'Shubhangi', with a horizontal line drawn through it.

*Shubhangi*



# Approval Sheet

The project titled 'Tool for Foreign Nationals to Learn Sentence Building in Hindi' by Shubhangi Salinkar, is approved for partial fulfilment of the requirement for the degree of 'Master of Design' in Visual Communication.

Guide

Chairperson

Internal Examiner

External Examiner

Date: 24-05-2015



# Acknowledgement

I would like to express my sincere gratitude to  
Prof. Anirudha Joshi for his support and valuable guidance  
throughout the project.  
The faculty of Visual Communication, IDC, for their constant  
feedback and support.  
My friends and family, for being my support throughout.  
Maria, Devi, and the others for their valuable inputs and for  
referring me to contacts.  
And everybody else who helped me along the way.



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# 1. Abstract

Over the past years, more and more people of foreign nationalities are moving to India for purposes other than tourism. In order to feel integrated with the local culture, they often find it necessary to learn the local language. Hindi is widely spoken as either the first or second language across North, Central, and some parts of Western India.

English-speaking foreign nationals face many difficulties in trying to learn Hindi. One of the major difficulties is that the grammatical structure of Hindi is very different from that of English, making it difficult for them to pick up the language, without learning the Grammar. Grammar is essential when it comes to sentence-building – It defines the rules with which words come together in a sentence.

The identified problem was that the users found it difficult to build sentences with the vocabulary that they had learnt – or might learn along the way.

The objective of the tool was to come up with a sentence building tool that would help learners

internalize grammar rules. Along with building sentences, learning another important skill required by the users - speaking - was also a part of the tool.

A learning environment called 'Jodo' was conceptualized. 'Jodo' means 'join', in Hindi, and it reflects the core of the tool – learning to join together grammatically accurate Hindi sentences. The focus of the tool was Hindi grammar, but the aim was to deliver it to the user by masking as much of the actual grammatical terms as possible. The Hindi skills in focus were: Listening (supplemented with reading transliterated text), and Speaking.

The learning in 'Jodo' is divided into 7 levels – With an increasing level of grammatical complexity. Each level is divided into three stages:

Learning: Where the user learns to internalize Grammar rules in sentence building through reading, listening, and exploration.

Dialog: Where the user practices speaking simple sentences. The goal of the dialogue stage is for the user to overcome the speaking

barrier, and practice simple pronunciation and sentence building.

Test: Where the user plays a small game, which is like an exercise. The goal of the Test stage is to re-enforce the learning goal of the current level, revise the learning in the previous levels, and test the user's ability to build sentences or word phrases.

Three levels of Jodo were evaluated with the users. It was found that the users picked up sentence structures easily enough, and learnt to build grammatically correct sentences within the limitation of the vocabulary known. They were also able to carry out a simple, impromptu conversation with a local.

## 2. Introduction

Hindi is the second largest spoken language in the world. About 41% Indians speak Hindi as their first or second language. [1] [2]

In the past years, more and more foreign nationals are migrating to India for purposes of academics, work or personal reasons. They move to India for longer durations as compared to tourists - anywhere between 3 months to several years – and make a life here. Without knowledge of Hindi, they find it difficult to integrate themselves into the local culture. They are also treated as outsiders, or as tourists. They may face difficulties in communication at every step while living their day-to-day lives - while commuting, shopping, eating at restaurants or while talking to people.

The target users identified were English-speaking foreign nationals who have lived in India (or plan to do so) for a period of more than three months.

There is a dearth of quality resources to learn Hindi. The project started with intent of making a tool for foreign nationals to learn the

Hindi language.

Hindi and English are 'far' languages, which makes learning Hindi a daunting task for English-speaking foreigners, as opposed to a more 'near' language, like say, German,

Italian or French. Near languages share more similarities in pronunciation, have several loanwords, have a familiar tone, rhythm, and intonation, may share a similar script, and may have a similar grammatical structure, than far languages.



source: <http://www.mommysavers.com/frugal-foreigner-auto-rickshaw-ride/>



A user study was conducted to understand the exact needs and motivations for the users to learn Hindi. It was found that the most important area where the users faced problems, was sentence building. Though they were familiar with individual words and phrases, when it came to constructing whole sentences, they were often clueless.

Grammar is the syntax that is used to construct sentences in a language. Hence, a detailed study of Hindi Grammar in the context of sentence building was done. The design process was carried out along with the grammar study, and design ideas were drawn from the structure of the grammar itself, put together with the user study.

A level plan was built, consisting of grammar modules, and a tool which would help users internalize the grammar was designed. The tool focused on the most important skills required for conversation - Listening and Speaking.

### **Design Process:** **Background Study**

A background study of existing tools for foreign language learning was done. Principles adult learning were studied, and how adults acquire second languages.

### **User Study**

A user study was conducted to understand the exact motivations, needs, and requirements of foreign nationals living in India. The users faced a number of challenging experiences with

the language. Some users who had made an attempt to learn Hindi, were closely interviewed and a more detailed study was conducted with them with regard to their exact challenges.

### **Content Analysis**

The various aspects of the Hindi language were studied, and it was decided which ones must be reflected in the design of the tool. A focused study of Hindi grammar in the context of sentence building was done, and a level plan and syllabus for the tool was fixed at this point.

### **Ideation and Final Concept**

Along with the grammar study, ideation was carried out as to how to make learning sentence building and grammar intuitive to the users. A method for visualizing sentence dependencies was conceptualized, and the subsequent ideation involved mapping it to different grammar levels and concepts.

### **Execution and building of a prototype**

A level plan and a workable digital prototype was built with an intent of testing the logic of the tool.

### **Evaluation**

The prototype was evaluated with the users on two aspects : Engagement and Learning, with the evaluation goals in place.

# 3. Data Collection

## 3.1 Literature Review

Steven Krashen [14] separates language acquisition from learning, stating that acquisition is more like the method in which a child learns a first language, naturally, by immersion. Acquisition is, in essence, unconscious learning – The users learn without knowing that, they are only aware that they are understanding input. However, this unconscious, immersive learning (acquisition) is difficult to achieve for a ‘far’ language like Hindi – It would require a lot of exposure, time, and dedication on the part of the learner. Jodo’s grammar-learning approach actually moves away from the immersive acquisition approach – But it was deemed necessary for this user group. The Natural Order Hypothesis states that acquisition of grammatical structures of any particular language follows a predictable order. This order may be different for each individual, but there are clear statistical similarities. Though Krashen clearly states that this is an order for acquisition, an attempt was made to build such an order in the learning content as well. Krashen’s Input Hypothesis says that for an

individual to ‘learn’, he/she must be supplied with an (i+1) level of input, where ‘i’ is a grammatical/vocabulary level the user has already acquired. Only when they understand the content of (i+1) using i, will they begin to acquire the grammatical structures in (i+1). This hypothesis puts a lot of faith in how adults learn – in the contextual processing that adult brains have. This made it permissible, necessary even – to introduce unfamiliar structures in bits and pieces, where required. Indeed, when characters in the final concept speak, they need higher(i+1) structures for expressive communication many a time – and they have been used.

Besides, specific principles that govern how adults learn, had to be referred. Knowles[3] identified six principles of adult learning, the first of which states that adults are internally motivated and self-directed. Language learning, in itself, is a tedious task, and requires a motivated learner. Throughout the project, the motivation of an adult, given relevant, useful content, is taken into consideration. Other principles state that adults are goal and

relevancy oriented, which would mean the learning material also, must follow the same principle.[4]

## 3.2 Introduction to User Study

A qualitative user study with 14 adult foreign nationals was conducted. The aim was to understand the following:

- Motivations for foreigners to learn Hindi,
- Hindi skills and proficiency required for the user’s needs
- Problems faced by users who had attempted to learn Hindi

This, along with the background data collection, led to identifying a syllabus for the Hindi Learning Tool.

The method of user study followed was to conduct detailed interviews in person/ over the phone with English speaking foreign nationals who had had an experience of living in India for at least 2 months.

Their reasons for stay in India mostly fell into the following broad categories:

- Professional
- Academic
- Personal

Based on these reasons, (along with the duration of their stay) the user's experiences and motivations to learn Hindi varied greatly.

### User Criteria

Adult English-speaking foreign nationals were interviewed. The only criteria was that they should have medium to high proficiency in English (whether they had learnt it as a first or a second language) and that they should have stayed in India for more than 1 month.

The foreign nationals interviewed were from the following countries: USA(4), Sweden(1), Germany(6), Singapore(1), Mauritius(1), France(1).

Based on duration of stay, two distinct types of Hindi requirement was observed:

### Hindi to meet Immediate Needs

Foreign nationals visiting for a time less than 1-2 months required a bare minimum knowledge of Hindi to get their immediate needs met.

This knowledge took care of their immediate needs, like taxis, shopping, restaurants, and emergency situations. This could be referred to as 'get by' Hindi.

### Hindi for Long-term Needs

Foreign nationals who stayed on in India for a longer time needed to learn to speak the language for purposes beyond their immediate needs, like communicating and interacting with the locals. Communication of thoughts,

activities, and expression in the target language required a much higher proficiency and a more dedicated approach towards language learning. These users also needed to have a capability of listening and understanding the native Indian speakers.

### Two Types of Long Term Residents:

**Type A** had stayed in India for a period of more than 3 months, had close Indian friends or had spent a lot of time with Indian people, knew some vocabulary, by asking and learning. Yet, when it came to expressive communication, they found it difficult to compose even a single new sentence(that they hadn't memorized) in Hindi. They resorted to English whenever possible, and relied on short words and phrases to get their needs met.

**Type B** had taken more constructive efforts towards actually learning Hindi. The major difference from Type A was that Type B had taken some effort to learn Hindi Grammar Structure and rules through some study material. This group found the language less intimidating, could easily comprehend quite a bit of what they heard, and could compose simple sentences with ease. Progressing to a more proficient level, for them, was a matter of further study and sufficient practice. They found it easier to gel with their Indian friends, understand their jokes and humor, and felt more at home in the country, and felt more integrated with the community.



source: <http://www.indiatimes.com/news/india/heres-what-the-world-tells-foreign-tourists-heading-to-india-and-its-scathing-230573.html>



## 3.2.1 Findings

### Sound of the Language

Almost all the users interviewed that one of the initial difficulties faced with Hindi was the 'Sound of the language'. New pronunciations, syllables, tone, rhythm, overall feel of the language all contribute to making the 'sound' of Hindi unfamiliar to foreign nationals.

### Desired Hindi Skills

More than 50% of the users interviewed wanted to learn only two of the four language skills- Listening and Speaking. They found it tedious to get into reading and writing, because of the unfamiliar script.

### Pattern Sentences

Users have been observed to memorize language patterns that they heard frequently. they often understood their meaning by context, and then used the same patterns in other situations. For instance, "लोकल आ रही है" | "अगला स्टेशन दादर है". They used these patterns to create other sentences, by fitting different words into the same pattern.

### Local's Response

The locals are delighted and respond positively Hindi been spoken. They are generally appreciative and helpful. Users who spoke Hindi to vendors and taxi/rickshaw drivers, found that there were lesser instances of cheating or quoting exorbitant prices for goods.

### Motivation

Users who belonged to Type A, were mostly observed to be foreign exchange students or people working in corporates and multinationals, living in metro cities. The

reason that they did not learn much Hindi was simply because they did not need to. Academic Environments, College Campuses and Corporate Companies had one thing in common – almost all Indians who the users



source: <http://humansofmumbai.in/page/4>



needed to interact with, had a medium to high level proficiency in English. The only time that they needed to resort to Hindi was when they needed to interact with locals for Taxis, Restaurants, Auto rickshaws, Shopkeepers, House-help, Security Guards, Workmen like plumbers and carpenters, etc. This communication again fell into the need-based category, and was very limited. The users could usually get by with gestures, individual words, parrot-learnt phrases, or with a help of an Indian friend.

### Hindi while Travelling

Such users reported that they actually felt a real need for learning the local language when they travelled to smaller cities, towns or villages across India. Even then, Hindi is spoken as a local language in central, northern and some parts of western India, and it is barely spoken in south India. Thus the utility of the language becomes even more limited.

### Diversity within Hindi

Hindi itself is diverse across diverse geography. Various accents, dialects, mixing with the local language of the state/city eg: Mumbaiya Hindi, results in a diversity which is very vast. Thus, even having learnt some of the language, users find it difficult to understand when locals speak.

### Influence of Other Known languages

Depending on the native (or other foreign) languages known, users observed varying degrees of familiarity with different aspects of the Hindi language.

One user, a native from Persia, had an easy time understanding spoken Hindi, due to its proximity with Persian, which is a close relative of Urdu. When it came to speaking, there was a definite problem with the pronunciation. Another user who was native Swedish, did not find the concept of grasping noun genders difficult at all – She knew a language structure where every noun has an associated gender – and anticipated it during learning and found it

relatively simple!

Another native German user who had learnt some Indonesian said that when she heard Hindi, her mind ‘switched’ to Indonesian and she tried to map the sounds and structure to that language –instead of English and German. A British user who had learnt some Kannada found it much easier to learn Hindi – compared to another who was completely new to all Indian languages. They went to the same Hindi



source: The Hinglish Project

learning class, and the user who knew some Kannada progressed much faster.

### Real Human Connections

The connections with native Indians, the interactions and conversations, are what make language learning enriching and worthwhile. This also provides a motivation for the learners to keep learning more. Users would be motivated, and would feel that their learning was of some value, only when they practiced the Hindi they knew with locals, and witnessed the results of the interaction.

## 3.2.2 User Study with Users who had Learnt Hindi

### Learning Material Used:

This group of users generally used some web-resources like scanned grammar textbooks, and supplemented their learning with watching tutorial views on Youtube, or consulting their friends for specific difficulties. Some users who tried to learn Hindi from such resources before they actually got to India, had a definite problem, because none of the resources available cater to a complete overall learning of Hindi.

### Pronunciation problems, double consonants, new sounds

All Hindi learners faced initial problems with pronunciation. New sounds of the letters क, त, च, छ, र, थ, भ, ध, ढ were sounds that were unfamiliar to them. Conjuncts those that in उच्चारण posed additional challenges.

### “Textbook” Hindi vs Conversational Hindi

The content learnt in textbooks was often out-of-date or irrelevant to conversational usage. Conversational Hindi is quite different from textbook Hindi, and it is full of slang, short-cuts to conjugations (eg: वो is used for both वह and वे, ये is used for both यह and ये), and moreover, this drift from text-book to real life Hindi varies regionally.

Hindi spoken in metro cities, with a considerable influence of western culture, is interspersed with English words, phrases, and sentences. The users need to be aware of this, and must know that its okay to substitute certain common Hindi words with their English equivalents: Eg: Train for गाड़ी /left/ right for दए बाए, and most of the common nouns. This would help them in more fluent and confident speech.

### Speaking Barrier

New learners of Hindi often faced a speaking barrier - they are not confident enough to start speaking in the new language. The unfamiliar pronunciations, the completely different 'sound' of the language - makes speaking a daunting task.

### Devanagiri Script

Devanagiri is a scientific and methodical writing system -It has a strong phonetic basis, with a character for every sound, and a sound for every character. Once the script is learned, it is easier to pronounce whole words. A learner can get to know how to pronounce a word simply by looking at its spelling.

However, script learning might feel tedious to those unfamiliar with it. Many learners want to learn the

language without going through the trouble of learning the script. But learners who do learn it, definitely progress faster and find it easier to speak what they learn, as they go.

### Transliteration

There are many problems associated with transliteration. English uses a combination of 2-3 letters to capture some sounds in the devnagiri, and the interpretation of the pronunciation after reading transliterated script might be different from the actual pronunciation. However, learning a new



script may not be on the cards, for some learners. Hence, transliterated content with full-time support of listening, may prove to be a good option.

### **Pronunciation**

Pronunciation is the way in which we make the sound of words. Pronunciations are important in comprehending and to be comprehended.

Even Type B users (i.e, who had taken some Hindi training), found it difficult to pick up what the locals were saying, because of their varied accents. Difficulty in pronunciation leads to difficulties in talking as well as listening. Pronunciation can be mastered by repeated listening AND speaking.

### **Grammar**

Grammar is the syntax for which words come together in a sentence. Knowing and internalizing grammar is important for building sentences and speaking a language.

Hindi and English are far languages - Hindi has its origins closely rooted in Sanskrit - while English belongs to the West Germanic Language branch. The two languages have significant differences in terms of grammar and syntax. The primary reason why it is nearly impossible for foreigners to simply 'pick up' Hindi by immersion, is this. The syntax for the new language needs to be formally learnt, to an extent, in order to make sense of the language patterns and to be able to construct properly formed sentences.[4]

Long term residents were often fairly good at vocabulary - they had a good idea of what things were called, and sometimes, of simple describing words(adjectives) and action-words(verbs). But they

found it nearly impossible to piece this vocabulary together in a sentence.

For this project, grammar with context to sentence building was focussed upon. More on this will be covered in the following sections.

### **Conversational Content**

The textbook approach and order of Hindi Grammar is often rigorous. (and thus tedious and de-motivating for a learner) The grammatical constructs and words required for having a (basic) conversation with a local are actually quite limited. Learners who learn this early on, find it easier to remain motivated, as they can use their learning in real conversations as soon as possible.



# 4. Existing Products for Language Learning

## 4.1 Duolingo

Duolingo is a free language-learning tool, and also a crowd sourced translation platform, that is offered in 11 languages, mostly European. It is not available for Hindi. [5] [6]

**Skills:** Equal focus on reading, writing, speaking and listening.

**Available for Hindi:** No

### Teaching Method-

Learning happens in levels, with progressively complex grammar, and vocabulary, learnt in stages. Each level has about 8-9 lessons. The lessons are composed of 4 types of exercises - translation from L1-L2 (Where L2 is the target language, and L1 is language known), listening exercise where the users type in what they hear, a matching exercise where they match an image with new vocabulary, and a speaking exercise where they need to speak out a sentence in the target language. Duolingo tracks progress through the levels, and gives users a gamefied experience of language learning. They get points called 'Lingots' for completing a lesson, and lessons can be repeated to earn more such Lingots. The lessons themselves are all exercise based, and the user is constantly challenged. There is no specific 'learning' phase, where users are given time to 'absorb' and

consciously learn a particular concept or content. Users can spend from up to 5 to 15 minutes on a particular lesson.

### Content :

Vocabulary is introduced in 'boxes', according to the need for grammar. There is no conversational component. No focus of language 'in use'. Sentences that learners come across are unrelated, and of little use for normal beginner's speech in the target language. eg: My snake eats your cake.

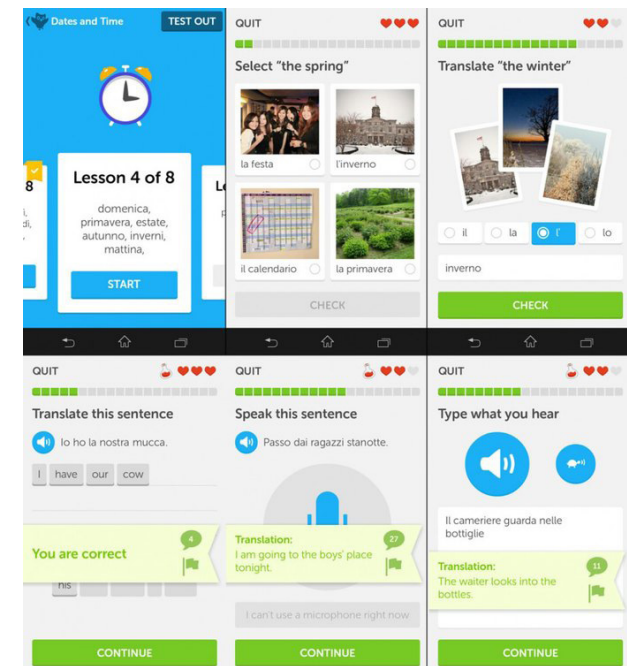
**Grammar:** Duolingo offers no explanation for grammatical rules, on the platform. This is unhelpful for users who want to know a broader reason and explanation of grammar sentences.

**Medium:** Web app and mobile app available.

**Language-specific-ness:** Method and content are not specific to the language being taught. The same model is mapped across languages, killing the exclusivity and cultural aspect of the target language.

**Engagement:** Users are constantly challenged due to the exercise format, and are motivated to beat their own high score. They can also challenge friends from other social media sites like Facebook

and Twitter, share their accomplishments, and earn points or 'Lingots'.





**Analysis:** Duolingo does a good job of engaging the user in the language learning process. Virtually no instructional 'learning' happens in Duolingo, and the user is answering questions from the first instant, and learning by getting the answers right and wrong.

Moreover, the level system and the system of earning 'Lingots' is definitely engaging. But the drop-rate for duolingo is quite high (reported 80%), which suggests that language learning can only happen if the learner is motivated enough - to learn the language in the first place.

However, Duolingo gives no grammar explanation or learning, to more interested learners. Its non-contextual and non-culture-specific content makes it drab.

Duolingo targets all four language skills equally - learning spellings in the target language, (writing) , may prove to be tedious. Some learners might not want to learn writing at all - which is why they might prefer other tools where writing is not compulsory.



**PIMSLEUR®**

source: Pimsleur

## 4.2 Pimsleur

**Skills:** Listening, Speaking, Reading

**Available for Hindi: No**

**Teaching Method:** Pimsleur uses 30 minute-long audio tapes, with dialogues, grammatical explanations, and a phonetical approach to reading.

At the beginning of each lesson, learners listen to a short dialogue of less than two minutes in the target language, of which they do not understand anything. The next half an hour is spent in dissecting that conversation, and analyzing its different components, pronunciation, and meaning. The mode is instructional, and pauses and gaps in the audio are provided, where the users are encouraged to repeat what they are listening. Courses have a separate reading component, where the users are taught how the sound system of the new script works, and how the letters combine to make new sounds in the target language. [5] [6]

**Content :** Relevant, conversational component with native characters are personas.

**Grammar:** Grammar is covered in context to the conversation, words and phrases included in the conversation clip.

**Medium:** Audio Tape.

**Engagement:** Users are motivated the instructional audio course, and learning is quick

and guaranteed and quick of the learner spends 30-off minutes on each tape regularly. This itself is a motivator. There are no added 'frills' for keeping the user engaged.

### **Analysis:**

Pimsleur's audio-immersion approach is worth noting. It supplements the pattern sentences' finding in the User Study section, which states that user's learn a lot - only by listening and internalizing. Pimsleur's teaching method does not rely on reading OR writing - and is proved to be effective.

The final concept of this project makes use of listening, supplemented with reading, at all places - a method that goes a step beyond Pimsleur, as it provides reading as a support to listening - and eliminates writing altogether.

The conversation-centered approach is also one of Pimsleur's merits - there will be no sentences that don't make sense in the context of a real conversation. However, in order to teach grammar rules within a limited vocabulary set, and with a more grammar-oriented approach. this becomes difficult to achieve completely.

## 4.3 Rosetta Stone

A computer-based learning method that uses visuals and a completely immersive methods, where the method has no material and communication in the first language, only the target language.[5] [6]

**Focus:** Reading, Listening, Speaking, Writing - equal emphasis.

**Available for Hindi: Yes**

### Teaching Method:

This method uses images, text, sound and videos to teach words and grammar. Rosetta Stone calls its method 'Dynamic Immersion', where users learn L2 without the help of L1. Modules are divided into Pronunciation, Writing, Vocabulary, Grammar, Listening, Reading, Speaking, or Exercise (Where users test themselves.)

Rosetta Stone also offers remote coaching, where learners can take 1 hour long appointments from Rosetta-Stone approved language teachers, for personalized learner. Heavy emphasis on speaking, Rosetta Stone uses patented audio-recognition technology to evaluate learner's speech and pronunciation.

**Content:** Even though the focus is not on conversation, there is an effort to make the content relevant to actual usage.

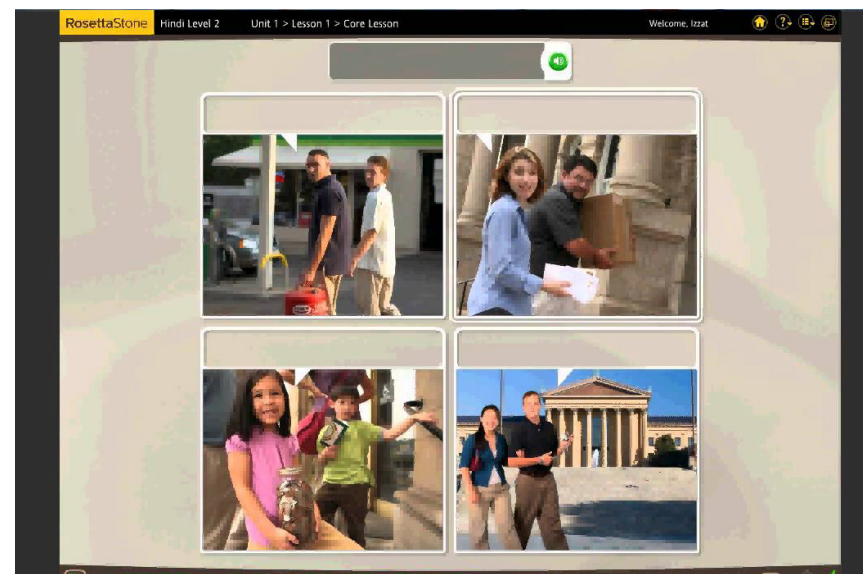
**Grammar:** Grammar is given lesser focus, more emphasis on grammatical examples that convey the essence of the grammar.

**Medium:** Computer Application

**Language-specific-ness:** No. the same stock images and sentences are used for all the languages offered.

**Engagement:** The visual heavy approach and a well-designed interface helps in building engagement.

**Analysis:** The visual-heavy approach of Rosetta Stone is worth noting. It majorly contributes to building engagement in the user. With a holistic approach that it offers, with the teacher-appointments, relevant content, and exercise-based learning, Rosetta Stone is definitely effective, but at a huge cost.



source:Rosetta Stone

## 4.4 Teach Yourself: Beginner's Hindi

This set of books are available in over 65 languages. They follow a traditional approach to learning languages. [5] [6]

**Skills:** Mostly Reading

### Teaching Method:

Teach yourself is basically a textbook, with dialogues, grammatical explanations and exercises that the users are encouraged to complete. The language used is informal, as if a teacher is speaking to students, in a language classroom. The dialogues are supplemented with an audio tape. Glossaries and translations help learners learn vocabulary. The book is divided into chapters, ordered by grammatical complexity and requirement in conversation.

### Available for Hindi: Yes

**Content :** Practical, relevant conversations in the target language form a part of the dialogues in the textbooks, with real characters who are mostly natives, with native behaviorisms and way of speaking.

**Grammar:** Grammar rules are explained at each point, in an easy language.

**Medium:** Book and supplementary audio tapes, which must be purchased separately.

**Engagement:** Users are required to undertake

a self-study course, as the name 'Teach Yourself' suggests, and the friendly language used, the native characters in the dialogues, a few illustrations, and a rough storyline to the dialogues through the book, add to the engagement.

**Analysis:** The module structure of this book is worth noting. It breaks the traditional grammatical approach, and mixes modules according to contexts required, and requirement in conversation. With plentiful of contextual examples, vocabulary rich glossaries, and grammatical rules stated in a simple, comforting language, Teach Yourself's format was one of the major inspirations for Jodo.

Also, it is interesting how the user is told about the function of various grammar points. For eg: 'Lets learn to talk about Routine Events' is how the present imperfective tense is introduced. eg: मैं रोज घर जाता हूँ.

However, Teach Yourself focuses heavily on reading and writing skills. Users would need to maintain notes while learning, and solve the exercises on their own. The format of Teach Yourself is a book - and the whole idea of this project was taking language learning away from written texts, and exploring more exciting and interactive medium for the same.



source: Teach Yourself

## 4.5 Learning Hindi.com

A blog with instructional posts, and comment threads with learners asking questions.

**Focus:** Grammar

**Teaching Method:** Blog-posts are in the form of short grammar lessons. Each post introduces one concept in grammar. Language used is friendly and easy.

A few examples are also provided. Users comment in the thread below if they have specific doubts, which are then addressed by the blog owners.

There is no course structure as such. The learner can browse around, learn at their own pace and in whichever order they want.

**Content :** Relevant. The varied nature of blog posts cover everything from vowels, consonants, to greetings, conversations, pronouns and verb tenses.

**Grammar:** Grammar rules are stated in a clear and easy language.

**Medium:** Blog Posts

**Engagement:** Users must be self motivated to learn from the blog and participate in the discussions.

### Analysis:

The lack of grammatical structure is one of the biggest drawbacks of LearningHindi.com. As a new learner, the wide array of posts the user can choose to start from or to proceed further, may prove to be a major disadvantage. Also, the instructional nature of the posts would prove useful only to a very dedicated learner, already with a base knowledge of Hindi and with someone to guide them.



source: learning-hindi.com



## 5. Goal and Design Brief

Enable the users to build and speak their own, grammatically accurate Hindi sentences.

A detailed study of Hindi grammar revealed that there were significant differences from English Grammar. The User Study revealed that users had difficulty with sentence building. User statements like, "I know some words, I don't know where they will go in a sentence", were fairly common. Hence, it is impossible for a foreigner to 'learn' Hindi, without acquiring the grammatical rules and structure of the Hindi language.

There were many resources available for vocabulary learning, like apps, books, and videos. For purposes of immersion, there is a lot of Hindi media like movies and music available on the internet. However, except for a few books, very few resources are available to learn Hindi grammar in an engaging, interactive manner. The users needed to learn how the vocabulary that they knew (or would learn along the way) would fit into meaningful, grammatically accurate sentences.

**Based on the data collection, study of existing products and the content, the following Design Brief was laid out:**

### **The design must:**

1. Enable users to build Hindi sentences with ease.
2. Equip users with a minimum vocabulary to learn sentence structure, and have a simple conversation

Besides, the design must contain the following:

### **Skills**

Equip them with talking and listening skills. (No reading and writing.)

Help users overcome the 'speaking barrier'

### **Grammar**

Use a grammatical approach towards language learning, without getting too specific and without making the grammar too intimidating. Give users a choice if they want to get into grammar, or skim through it on the surface.

### **Content**

Make content of the tool relevant, and contextual to a foreigner in India

### **Other**

Create engagement and motivation for the learners.

Encourage actual conversation outside of the tool.

Bring Hindi learning out of the textbook format, into an interactive and more engaging medium.

## 6. Content Analysis

Hindi grammar within the context of sentence building, from the view point of an English speaker, was analysed.

Sentence building involves the following components:

1. The building blocks, ie, the **vocabulary**.
2. The **word order** in which the words appear - A wrongly ordered sentence is often incomprehensible or can convey a changed meaning.
3. The **word categories** or parts of speech of the vocabulary. Different word categories behave differently in a sentence, in context of other words, and in context of the meaning.
4. **Word dependencies**, how words change in relation to each other, and how.
5. **Conjugation** how verbs alter from their base form depending to other components in a sentence(nouns/pronouns), or context. Conjugation may be affected by person, number, gender, tense, aspect, mood, voice, or other grammatical categories.

They are elaborated in detail in the context of Hindi Grammar, on the following pages.

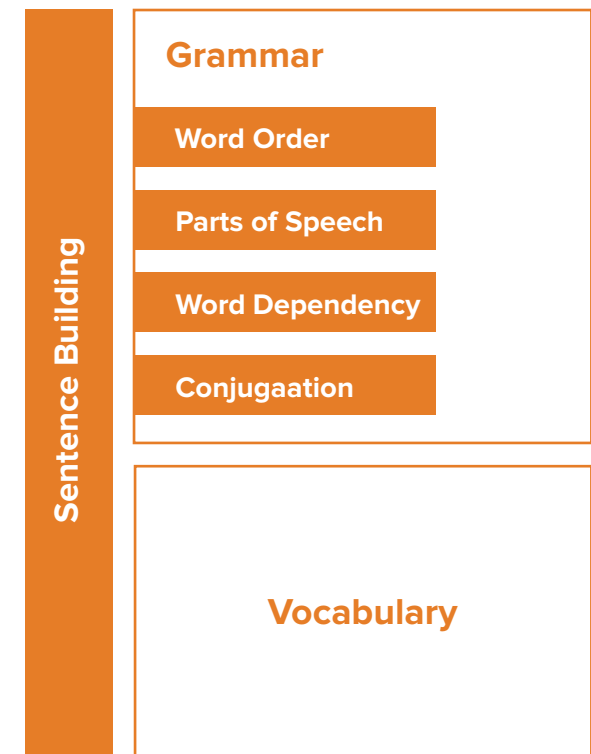


Figure: Components of Sentence Building



## 6.1 Vocabulary

Vocabulary was carefully chosen based on:

### 1. Frequency of Usage

Some words appear more frequently than the rest, in language. In conversational language, the range of the required vocabulary is further narrowed down. The words were chosen according to user contexts, ease and simplicity of content. The fact that English words might be substituted in some situations was taken into consideration.

### 2. Word type (Part of Speech)

Nouns, pronouns, adjectives, adverbs, verbs - Words of these separate categories were introduced according to the level of learning that the user was in. eg: In Level 1, the 8 pronouns, verb conjugations of होना, were introduced. As the subject, a mixture of nouns and adjectives (both Hindi and English) were introduced.

### 3. Difficulty in Conjugation / Form changing

Some words are exceptions to the rules relating to dependency and conjugation. For eg: the word सीधा changes to सीधी/ सीधे, depending upon the Noun, but the word शादी-शुदा has the same आ ending but does not change. Care was taken that all the words introduced as base

vocabulary did not belong to this category. Because Jodo encourages the user to decipher rules from the grammar in action, this would have led to further confusion.

Vocabulary was not the focal point of the solution. Instead, just enough (base) vocabulary was provided to let the user build meaningful sentences, in various permutations and combinations within the sentence structure being learned.

A separate vocabulary section caters to expanded vocabulary learning, where vocabulary is introduced according to word type.



Level1	Level 2			Level 3					Level 4			Level5	Level 6
	Verbs	Nouns	Other	Numbers	M 1	M2	F1	F2	I Adjective	NI Adj.	Personal Pronouns	Verbs	Post Position
मैं	करना	पानी	यार	एक	कुत्ता	अध्यापक	बिल्ली	किताब	अच्छा	जिंदा	मेरा	पढ़ना	को
तुम	लेना	खाना	वगेरा	दो	पैसा	कागज़	लड़की	शाला	बुरा	साफ़	हमारा	लिखना	के
आप	देना	काम	ya	तीन	कपड़ा	पनीर	बेटी	औरत	कैसा	सुन्दर	तेरा	हसना	से
हम	आना	मीटर	और	चार	कमरा	दूध	कुर्सी	बहन	छोटा	जवान	तुम्हारा	रोना	का
यह	जाना	थैली	पर	पांच	पौधा	घर	पत्नी	आशा	बड़ा	स्वादिष्ट	इस्का	भागना	पर
वह	उठाना	भय्या	दोनों	छह	लड़का	माकन	शक्ति	जान	पतला	भारी	उस्का	कहना	केलिए
ये	बैठना	दूध	इधर	सात	बेटा	पेड़	खिड़की	तस्वीर	मोटा	अँगरेज़	इनका	भेजना	तक
वे	सोना	सब्जी	उधर	आठ	नेता	आदमी	गाड़ी	महिला	पहला	फिरंग	उन्का	गाना	के पास
क्या	पीना	कपड़े	मत(न)	नौ	राजा	डाक्टर	छुट्टी	माता	दूसरा	आसन		बताना	से दूर
नहीं	चलना	फूल		दस	ताला	दोस्त	खुशी	दुकान	तीसरा	खुश		मॉँगना	से पहले
होना	रुकना	दुकान			चूहा	दुश्मन	अलमारी	शराब	प्यारा	ठीक		सुनना	के बाद
नाम	बनाना	घर			बगीचा	भाई	सहेली	बात	महँगा	बीमार		देखना	के ऊपर
नमस्ते	लाना	पुलिस			रास्ता	सितार	चाबी	चाय	नया	नाराज		पूछना	से निचे
शुक्रिया	रहना	पैसे			समोसा	काम	मम्मी	नींद	पुराना	शादी शुदा		मिलना	की तरह
घर	बुलाना	(वाला)			गाना	पड़ोसी	होली	देर	बूढ़ा	सुखी		रखना	
अच्छा	कहना				पराठा	अस्पताल	दिवाली	मदद	सस्ता	कई		समझना	
ठीक	पूछना	चीज़			डोसा	पंछी	रोटी	माँ	तीखा	दूर		खेलना	
यहाँ	मिलना				केला	परिवार	पूरी	बारिश	नीला	पास		बजाना	
वहाँ	बोलना				अंडा	पानी	मछली	दाल	पीला	बढ़िया		ढूँढना	
सुन्दर	सुनना				महीना	फूल	कॉफी	गाजर	हरा	देसी		खोलना	
बीमार						समय			पुरा			घूमना	
						हाथ			काला			सकना	
						मुह						जीना	
						दिल						मरनादिखाना	
						प्यार						उड़ना	
						दुःख						जीतना	
						नफरत						हारना	
						संगीत							
						सवाल							
						जवाब							
						पापा							
						नाना							
						सूरज							
						शहर							
						चावल							

Figure: List of Vocabulary

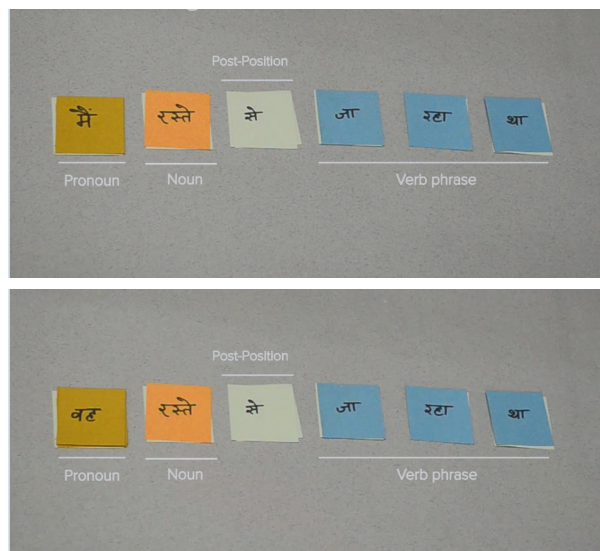
## 6.2 Analysis of Word Categories with Respect to an English Speaker

The word categories in Hindi are detailed out in this section. (Grammatical terms mapped to the nearest English category name).

The categories of Noun, Pronoun, Adjective and Verb are further subdivided based on their changing forms.

Each word category has a different function in the sentence, and is governed by different grammatical rules. They behave differently in sentences, and abide by different dependency rules. [8] [10]

Figure: Word Categories



### 6.2.1 Pronouns

There are a fixed number of pronouns. They are: 1st Person: Singular मैं | Plural हम  
2nd Person: Singular: तू Singular, Plural: तुम, आप  
3rd Person: Singular : यह वह, Plural: ये वे

Pronouns are indispensable to conversation. They capture the very essence of an interaction, when they mould the sentence based on who is referred to. Hindi pronouns capture person as well as the number.

The second person pronouns, additionally express the honourific system, with तू, तुम, आप. It was decided to discard the pronoun तू, because it is the most intimate of all three second person pronouns. Usage of तू inappropriately, could be interpreted as rude and using तुम or आप are usable in any context, and always a better option.

तुम or आप are used in singular as well as plural, and are treated as grammatically plural always.

Each pronoun has a special conjugation of the verb होना associated with it. हूँ, हो, है, हैं. (In the present tense.)

Together with its होना conjugation, a subject pronoun can form a smallest meaningful

sentence in Hindi. eg: मैं हूँ. The verb conjugations depend upon the person and number of the subject.

It is a good idea to begin language learning with pronouns, because they are the essence of an interaction.

Personal pronouns मेरा, तुम्हारा are essentially pronouns in the oblique case, but they have special word structures that must be memorized. It was thought that they would be introduced later on, as they depend and modify according to the subject, exactly like adjectives.

<b>mein</b> I	<b>hum</b> we
<b>tum</b> you	<b>aap</b> you
<b>yah</b> this	<b>ye</b> these
<b>vah</b> that	<b>ve</b> they

Figure: List Pronouns

## 6.2.2 Verbs

### Verb Tense

Hindi has tenses that are similar to those used in English: present simple, past continuous.

Verbs are divided into various tenses and cases. Tenses define the time of action, and the cases define the nature, mood, tone of the action.

The Hindi language has simple and composite verbs. The single most important verb, 'होना', for the present tense, is the Hindi equivalent of 'is'.

It is also used with other verbs, as an auxiliary. In present imperfective form, 'होना' is used to specify the timeframe of the verb.

The infinitive forms of verbs, like खाना and सोना, are pure forms. They are then modified according to various factors. The infinitive by itself is used for indefinite orders:

खाना

Imperative forms of verbs are used to convey commands and requests.

eg: खाना-खा/ खाओ/ खाइए

Imperfective present tense is formed out of participle+auxiliary

(खा+ता/ती/ते) + होना

खता हूँ

Imperfective past tense is composed of the auxiliary था/ थी/ थे

खता था

Present, Past continuous forms of verbs have the 'रहा' to demonstrate events in action.

खा रहा हूँ, खा रहा था

Perfective past tense includes the following constructions:

खाया/दौड़ा/दौड़ी/दौड़े

Future tense forms take the following constructions:

खाऊंगा/ खाऊंगी/ खाएँगे

[See more in Verb Conjugation]

## 6.2.3 Nouns

Nouns are of two types: Masculine and Feminine. Based on how they change into their plural forms, Masculine and feminine nouns are further subdivided:

**M1:** Masculine Nouns (that end with आ)

Change to ए endings in plural.

eg: कुत्ता - कुत्ते

**M2-** Masculine Nouns that end with anything other than आ, don't change in the plural

eg: घर - घर

**F1-Feminine** Nouns that end with इ, ई

Change to इयाँ endings in the plural

eg: लड़की- लड़कियाँ

**F2-Feminine** nouns that end with anything other than इ, ई

Change to ए endings in the plural.

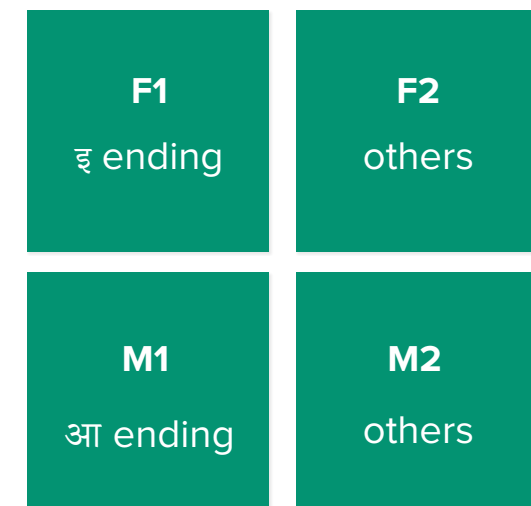
eg. किताब-किताबें

Each noun has an associated gender. Noun genders cannot always be guessed or predicted. While there are obvious masculine nouns like लड़का (boy) and आदमी (man), there are less obvious ones like फूल (flower) and पेड़ (tree). Yet others like कुर्सी (chair) and कागज़ (paper) are feminine.

Nouns with इ/ई endings are not always feminine either. आदमी (man) and पड़ोसी (neighbour) are masculine, while आ endings like दिशा (direction) and आशा (hope) are feminine.

Once the noun gender is known, it is easy to figure out its type (from its ending), and thus make its plural form.

Figure: Types of Nouns



The Adjective+Noun combination could be used for learning, so that learning adjective inflection and noun plurals could happen at one time. eg: अच्छा लड़का, Moreover, listening to adjective forms along with the noun in its singular/plural form, provides an aid to remember the patterns.

eg: अच्छा लड़का, अच्छे लड़के, अच्छी लड़की, अच्छी बिल्ली, अच्छी लड़कियाँ, अच्छी बिल्लियाँ

But adjectives themselves are another word type, with their own subtypes. Hence, it was decided that Nouns could be learned along with numerals.

With numbers, the phrases were:  
एक लड़का, दो लड़के, एक लड़की, दो लड़कियाँ, etc.

The number of nouns that could be learned are many. But it is important to note, that especially in colloquial/ spoken Hindi, it is a common practice to substitute English nouns for their Hindi counterparts. eg:  
वह हवाईजहाज है. वह aeroplane है.  
मैं दफ्तर जा रहा हूँ. मैं office जा रहा हूँ.

Hence, it was decided to introduce mixed Hindi and English noun subjects early on, to let users know that its permissible to substitute English words wherever they are at loss for Hindi vocabulary, so as to keep the conversation going.

## 6.2.4 Adjectives

Adjectives agree with the nouns they qualify. Adjectives are of two types:

1. Inflecting Adjectives
2. Non Inflecting Adjectives

### Inflecting Adjectives

These change according to the noun or pronoun that they qualify. They generally have आ endings. eg: अच्छा, बुरा, बड़ा, छोटा

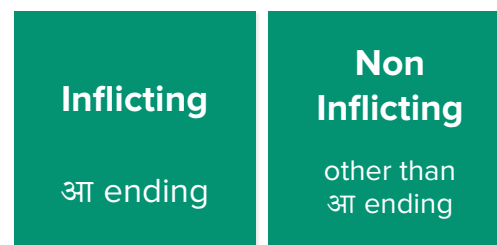
### Non Inflecting Adjectives

These adjectives don't change. They generally don't have आ endings. eg: साफ़, गरीब

Adjectives appear just before the noun that they qualify, or before the verb. It was an obvious choice to include adjectives along with nouns for learning, and because they depend on noun subjects.

eg:  
अच्छा लड़का  
अच्छी लड़की  
अच्छे लड़के  
अच्छी लड़कियाँ

Figure: Types of Adjectives



## 6.2.5 Post Positions

In Hindi, words that describe place are known as 'post' positions. This is because unlike their English counterparts, 'prepositions', they appear after the noun, and not before.

eg: लड़की कुर्सी पर बैठी है.

Some important post-positions are:  
पर, में, से, तक, को,

Hindi has two main cases: The **Oblique** which is always used before post-positions, and the **Direct**, used elsewhere.

Direct: यह अच्छा लड़का है!

Oblique: उस अच्छे लड़के से तीस रुपये लो!

Some Nouns, Adjectives, and Pronouns change form in the oblique case. The Masculine M1 type nouns and the inflecting adjectives change form in the oblique case.

eg:

Direct: वह लड़का जा रहा है.

Oblique: उस लड़के से तीस रुपये लो!

Post Positions are important for conversation, as they are often used to lead, point, direct, and in other forms of expression. However, the introduction of the oblique case could be done only after the direct case was thorough. Hence they were introduced after the Imperfective Present tense, in Level 6.

## 6.2.6 Others

### Adverbs, conjunctions, interjections:

These are unchangeable. Various interjections and conjunctions appear in tips and dialogues with characters in the dialog sections. Adverbs appear only after verbs have been introduced. Adverbs are phrases like: जल्दी से, धीरे से, ज़ोर से, Conjunctions are joining words like: और, फिर, पर, या Interjections take exclamatory forms like: अच्छा! नमस्ते! शुक्रिया! बढ़िया!

### Question words

The question word 'क्या' appears in two forms - as a question -marker, where it changes any statement into a question (when placed at the beginning or end of a sentence), and as 'what', where it appears just before a verb.

The rest of the question words appear in various dialogues by the characters in the dialog section, where the user learns them via the translation/context. eg: क्यों, कहा, कैसा, कब, कितना, etc.

### Nahi(Negator)

The word नहीं is introduced in sentence building, in Level 1. नहीं before the verb negates the sentence.

### Numbers

Numbers from 1-10 are introduced in level 3, along with nouns. They are effective in conveying the idea for singular and plural. More numbers could be learned as additional vocabulary in the vocabulary section.

## 6.3 Word Order

Hindi uses a different word order than English. In Hindi, the subject usually comes at the beginning of the sentence, and the verb comes at the end. The negative comes just before the verb.

Hindi word order, at the most generalized level, is **[Subject Object Verb]**, whereas the English word order is **[Subject Verb Object]**.

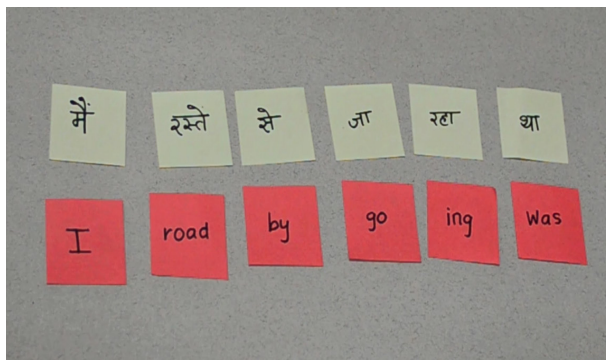
An **experiment** was conducted on English to Hindi word order mapping. The aim of the experiment was to find if the users could use a direct formula for mapping the English word order to the Hindi word order, to make sentences.

**Eg: आप क्या कर रहे हैं?**

**You what do (ing) are ?**

The orders of 50 such sentences were found.

Figure: Example word order



Not only was that method non-intuitive, it was also a very round-about way of learning to build a Hindi sentence. It would require the user to make an English sentence, reorder it according to the Hindi order (This re-ordering is tough and does not follow a set pattern.) Then translate individual words back into Hindi and make a sentence. This does not even take into consideration verb forms, which are often not directly translatable from one language to another.

Hence, instead of providing a direct formula for mapping of word order, It was decided to use a bottom-up approach and teach the user Hindi sentence building, from scratch.

Hence the method followed was to start the present tense sentence construction by a simple two word sentence, moving progressively towards longer sentences.

One of the insights from the user study revealed that users had problems understanding the structures and building sentences longer than 4 words. Hence, a method where they would gradually build up to sentences with more and more words was developed.

eg:

मैं हूँ

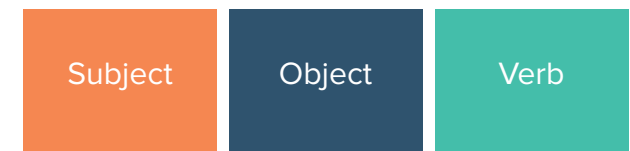
मैं ठीक हूँ

क्या मैं ठीक हूँ

मैं ठीक नहीं हूँ

Coupled with audio of these sentences, the users would listen to sentences and use them as 'patterns'. The word order could be internalized as the patterns would be heard over and over again.

### Hindi



### English

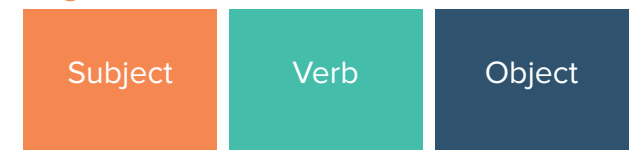


Figure: Word Order in a sentence

## 6.4 Word Dependency

The forms of Adjectives, Verbs, Personal Pronouns depend on the Noun subject or the Pronoun acting as the Noun Subject.

They also depend on the Post-position, and in the presence of a Post-position, they change into their respective oblique-case forms. [8] [10] [11]

In sentences upto Level 5, the following two types of dependencies are observed. These are the longest possible sentences covering all word types upto Level 5:

मेरा छोटा लड़का जाता है  
मेरे छोटे लड़के जाते हैं  
मेरी छोटी लड़की जाती है  
मेरी छोटी लड़कियाँ जाती हैं

As we see, the Pronoun, Adjective, Verb form and the conjugation of the verb 'होना' - all depend upon the subject Noun. (Or the pronoun acting as the subject, in the absence of a Noun).

Personal Pronouns, Adjectives, Verb Forms change according to 2 factors:

**1. Number**

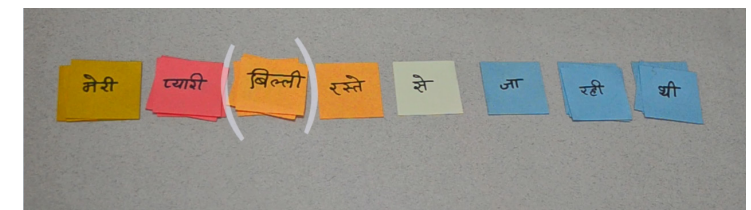
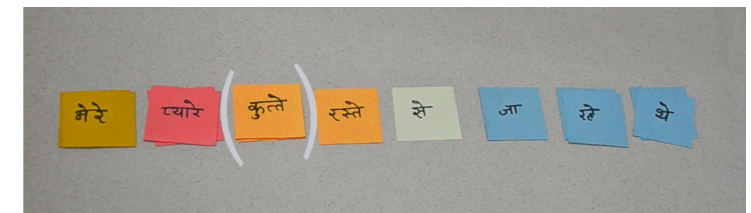
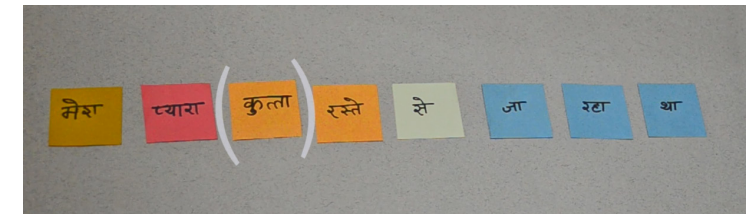
**2. Gender** (of the subject)

Since most of the elements of the sentence

depend on the Noun Gender or Number, changing the Noun in either of the two ways would mean that everything else in the sentence would change.

The various dependencies observed in the Hindi language are detailed out on the next page.

Figure: Subject Noun Number and Gender Dependency





This led to the idea of a **perfectly linked** (grammatically correct) sentence, and when the Subject Noun is changed, the links 'break' and the sentence must be re-linked by managing the dependences correctly, by changing all other word forms.

### 1. Linked Sentence



### 2. Change in Noun Subject (Gender and Number)



(Links Break)

### 3. Re-Linked Sentence



Figure: Concept of a grammatically 'linked' sentence.

This idea was extrapolated to a grid sentence structure - Where the dependencies of two sentences needed to be dealt with.

Using this grid structure, the idea for a word scrabble-like game was developed, which would test the user's ability to build sentences as well as manage sentence dependencies. This game appears in Level 3.

Everywhere in the learning stage, ideas around changing particular words in the sentence, and observing the effect of the change on other words, are explored.

Verb Conjugation, as we shall see in the next section, behaves in some places like a dependency. In these places, it is treated similarly. In other places where conjugation occurs to denote a different sentence function, like tense, mood, tone, etc., it is introduced separately.

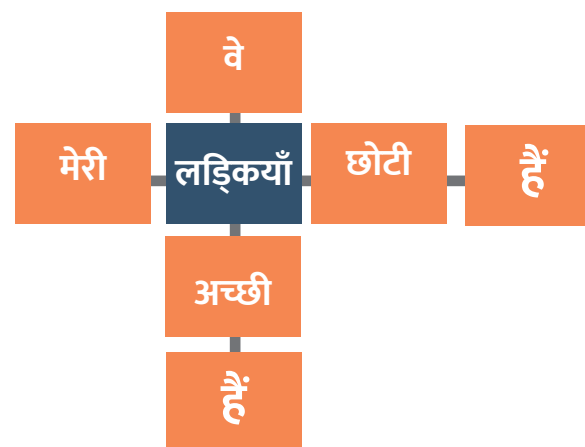


Figure: Concept of a grid 'linked' sentence.



## 6.5 Verb Conjugation

Hindi has the following Verb Conjugations.[7][8][9]

### Infinitive

It is the root form of all verbs. eg: खाना

Infinitive forms would be learned by the user as vocabulary, with a range of verbs covered. What is equally essential is to learn to change these forms, according to subject, tense, mood, etc.

### Present Tense

The present tense form of होना is हूँ, है हैं, हो, which are affected number, and person.

These need to be memorized. This is the most frequently used and basic need of the Hindi language. They are placed with pronouns, as each pronoun goes with an associated होना conjugation.

### Present Perfective

1st person singular	मैं खता हूँ
1st person plural	हम खाते हैं

2nd person singular	तू खता है
2nd person singular/plural	तुम खाते हो
2nd person singular/plural	आप खाते हैं

3rd person singular	यह खता है
3rd person singular	ये खाते हैं
3rd person plural	वह खता है
3rd person plural	वे खाते हैं

Once the होना conjugations have been learned, changing the infinitive खाना to खता or other forms

is similar to the way inflicting adjectives change. Hence, they are introduced in level 4, immediately after learning adjectives.

### Present Continious

Made of a compound verb, the होना conjugates just like in present perfective. रहा conjugates according to gender and number.

मैं खा रहा हूँ

This too, involves changing forms of रहा, which behave exactly like adjectives. They are placed immediately after learning present perfective.

### Past Tense

The past tense form of होना is था, थी, थे, which are affected by gender as well as number, but not person.

### Past Perfective

मैं खता था/थी  
हम खाते थे

### Past Continious

मैं ख रहा था/ मैं खा रही थी  
हम खाते थे

These forms are very simple to the present tense forms, only the auxilliary होना is replaced by the even simpler था, थी or थे, which conjugate according to gender and number of the subject.

### Future Tense

The future tense converts verb roots into their ऊंगा /उंगी/ऊंगे forms, which depends on number and gender, not person.

मैं खाऊंगा/खाउंगी

हम खायेंगे

These distinct forms are a little more complex to convert from the root. Also, use of future tense is given less priority as compared to the present, so it appears last in the tenses.

### Imperative

Used to give commands and requests. eg: खा खाओ  
खाइए खाइएगा. The infinitive form is also used as it is, for extra polite imperatives: eg: आप ज़रा खाना

### Subjunctive

Used to ask permission (खाऊ?), and give permission. (खाए!)

These are important forms. In a situation contextual to foreigners, asking for services (restaurants, cabs, for help) for them is a frequent situation where they require Hindi. Be it giving orders to the auto-driver, or buying vegetables, or asking somebody to enter/ exit, Imperative and Subjunctive forms need to be learnt early on in the learning.

However, their forms are unlike any other verb forms, and they are one of the most difficult verb forms to make. Moreover, usage of verbs require a good knowledge of nouns, adverbs, and, post-positions.

Despite all this, it was decided to include Imperative and Subjunctive verb forms as early as possible because of their immediate need for this user group.

# Hindi Grammar

word-dependencies

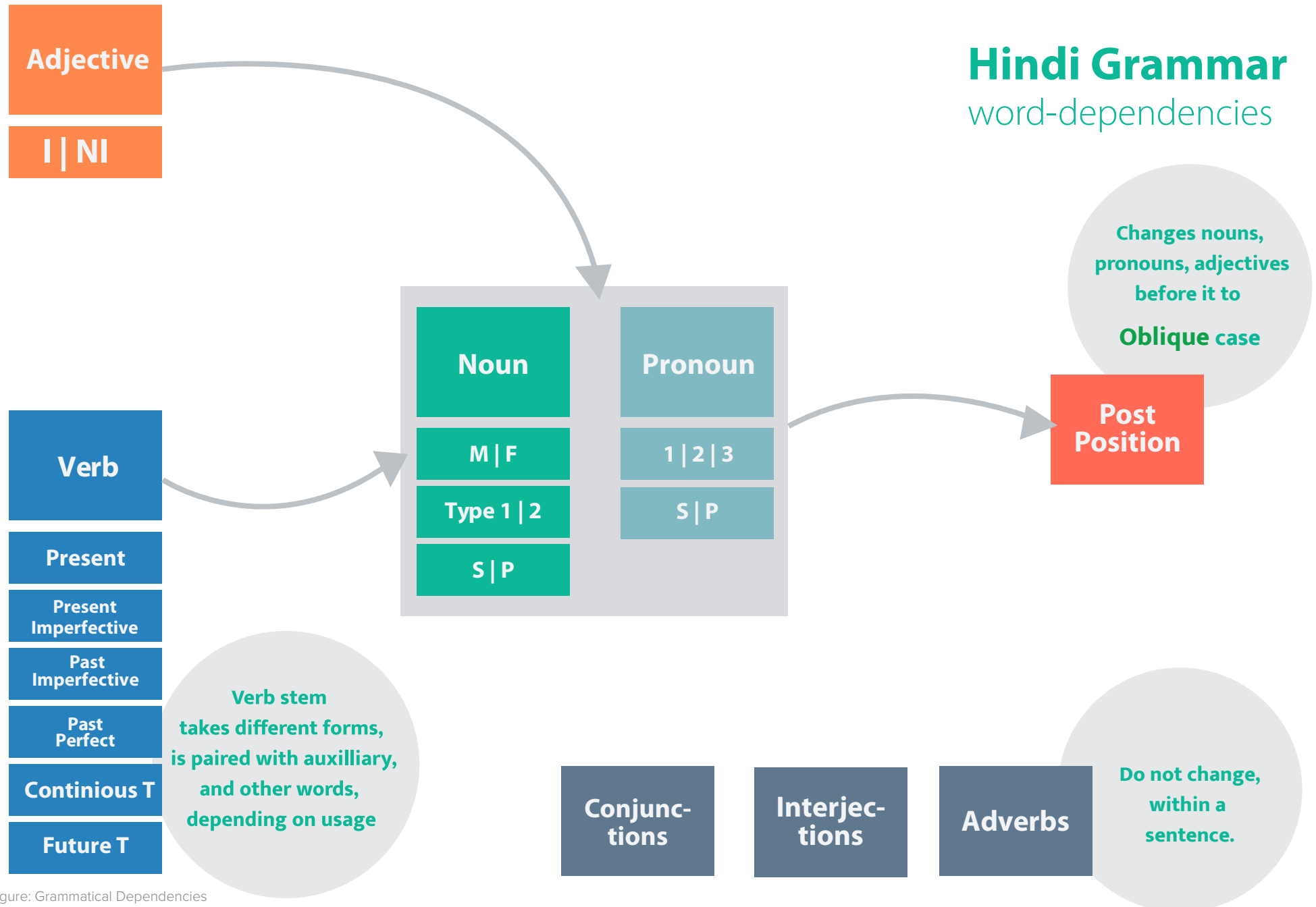


Figure: Grammatical Dependencies

# 7. Content Distribution Across Levels

The content for the tool was broken down into modules, using the findings from the content analysis and data collection.

Designing an optimal sequence for learning was the task ahead. Based on the user study, existing products, and analysis the content, a 7-level structure for the tool was designed.

## **The major design decisions here were:**

- Which grammatical structures to introduce, in what order.
- Finding which grammatical structures follow a natural progression.
- Which parts of speech / concepts to put together for learning.
- How each part of the content must be taught.
- What was the base vocabulary to be used, to learn the grammatical concept.

Seven levels were detailed out. The user would go through them, level by level.

In order to minimize and make grammar less intimidating, concepts were introduced in bits and pieces, sometimes broken down into multiple levels and stages. There was a lot to be learned that lay beyond the scope of these seven levels.

## 7.1 Designing Grammar Modules

A natural order in which grammar in Hindi must be introduced was developed- It was based on two parameters:

### 1. Requirement in speech

### 2. Grammatical Complexity

Teaching adults relevant content, early on in the learning process, builds motivation and encourages learners to carry on with the learning process. Point (1) aims at providing them content that they can actually use in conversation.

With this in view, it was an obvious choice to include greetings (नमस्ते, शुक्रिया), question words (क्या), early on in Level 1. **Level 1** also forms the crux of sentence building, with a basic skeleton sentence structure being taught in easy steps.

**Level 2** is specially contextualized to foreigner's needs. Based on the user study, it was observed that foreigners need to use Hindi while talking with natives who mostly provide them with a service of some kind. With this in view, Level 2 focused on imperative forms of verbs, which express commands and requests. eg: पैसे लीजिये, यहाँ चलिए. However, it was a trade-off between grammatical structures and user's needs - These verb forms have distinct structures, and do not follow a natural progression in learning

**Level 3** deals with nouns - singular and plural, masculine and feminine. (लड़का, घर, लड़की, किताब)

**Level 4** deals with adjectives that describe nouns, and hence make the language more expressive. (अच्छा, बुरा, etc) Personal pronouns were included because they modify exactly like adjectives. (मेरा, तुम्हारा, इसका, etc)

**Level 5** includes descriptive verbs for the first time - verbs for various activities, and their conjugation in the present / past imperfective tense. (मैं सोता हूँ, तुम खाते हो, वे खेलते थे)

**Level 6** included Post-positions - rather late in the learning process, but they could not be introduced before. This is because post-positions are associated with the Oblique case of sentences, and the Direct case must be learnt thoroughly before the Oblique case to avoid confusion. (उस रास्ते पर वह लड़की चलती है, सीड़ियों के नीचे एक)

**Level 7** included the continuous present and past tense - a natural progression after present / past imperfective tense. (मैं जा रहा हूँ, वह जा रहा था)

A more detailed study of all the grammatical elements involved is covered in the Content Analysis section.

Thus the insights from the User Study, and the grammar study was put together to come up with a logical level structure for the final tool.

Level	Content	Learning Goal	Need Fulfilled
Level 1	1st, 2nd, 3rd person Pronouns होना conjugations Greetings, क्या[?], नहीं, few simple Nouns , Adjectives.	1st, 2nd, 3rd person Pronouns होना conjugation, word order मैं doctor हूँ / आप doctor हैं / वह doctor है क्या मैं doctor हूँ? मैं doctor नहीं हूँ!	Word Order, Introduction, Honorific Systems, Basic sentences required for introduction, Basic questions, Negation.
Level 2	Subjunctive and Imperative form of verbs Other kinds of simple words needed while making commands and requests. Interrogatives क्या क्यों कब	Familiarizing with verb infinitive (root) forms eg: करना Learning to change them to Asking permission:करू? Commands and requests: करो/कीजिये मैं अन्दर आऊ? आप अन्दर आईये!	Commands and Requests, Tone of speech, contextual conversations with vendors travelling, with servants, and also Hosts.
Level 3	All types of Nouns. Noun pluralization. Numerals	Learning new nouns, and whether they are M or F. Learning to pluralize nouns. according to rules for M1, M2, F1, F2. एक लड़का, दो लड़के! एक लड़की, पांच लड़कियाँ!	Learning the basic building blocks for Hindi, having fuller conversations. Pluralization is an essential skill for Hindi, and must be mastered as soon as possible.
Level 4	Adjectives Personal Pronouns	Adjectives, Inflicting and Non Inflicting. Personal Pronouns. How they change wrt Nouns. मेरा अच्छा लड़का / उसकी अच्छी किताब!	Learning to describe things, conversations move beyond the 'obvious', become qualitative, expressive.

\* Levels 1, 3, and 4 were chosen for the final ideation and implementation

Level	Content	Learning Goal	Need Fulfilled
Level 5	Imperfective Present Tense Imperfective Past Tense	Converting from infinitive to Imperfective. खाना-खाता Learning how verbs change wrt Noun/ Pronoun. लड़का पानी पीता है. लड़की खाना बनती है. हम बहार जाते हैं. था थी थे past tense forms	Focus on Verbs. Different actions, activities. Talking about things you do, in the past or present.
Level 6	Post Positions में से को etc	Learning about Oblique cases. Oblique forms for Noun M1/M2/M3/M4 Adjective changes Personal Pronoun Changes उस हरे पेड़ के नीचे एक नदी है!	Talking about where and how things are with respect to each other. A very essential component for language, but complex to master.
Level 7	Continuous tense, past and present.	Usage of the 'ing' form रहा. मैं यह काम कर रहा हूँ!	Talking about things in process.

## 7.2 Supplementing Grammar with Vocabulary

Sentence building has two components: Grammar and Vocabulary. Once the Grammar modules and methods were fixed, it was to be decided which vocabulary to use, to form the content of the tool.

At some levels, there is a certain **fixed vocabulary** that must be learned. For eg: There are 8 pronouns in the Hindi language, at Level1.

In addition, there is other vocabulary (Like nouns, adjectives), that are varied, differ in meaning, and aid in expression. In order to make grammar learning easier, and since grammar was the focal point, only a **minimum vocabulary** from these word types was chosen for the learning.

In order to make communication more expressive, additional **expandable vocabulary** needs to be learned. The figure on the right shows at what point of time during the level-based learning, can the user expand their vocabulary knowledge of particular word-types.

grammar levels		base vocabulary		expandable vocabulary			
		Level 7	रहा	more nouns	more adjectives	more verbs	adverbs
		Level 6	post positions पर, में, से, तक, को,				
		Level 5	था थी थे				
		Level 4	personal pronouns मेरा, हमारा, तुम्हारा, ...उनका minimum adjectives अच्छा, साफ़				
		Level 3	minimum nouns लड़का, घर, लड़की, किताब min. numbers एक, दो				
		Level 2	specific verbs आना, जाना, चलना, करना, लेना, देना, बताना, बोलना;				
Level 1	pronouns मैं, हम, तुम, आप, यह, वह, ये, वे ..... होना, क्या, नहीं, हाँ	conjunctions और, पर;	question words क्यों, कौन, कैसा, कब, कहा, क्या,				

Fig: Base and Expandable Vocabulary

## 7.3 Learning Method

Once the grammar modules and the level structure was decided, the method of learning was thought upon. At this point, the study of the existing products was also referred to.

Though the goal of the tool was ultimately enable conversation, and to do so, it needed a heavy grammatical base.

It was decided that internalizing of grammar structures would happen the first, in the learning process. This learning would be self-motivated, yet engaging enough. The idea of linked sentences was applied to dynamic on- screen sentences that modify on their own, when the user makes some changes in the words. Thus **learning would happen via exploration, observation, and the user building a mental model of the grammar structure.** Looking back at adult learning principles, motivated adult learners would find this technique open and engaging enough, to learn.

This learning would be completely backed by audio, with the user listening to sentences and phrases over and over again. The idea of 'pattern sentences', from the user study section was applied here.

Speaking in the target language is a completely different skill, apart from knowing how to build the sentences. Learners often face a speaking

barrier - (especially in the absence of a tutor) where they learn from the resource, yet, do not attempt to speak out what they have learned. Thus, they can never use their learning in practice, ie, in actual conversation.

Overcoming the speaking barrier is essential for the goal of conversation. Hence, an attempt was made to get the user to **speak out, simple, easy sentences, and the speech to be evaluated.**

However, a detailed approach towards speech and its evaluation was out of the scope of this project. Pronunciations, phoenetics, and other factors that govern speech, were not focused upon.

Exercises are essential for learning, and retaining learning. Duolingo's complete exercise format keeps the learner constantly challenged, and 'on their toes.' Teach Yourself: Beginners Hindi contains in-depth exercises at the end of each chapter, which the user is encouraged to solve. **Tests and exercise enable retention, and re-enforcement of the concepts learned.** Various formats for exercises for each level were explored, and they were designed in the form of small games, which would keep users engaged and also enable re-enforcement of grammatical concepts and retention.

An additional function of the exercise would

be to test if the user could apply the grammar concepts (learnt on the base vocabulary) on new vocabulary,

All the while, in order to make speech and conversation more descriptive and wider, the scope of the known vocabulary could be widened, via various sources. The tool attempts to provide a vocabulary learning section, which is quite limited in scope as of now. But as long as the vocabulary is learned in such a way that the users could easily substitute in the place of the minumum vocabulary learned, they could widen their conversational scope.



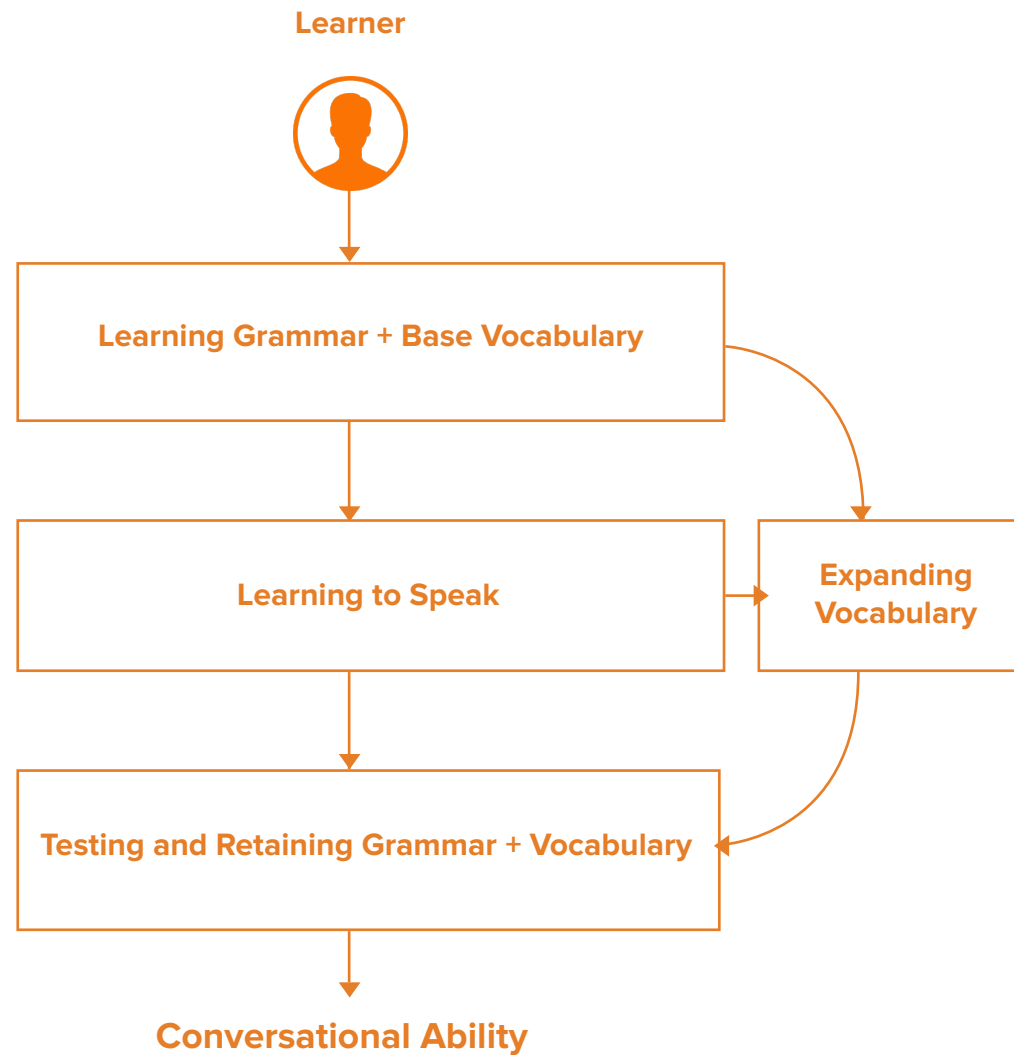


Figure: Methods and Stages in achieving conversational ability



## 8. Final Concept

In order to fulfill the design goals, different ideas that were developed in the course of the ideation, were put together into one tool. The result is '**Jodo**', a tool with which foreigners can learn conversational Hindi. The skills which they acquire is listening and speaking.

Language learning is multi dimensional. It includes learning many concepts, and involves various skills. Complete learning of languages often requires using a variety of methods at the same time. Linguists and polygots mostly recommend using a text resource, audio resources, real human interactions, in a mixture that best works for the learner. (When it comes to a self motivated study of language.)

Jodo is a language learning-environment, and is currently designed for the tablet form factor. It is also usable on laptop and desktop computers.

Users can download the Jodo app, or use it on the website with is freely accessible. The user is required to create an account in Jodo, and by signing in, can see their recorded progress and can be a part of the learning environment. Possibilities of a multi-user environment where the user may learn/play remotely with other users were explored.

Jodo has a Level- based learning environment. The learning environment is divided into 7 levels, as discussed.

Each level is divided into 3 stages that the user must go through:

- 1. Learning**
- 2. Dialogue**
- 3. Test**

**Learning** The goal of the Learning stage is for the user to internalize Grammar rules in sentence building through reading, listening,

and exploration.

**Dialogue** The goal of the dialogue stage is to overcome the speaking barrier, and practice simple pronunciation and sentence building.

**Test** The goal of the Test stage is to re-enforce the learning goal of the current level, revise the learning in the previous levels, and test your ability to build sentences or word phrases.

- The learning method mainly focuses on Listening (Aided by reading) and Speaking.
- Devanagiri script learning is kept optional, as teaching the script is out of the scope of this tool, and it may become unusable for people who don't know the script. Transliteration is always available.
- A section 'Task of the day', encourages real interactions in Hindi with real people, outside of the tool. It suggests things to say to a local,

that fit within the learner's current level of proficiency, and the grammatical constructs of the level he/she is at.

- Vocabulary section, for the users to browse through vocabulary, based on their current level of expertise.
- Grammar rules are hidden one level deep, the user can learn the language entirely by sound, and by internalizing grammar rules by repeated listening.

## Steps to Use:

The user downloads the Jodo app on the tablet device, or uses the web version via a desktop/ laptop.

The user is required to login, and create an account where his/her progress will be tracked.

The user begins with the learning stage of Level 1.

Each of the stages (Each stage can take from anywhere between 15-30 minutes) can easily fit into an adult learner's schedule, between work, chores, and travel.

The user must go through the test stage of each level compulsorily, in order to proceed to the next level. The test stages contain points in the form of Samosas. Three samosas make 1 Jalebi.

In order to proceed to the next level, the user

must have atleast 1 jalebi from the current level. The user may take the test as many times as they want, to earn more Jalebis.

The user may go back to any of the stages of previously completed levels, but may not jump to a higher level.

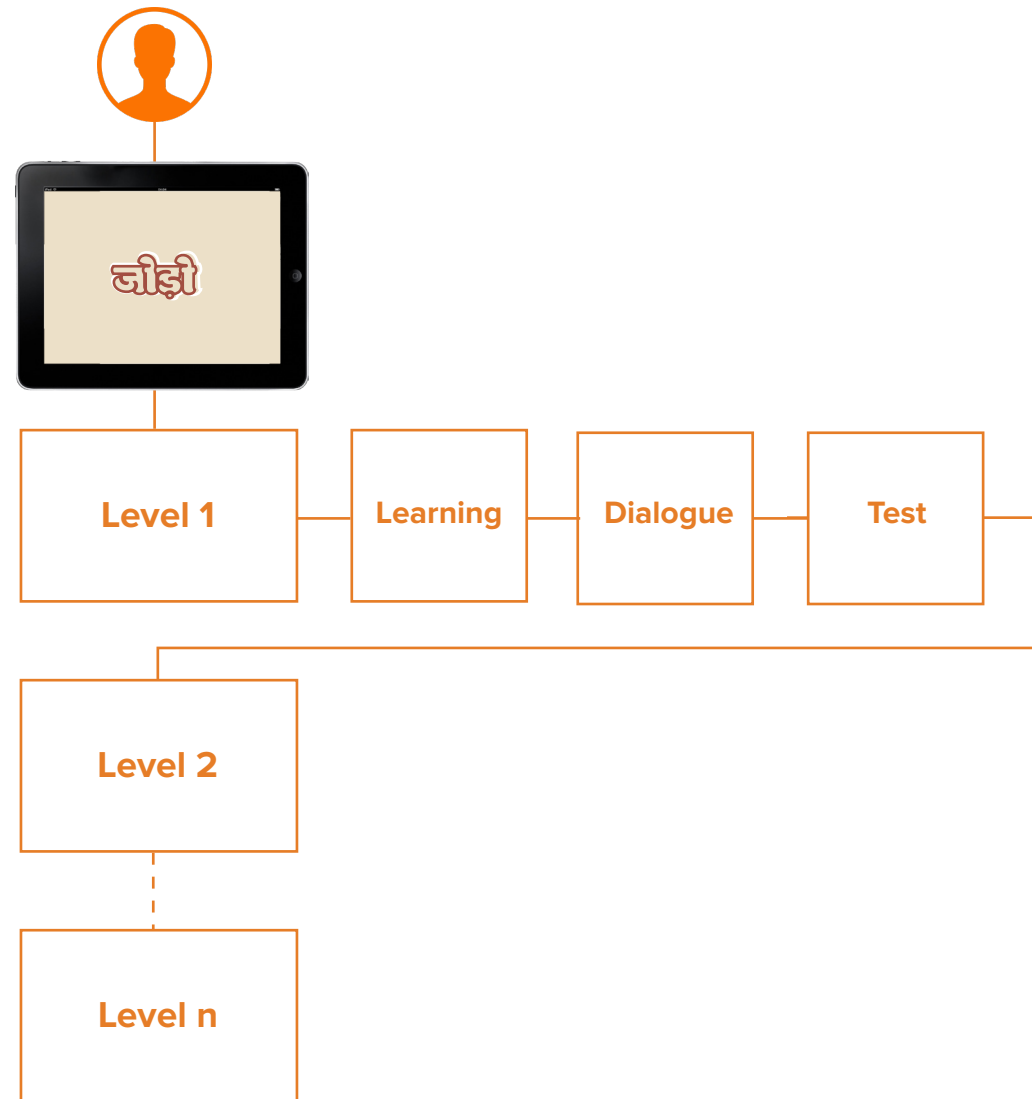


Fig: User Journey

# Home

Level Plan

3 stages within each level:  
Learning | Dialogue | Test

Characters to guide the user through  
the levels. Each level has a designated  
character, that handles the grammar tips  
and conversations of that level.

Task of the Day- which encourages  
real human interactions.

## जोड़ी

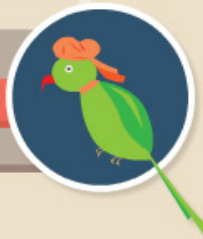
## Hindi Levels

Namaste, I'm Mithu! And you?

## Level 1

Pronouns, The verb  
'to be', Greetings.

START



## Level 2

Nouns and Plurals



## Level 3

Adjectives and  
Personal Pronouns

## Level 4

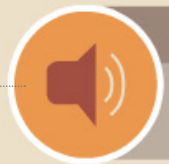
Simple Verbs



## Vocabulary

dukan  
shoppaisa  
moneyraat  
nightkyu  
why

## Task of the Day

Complement Someone on their beauty!  
"Aap bohot khoobsurat hai!"

# 8.1 Learning Stage

This is the first of the three stages within each level. This is where the actual learning of grammar patterns happens.

Users go through a step by step guided sentence building, involving all possible sentence constructions with the word-types in that level. Users change sentences using the word combinations, listen to them repeatedly, and internalize sounds.

The grammar rules can be seen 'in action', while the user explores with various word combinations for the target sentence. The user can play around and explore, and in the process, build a new sentence each time.

The user interacts with the screen by clicking on any of the word-tiles, which results in the word-tile taking its position within the target sentence. Other words already in the target sentence automatically modify or conjugate according to the sentence dependency rules. This is supported by audio feedback of the (new) sentence on the board. The user can hit

the audio button as many times as they want, listen to, and internalize the grammar patterns. Audio feedback can also help in understanding pronunciation.

Some amount of vocabulary can be learnt, by reading word-meanings on the word-tiles. The learning stage is designed such that the grammar rules are seen 'in action', from the changes that happen when the user selects a particular word-tile. There is no explicit need to know the grammar terms.

Let us see how the 5 components of sentence building, are covered in this stage.

## 1. Vocabulary

Vocabulary is in the form of word-tiles. The transliterated word is available on the tile, with its meaning underneath.

## 2. Word Order

Level 1 begins with 2 word sentences, and progressively goes towards building longer sentences. This step by step sentence building helps in the learning of word order.

## 3. Word type (Part of Speech)

This is learnt by the way the tiles are grouped on the screen, according to the word types. eg: nouns /pronouns/adjectives etc.

## 4. Word Dependency

This is learnt by changing a particular word in a target sentence, and observing (by reading or listening), how the whole sentence changes.

## 5. Conjugation

These are introduced in different sections or different levels, and the function of each verb form is stated explicitly, using the grammar tips wherever possible.

After completing the learning stage, the learners can proceed to the dialog stage and to the test stage.





I am

Click to see slot type





maĩ  
Ihuũ  
am


maĩ I	hum we
tum you	aap you
yah this	vah that
ye these	ve they

huũ am	haĩ are
ho are	
hai is	


Watch how the form of 'hona' ('to be') changes with diferent pronouns.






[Home](#)
[Vocabulary](#)
[Report Card](#)
En  हिंदी 
 Joanne34
[Settings](#)




You are not fine.





tum



theek



nahi



ho

maĩ  
I

hum  
we

tum  
you

aap  
you

yah  
this

vah  
that

ye  
these

ve  
they

theek  
okay

doctor

Jonanne

nahi  
no/not

huũ  
am


ho  
are

hai  
is


haĩ  
are





Additional Word

Haa  
Yes



'Nahi' (No, comes just before the verb.



## 8.1.1 Components of the Learning Screen

**Word-tiles:** They might be clickable or not-clickable. The word-tiles have the Hindi word (transliterated/ Devanagiri) and its English meaning underneath, on it. The user can change the target sentence using the clickable word tiles.

**Word Tile Groups:** Word tiles are laid out in groups, depending on their word-type (eg: Verb, Noun, Subject, Post-position, etc) , and place of the word-type in the target sentence.

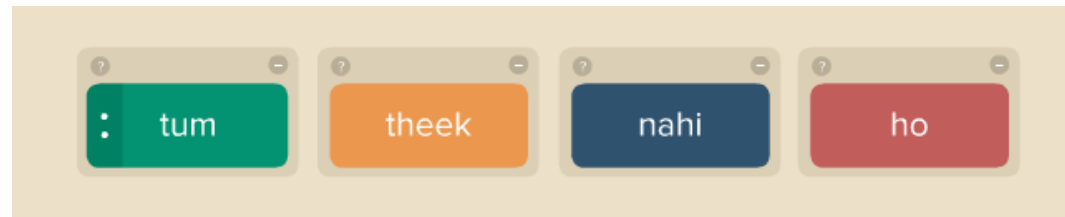
The **translation** of the target sentence appears at the top.

The red **sound** icon can be used to listen to the target sentence multiple times.

Grammar and Usage Tips: The 'tips' given by a character provide insights into grammar rules, usage tips, and other guidelines.

(Next) The learning itself is divided into stages. The user may click on next, to go to the next stage of learning. Eg: A different noun type/ A different sentence type.

**Additional Vocabulary:** Which must be learned immediately, or is closely related to the sentence being discussed, is provided



**Target Sentence:** The sentence currently on the screen. It is made up of target words, which are colored tiles denoting a specific word type. Target words act as 'slots' where words of a specific word type can fit. User can change the sentence by clicking any of the white clickable word tiles (Which would then take the place in the target sentence, with the correct dependencies and conjugation.)

Pronouns/Nouns in the target sentence which have singular or plural forms, can be changed from the **tab** on the target word.

The (-) on the target word can be clicked, to collapse the particular slot.

The (+) can restore a collapsed slot.

The (?) on the target word provided information about the slot type. eg: M1 Noun, Pronoun, Negator, Question Word, etc. This is essentially a grammar description which is optional, can be accessed at will, and can be hidden away.

## Level 1

Word Order

1st, 2nd, 3rd person

होना conjugation

### 8.1.2 How User Learns the Content

The layout of Level 1 learning begins with two word-tile groups, in its first stage:

#### Stage A

1. Pronouns
2. होना Conjugations

Only the pronouns are clickable, and govern the target sentence.

#### Stage B

A new word-tile group, which is the subject in the sentence, appears between the pronouns and the hona conjugations. It is clickable. This subject could be a noun or an adjective. The number of word tiles in this group could be scaled up. This slot is collapsable.

#### Stage C

The negator 'नहीं' appears before the verb hona. This is absolute, and is non-clickable. The slot of नहीं may be collapsable.

#### Stage D

The Question-Marker word 'क्या' is added, right in the beginning of the sentence. This is non-clickable. This converts the statement sentence into a question. क्या is collapsable.



This is fine.

yah

**noun or adjective**  
That tells something more about the pronoun on the left.

**hona (verb)**

Various forms of hona are used in the present tense, indicating the person and number.

maĩ  
I

hum  
we

theek  
okay

huũ  
am

haĩ

tum  
you

aap  
you

doctor

ho  
are

are

yah  
this

vah  
that

ye  
these

ve  
they

Jonanne

hai  
is

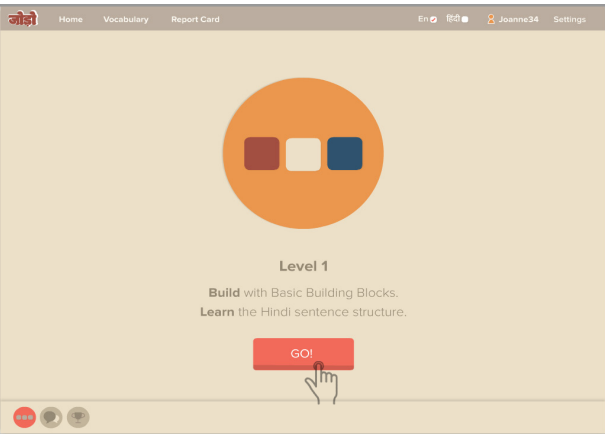
'Nahi' (No, comes just before the verb.



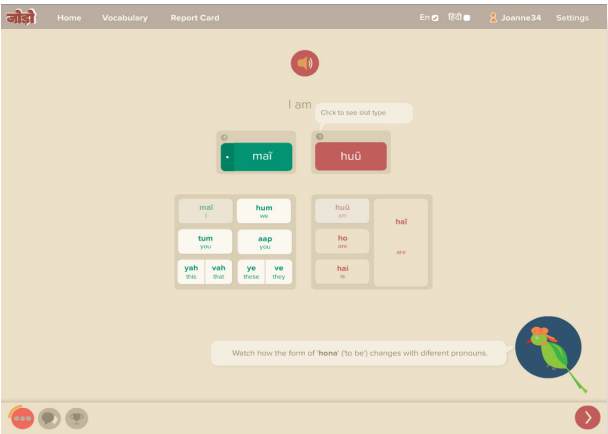
# Level 1 User Journey



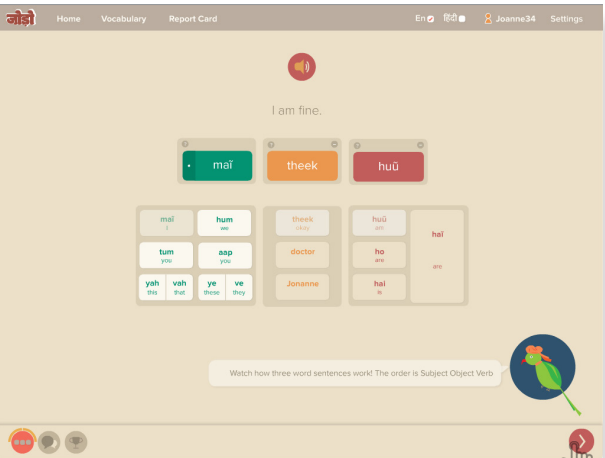
Level 1 Learning Home Screen



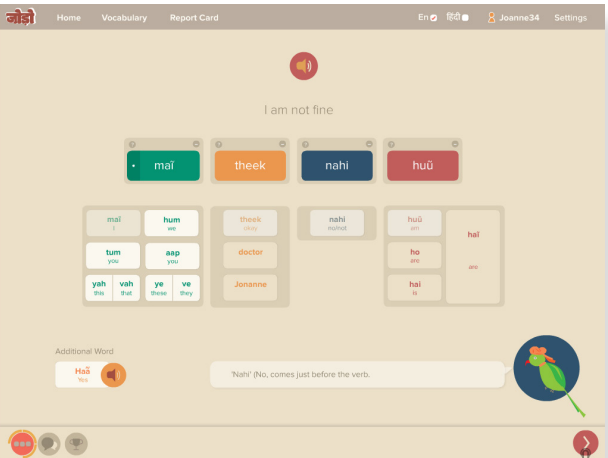
Basic 2-word Sentence (Stage A)



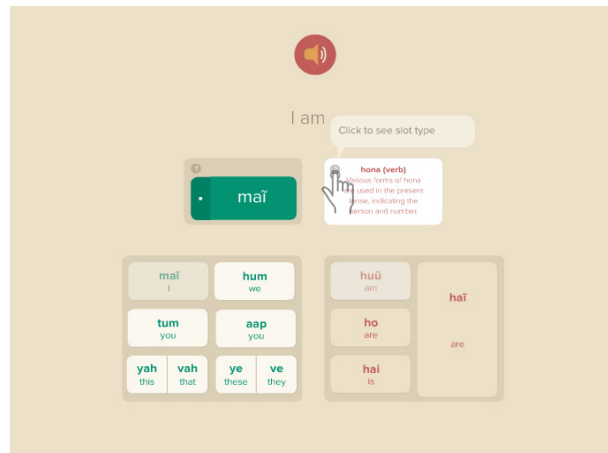
Next Stage: 3 word sentence (Stage B)



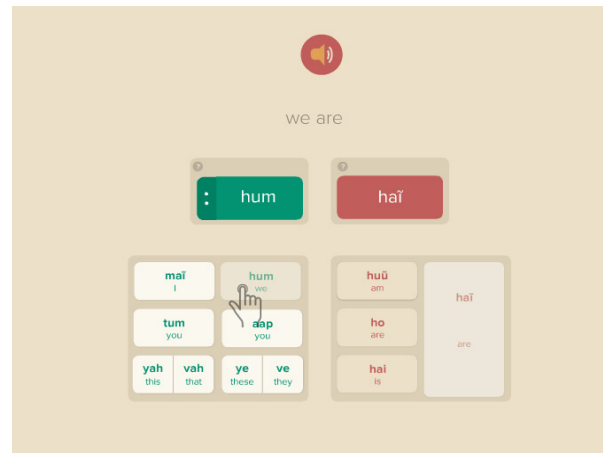
Next Stage: 4 word sentence with नहीं (Stage C)



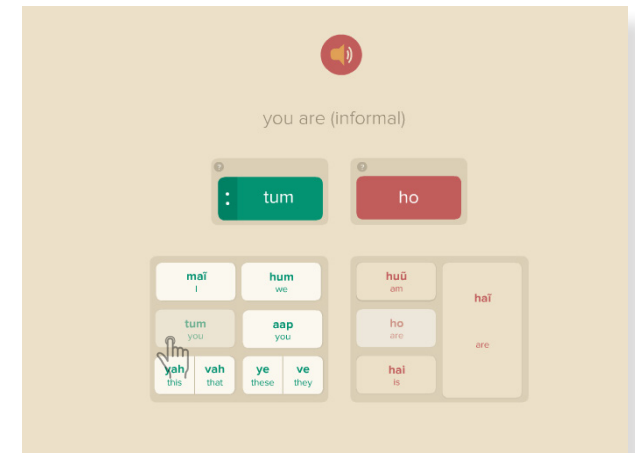
## Grammar Slot explanation



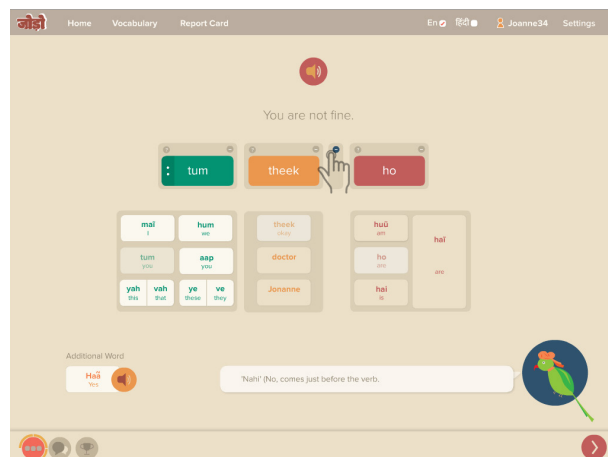
## Changing Pronoun, conjugation happens automatically



## Changing Pronoun, conjugation happens automatically



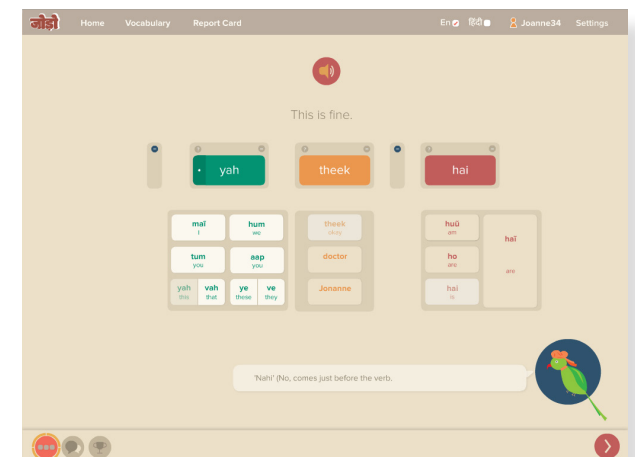
## minimizing slots



## Next stage, sentence structure with क्या (Stage D)



## Minimizing/maximizing slots to explore possible structures





## Level 2

Learning new **nouns**  
& their type.

Learning to **pluralize** nouns  
according to type.

### How User Learns

The layout of Level 2 learning has two word-tile groups:

#### 1. Numbers

#### 2. Nouns

The nouns appear in stages, in 4 different groups: M1, M2, F1, F2.

**Stage A:** Masculine Type 1 Nouns (आ ending)

**Stage B:** Masculine Type 2 Nouns (except आ ending)

**Stage C:** Feminine Type 1 Nouns (इ/ई ending)

**Stage D:** Feminine Type 2 Nouns (except इ/ई ending)

Noun-Type descriptions can be accessed by clicking on the type name.

Nouns can be changed from singular to plural and vice versa in two ways: from the dot tab, or from the एक/दो word tiles.

By listening to word-phrases with both singular and plural forms of the noun eg: "एक किताब, दो किताबें", the user develops a sense of how words are pluralized.



1 book

ek

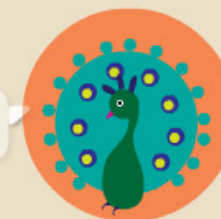
• kitab

ek	do
1	2

M1	ladka boy
	kamra room
M2	ghar house
	dost friend

F1	ladki girl
	chutti holiday
F2	kitab book
	dukan shop

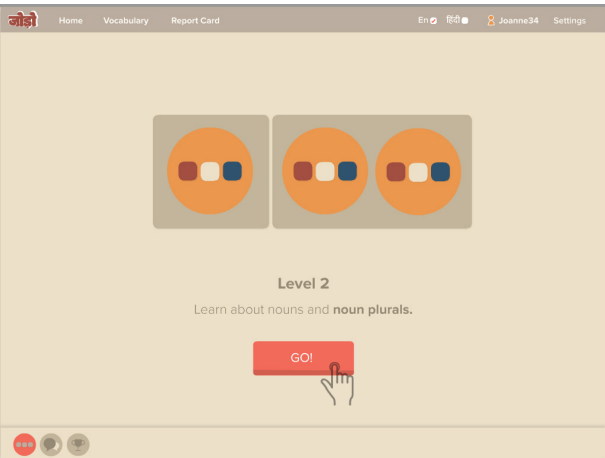
F2 nouns end with anything except an 'i' sound. They change to an 'e' sound in the plural!



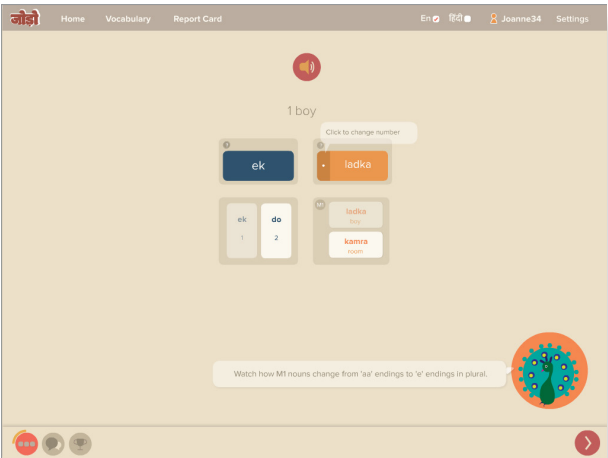
# Level 2 User Journey



Level 2 Learning Home Screen



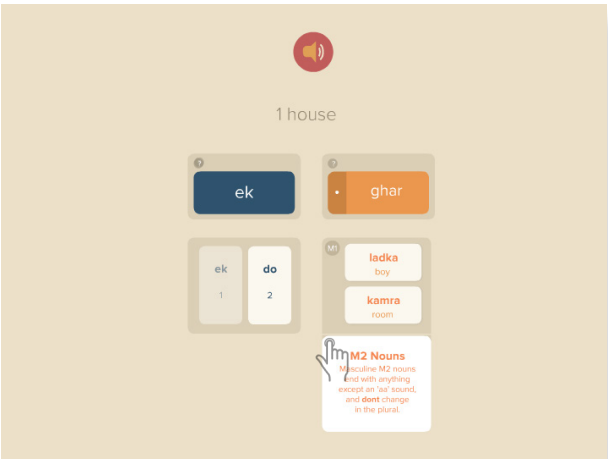
Masculine Type 1 (M1 Nouns) (Stage A)



Masculine Type 2 Nouns (Stage B)



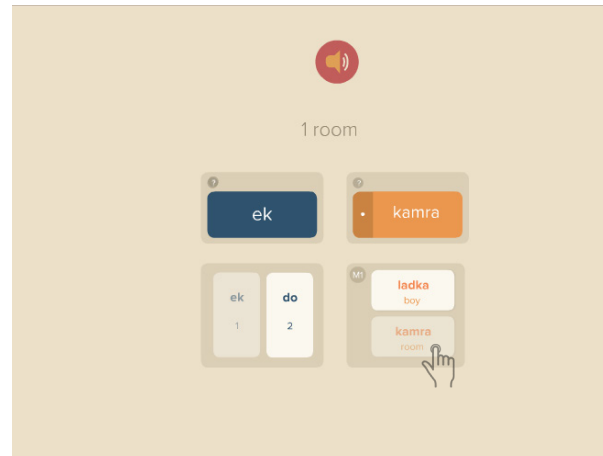
Word Type Explanation



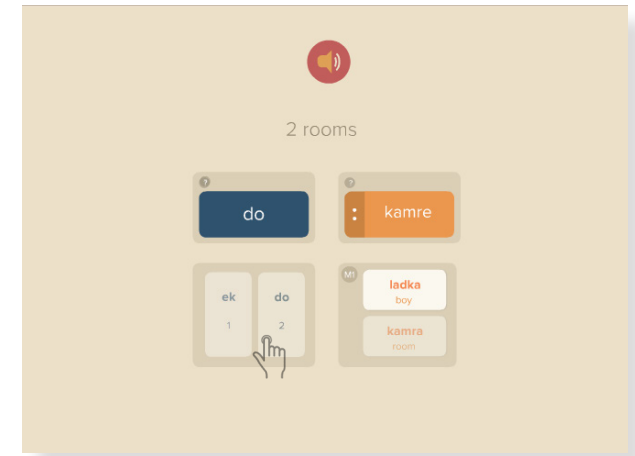
## Grammar Slot explanation



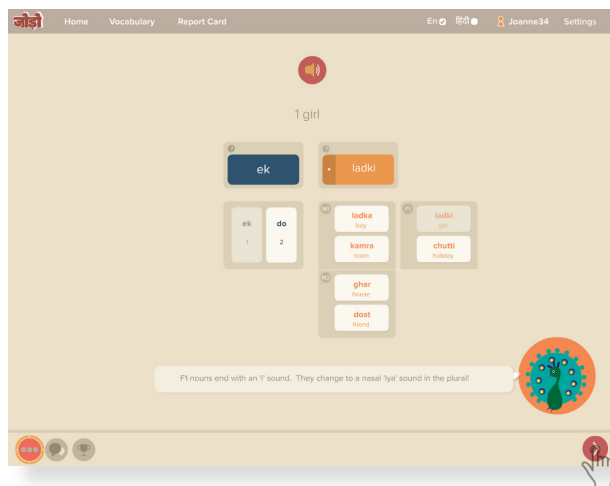
## Noun Change



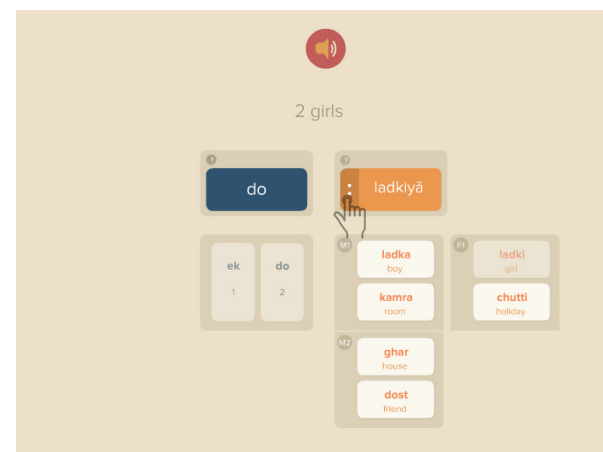
## Noun Number Change



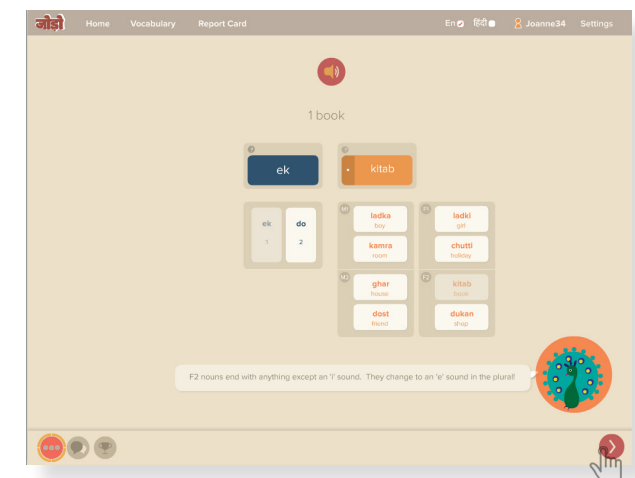
## Feminine Type 1 Nouns (Stage C)



## Number Change from the dot tab (alternative to number)



## Feminine Type 2 Nouns (Stage D)



## Level 3

### Adjectives

Inflicting & Non Inflicting

Personal **Pronouns**

How they depend on

Noun gender and number

### How User Learns

The layout of level 2 learning has two word-tile groups:

#### **1. Adjectives**

#### **2. Nouns**

The nouns are placed in 4 different groups: M1, M2, F1, F2.

**Stage A:** Inflicting Adjectives

**Stage B:** Non Inflicting Adjectives

**Stage C:** Personal Pronouns

The adjective form changes according to the noun gender and number, as selected.

Noun number can be changed only be changed using the dot tab.

Additional adjectives may be added to the layout. It is scalable.



good books

acchi

kitabẽ

accha  
good

M1  
ladka  
boy

M2  
ghar  
house

F1  
ladki  
girl

F2  
kitab  
book

View more such adjectives!

bura  
bad



bada  
big



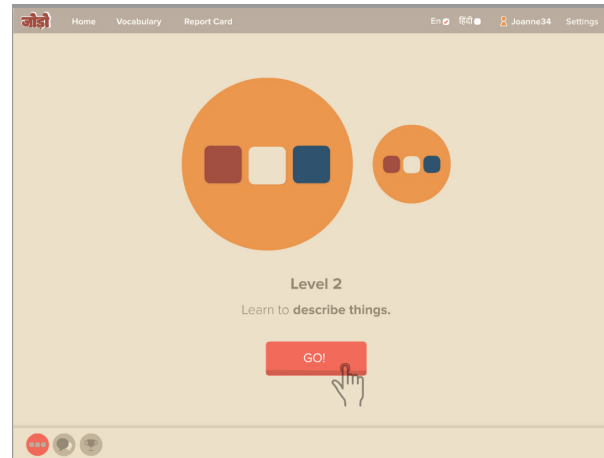
Adjectives with 'aa' endings change according to the noun.



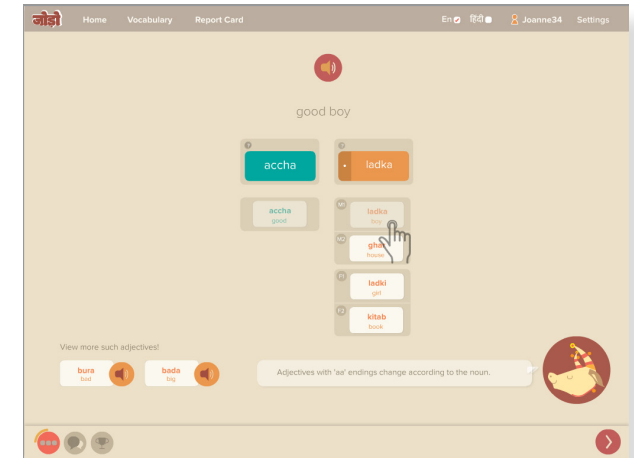
## Level 3 User Journey



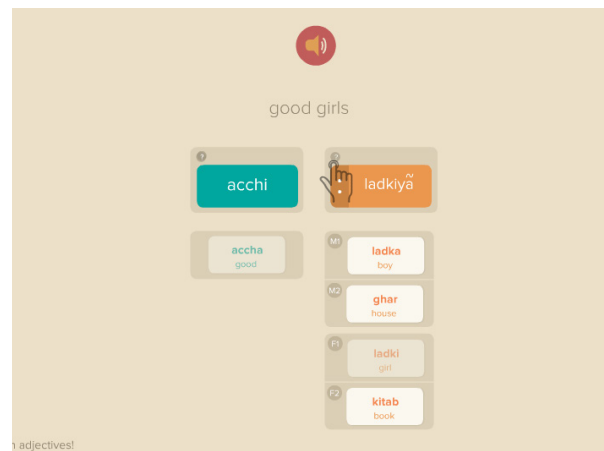
Level 3 Learning Home Screen



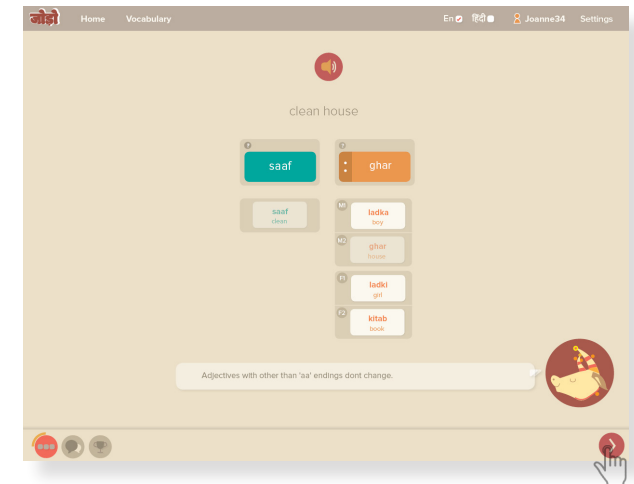
Inflecting Adjectives



Number Change



Non-Inflecting Adjectives (Stage B)





## Grammar Slot explanation

good book

adjective  
describing the noun.

accha  
good

ladka  
boy

ghar  
house

ladki  
girl

kitab  
book

adjectives!

## Number Change

good boys

acche

ladke

accha  
good

ladka  
boy

ghar  
house

ladki  
girl

kitab  
book

adjectives!

## Gender Change

good girl

acchi

ladki

accha  
good

ladka  
boy

ghar  
house

ladki  
girl

kitab  
book

adjectives!

## Personal Pronouns (Stage C)

my house

mera

ghar

mera  
humara  
tumhara  
aapka  
iska  
uska  
iska  
uska

ladka  
boy

ghar  
house

ladki  
girl

kitab  
book

Personal Pronouns change like inflecting adjectives.

## Gender Change

my book

meri

kitab

mera  
humara  
tumhara  
aapka  
iska  
uska  
iska  
uska

ladka  
boy

ghar  
house

ladki  
girl

kitab  
book

Personal Pronouns change like inflecting adjectives.

## 8.2 Dialogue Stage

This stage comes after the learning stage. The main aim of the dialogue stage is for learners to overcome their **speaking barrier**, and practice speaking. Often, learners go through a silent period while learning, relying only on reading and listening to practice their language skills. Getting them to speak, early on in the language learning process, removes the speaking barrier and provides them with some confidence and practice when they actually need to speak in a real situation.

This stage also provides a visual representation and real-life usage of the grammar concept being discussed in the particular level, and attempts to make it more real. eg: In Level1, where 1st, 2nd and 3rd person pronouns are discussed, having the user speak with 2 different characters can capture the essence of the 1,2,3 person conversation.

This stage is unlocked only after the learner has completed the learning stage. Since this stage involves usage of a microphone and audio, the user may choose to complete it later, whenever it is convenient to do so.

Namaste!



## Talk with **Mitthu**, the Talking Parrot!

Species: xxxx, Age: 109 years Language Skills: Proficient

He might just introduce you to his other (talking) animal friends, too!

Say Hello to Mithu!



## 8.2.1 Components of the Dialogue Screen

**Characters:** One or more characters may speak to the learner, or to each other.

**Objects:** The character may refer to certain objects, the pictures of which appear on the screen.

**Speech Bubble:** The speech is always transcribed in a bubble, and may be heard by the user multiple times by clicking on the audio button beside it. It may also be translated by clicking on the text itself.

**Cue:** The user is given a cue as to what exactly to speak, and he/she is required to compose the sentence and speak it out, whenever ready.

**Next/Speak/Recording:** This button, when red, indicates the user might hold it down for speech. While recording, it turns brown. If the speech is correct, it becomes the green next arrow. If not, it becomes a red re-do icon.

**New Words:** If the user's sentence will contain new words, the words and their pronunciations are available on the screen.

The user holds the speech button down, speaks the sentence, and releases it. The speech is evaluated, and the feedback either prompts the user to move ahead with the conversation, or to try again if it does not sound right.

## Level 1 Dialogue

### How User Learns

Level 1 Dialog has the main character as Mitthu, a talking parrot. The content of Level 1 Dialogue involves simple introductions, pleasantries, asking / telling ones names, etc. In addition, it gets the user to build and speak sentences that were covered in the Learning stage.

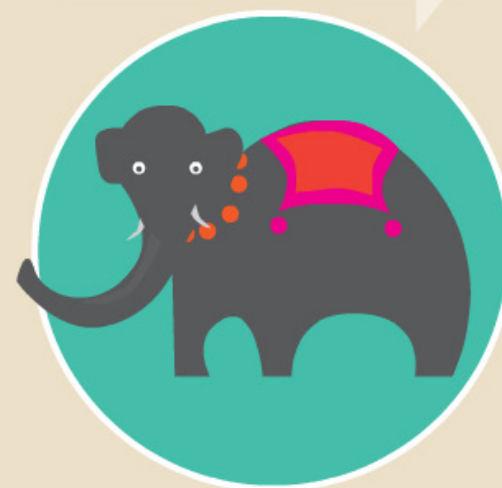
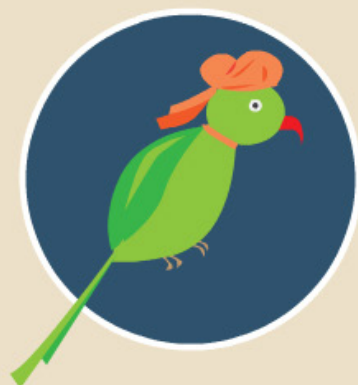
The user is required to make full use of the pronouns, and remember pronouns for me, you, it, them, depending on the character/object addressed.

The presence of 3 participants in the conversation that ensues: The user, Mitthu, and Ganesh the elephant - Ensures the usage of all 3 persons.

The conversation is designed such that most of the patterns that the user is required to speak, are available in the question itself.

eg: आपका नाम क्या है? मेरा नाम \_\_\_ है.  
क्या वह पंछी है? नहीं, वह पंछी नहीं है!

Kya aap Bhartiya hai?



Tell Ganesh whether  
you're Indian or not.



# Level 2 Dialogue

## How User Learns

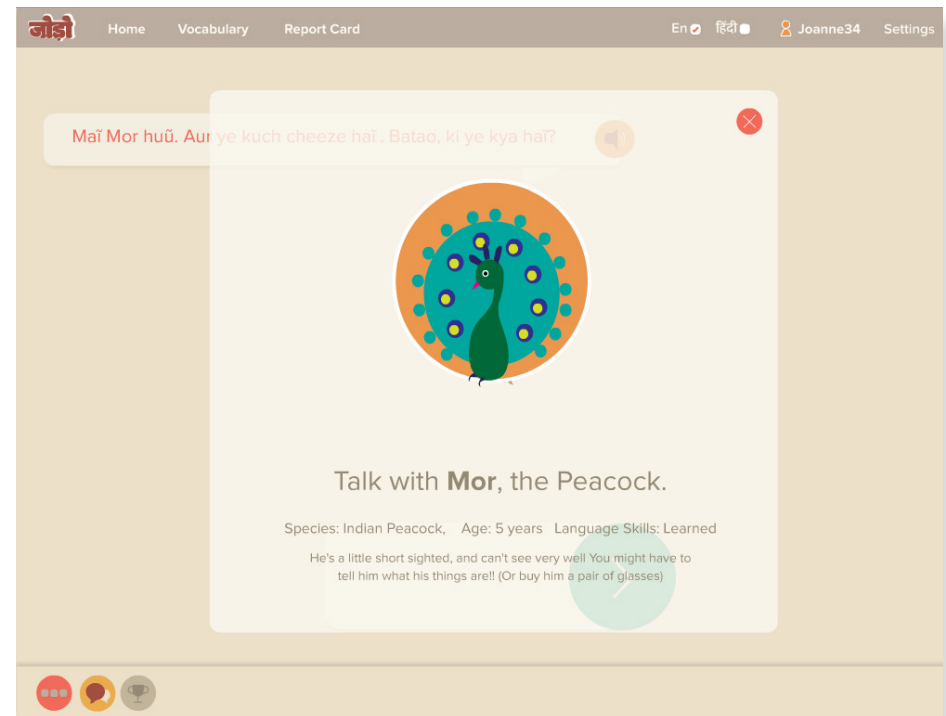
Level 2 Dialogue has Mor, the peacock, pointing out at various objects, and asking the user what it is. The user is required to answer in whole sentences, on the lines of "This is a chair" / "These are 2 chairs."

Thus the user learns new words, relates them with images, and after knowing its gender (The new word and its gender is given) , attempts to change it into its plural form and speak it out with the full sentence.

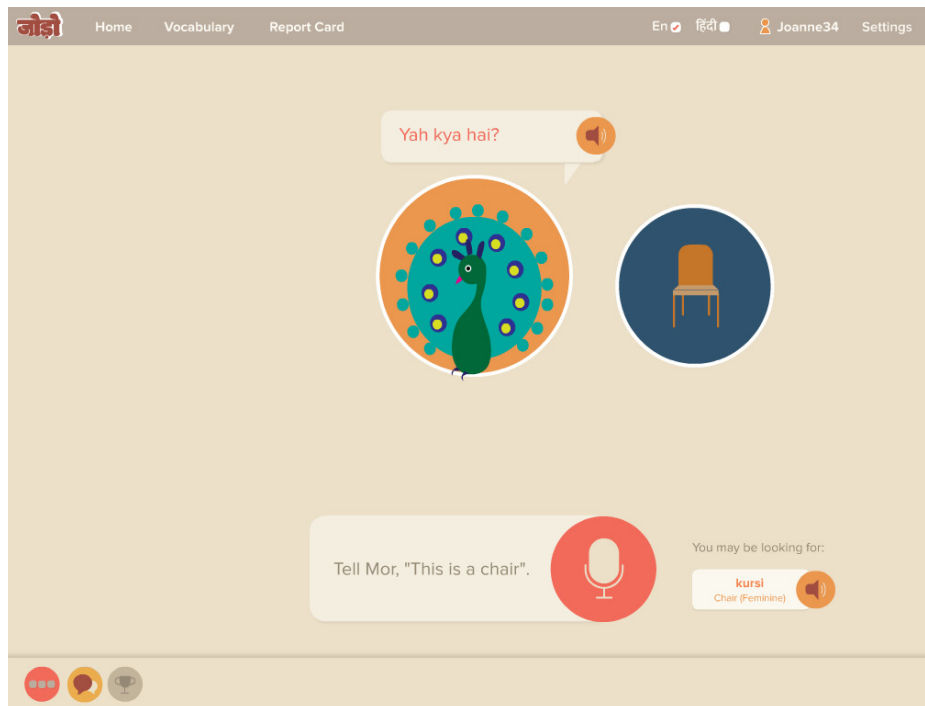
The user is not expected to know the new word, but is expected to listen to it, speak it out in a full sentence, and be able to speak its plural once the gender is known.

eg: कुर्सी is a feminine noun. Since it ends with an 'ई', its plural is 'कुर्सियाँ'

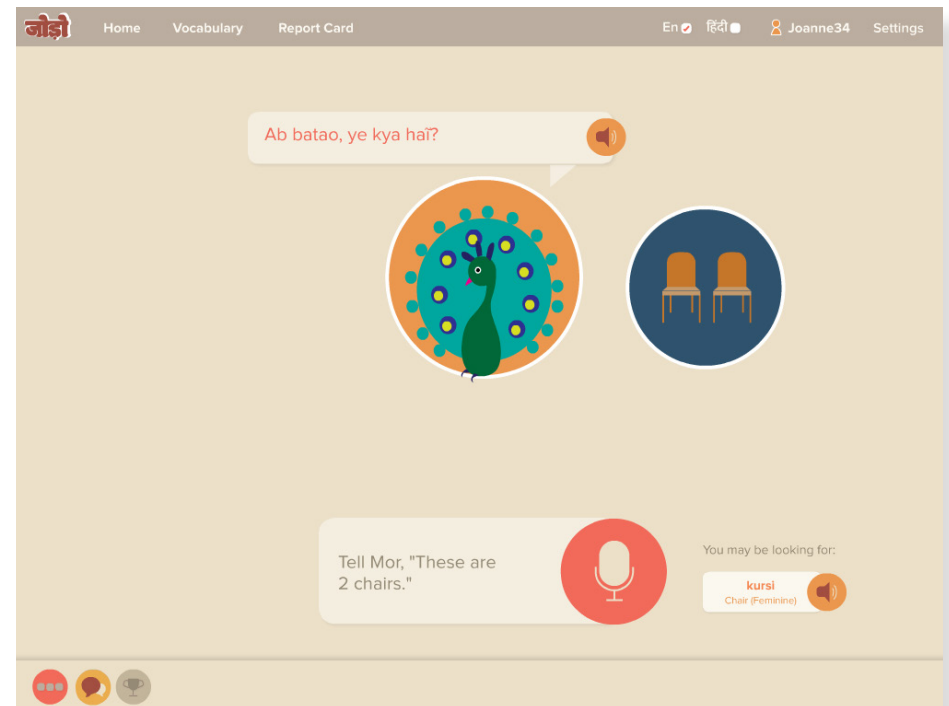
About 5-6 such questions later, Level 2 Dialogue ends.



Character Introduction



Singular chair, user says : "यह कुर्सी है."



Plural noun, user says "ये दो कुर्सीयाँ हैं"



# Level 3 Dialogue

## How User Learns

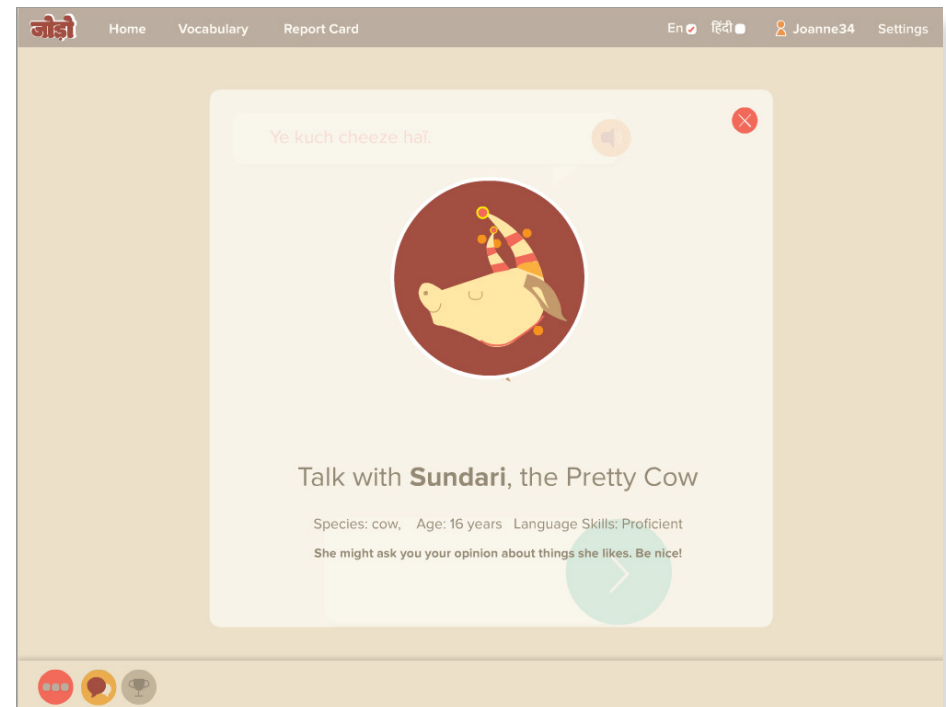
Level3 dialogue deals with describing things.

The user learns new nouns (object names), new adjectives, and also learns to modify these adjectives depending on the noun they qualify.

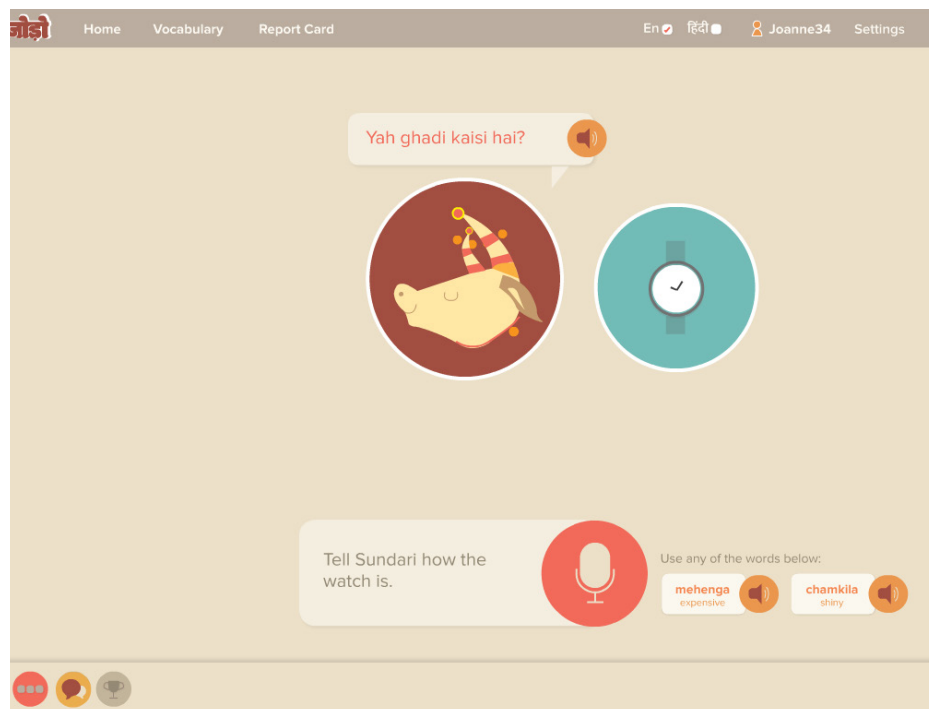
Sundari, the cow, asks the user to describe various objects.(eg: Watch, house, fish, etc)

The user is required to pick one of the two adjectives, and form a sentence with it, which describes the object. For eg, if 'चडी' is feminine, the adjective 'महँगा' becomes 'महँगी'.

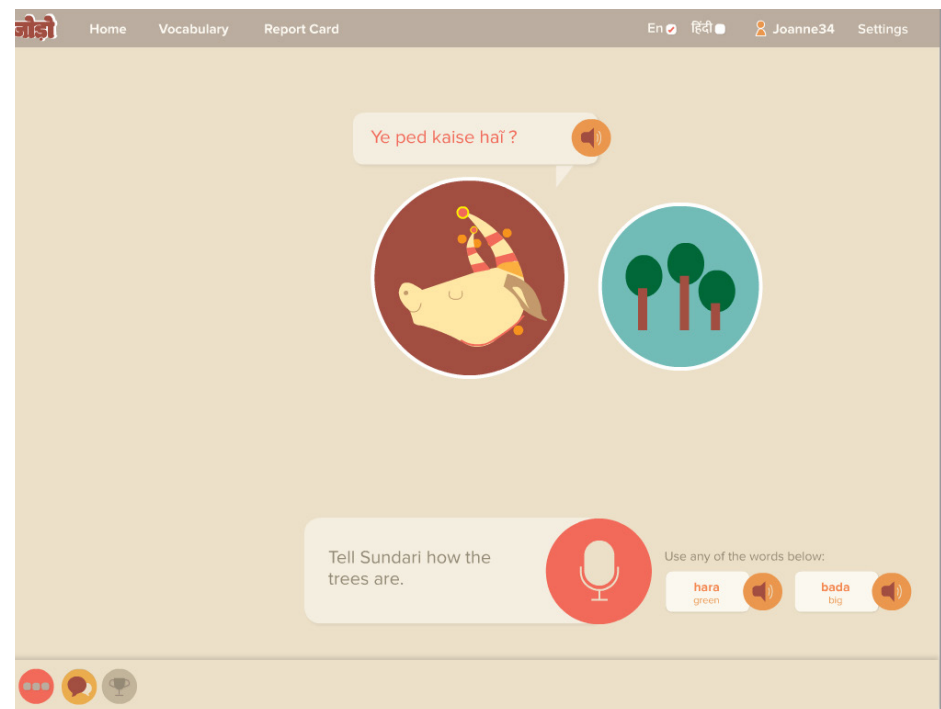
After 5-6 such descriptions later, Level 3 Dialogue ends.



Character Introduction



User says : "यह घड़ी मेहेंगी है/ यह घड़ी चमकीली है."



User says "ये पेड़ हरे हैं / ये पेड़ बड़े हैं."

## 8.3 Test Stage

The test stage is designed as a game, to reinforce the learning that has happened in that level. The learner can progress to the next level only if they pass this test. The test for each level is different based on the specific learning goal of that level.

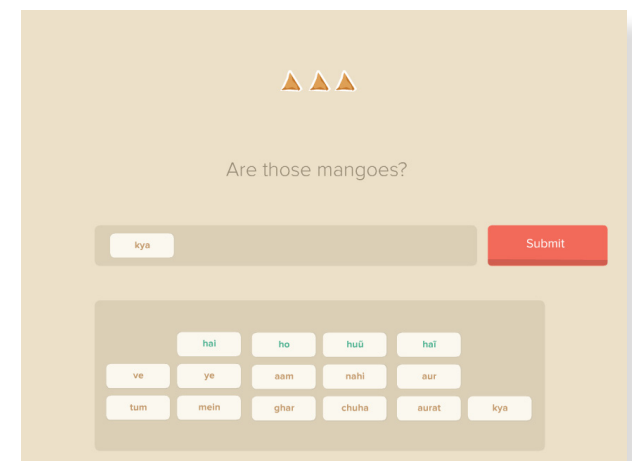
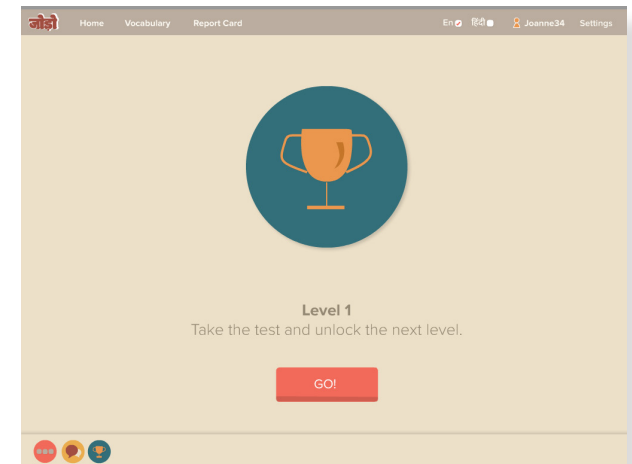
### Components on Screen

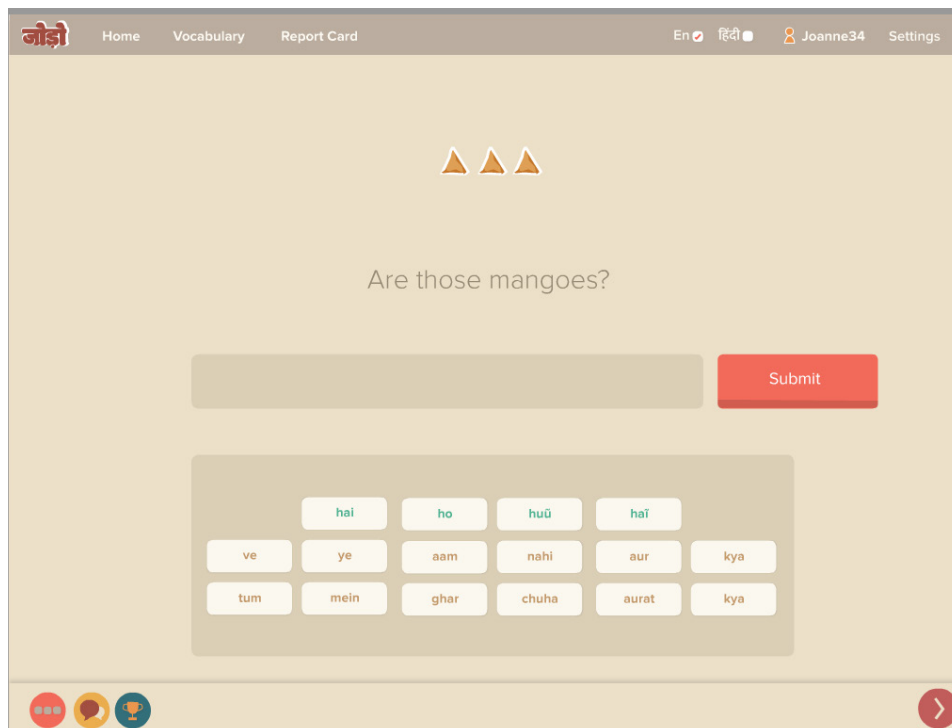
**Samosas:** The game starts with three Samosas. They indicate a full score. If the user gets one wrong, one samosa is lost. Three samosas lost means that the game must be replayed.

**Question:** The question is an English sentence which must be translated. The game has 10 such sentences.

**Tiles:** These game tiles contain transliterated Hindi words. These must be dragged and dropped into the target sentence. Word meanings may be accessed by a single click. In case of nouns, the masculine/feminine are given in brackets along with meanings. They are placed at the bottom of the board in a jumbled manner.

**Submit:** When the user thinks they have constructed a grammatically correct translated sentence of the question, they hit submit.

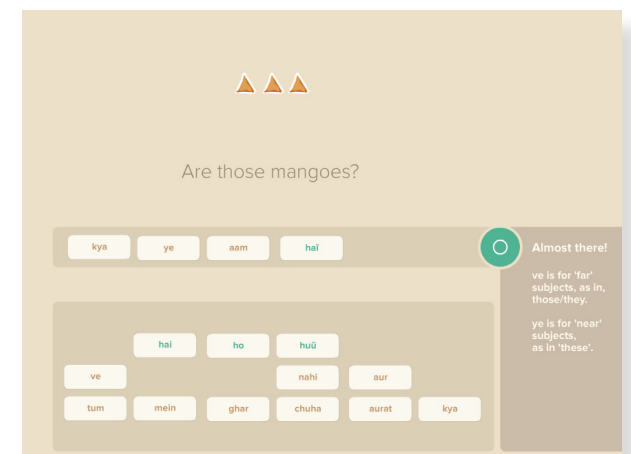
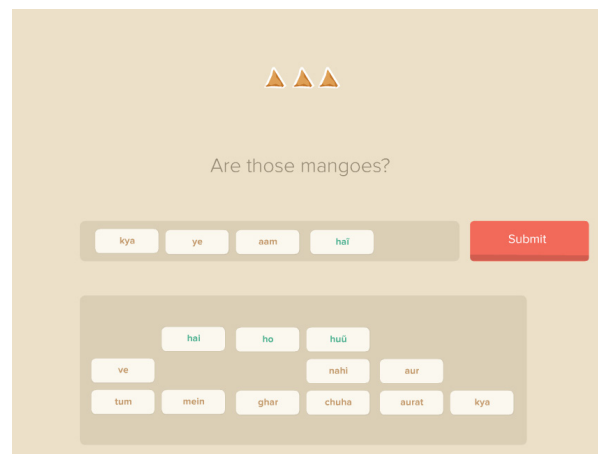
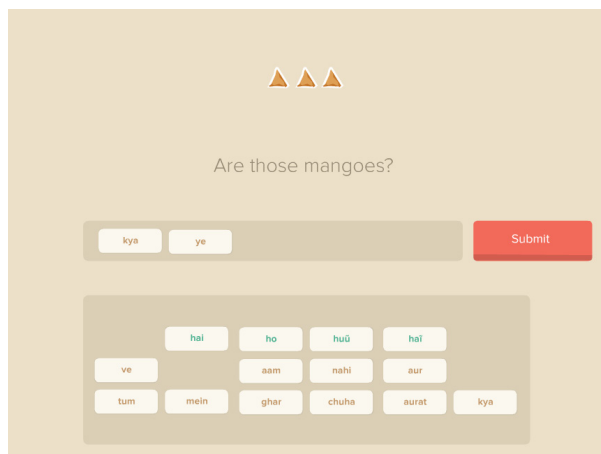




## Level 1 Test

An English sentence is given, and its translated Hindi sentence must be constructed using the given tiles. The exercise consists of 10 sentences. If the user gets all of them right, he/she completes the level with all three samosas and earns 1 jalebi.

Each mistake costs a samosa. The user may replay the game as many times as they like, to earn more jalebis.



## Level 2 Test

Level 2 test too, contains 10 sentences to be translated. However, each sentence appears in pairs:

eg: This is a book.

These are 4 books.

After translating the first sentence according to the same rules as Level 1 Test, the sentence automatically modifies.

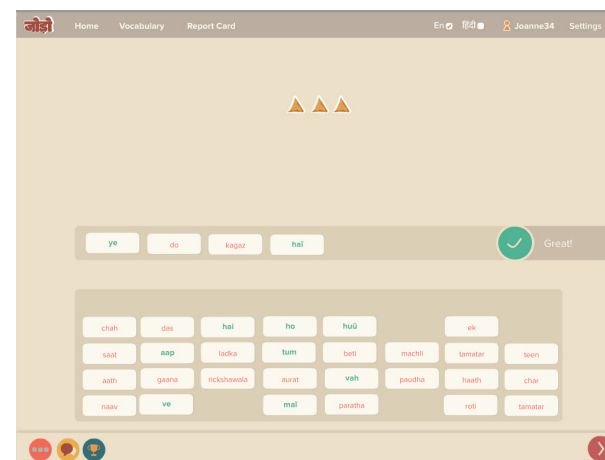
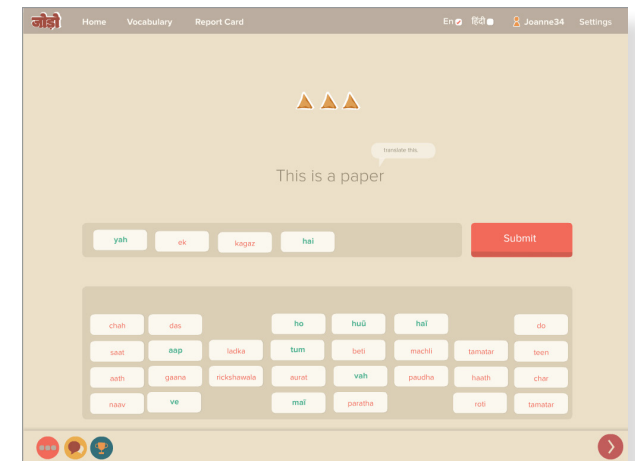
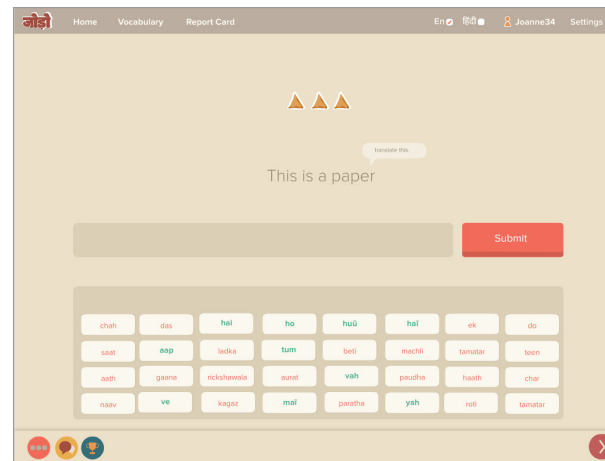
eg: यह लड़की है

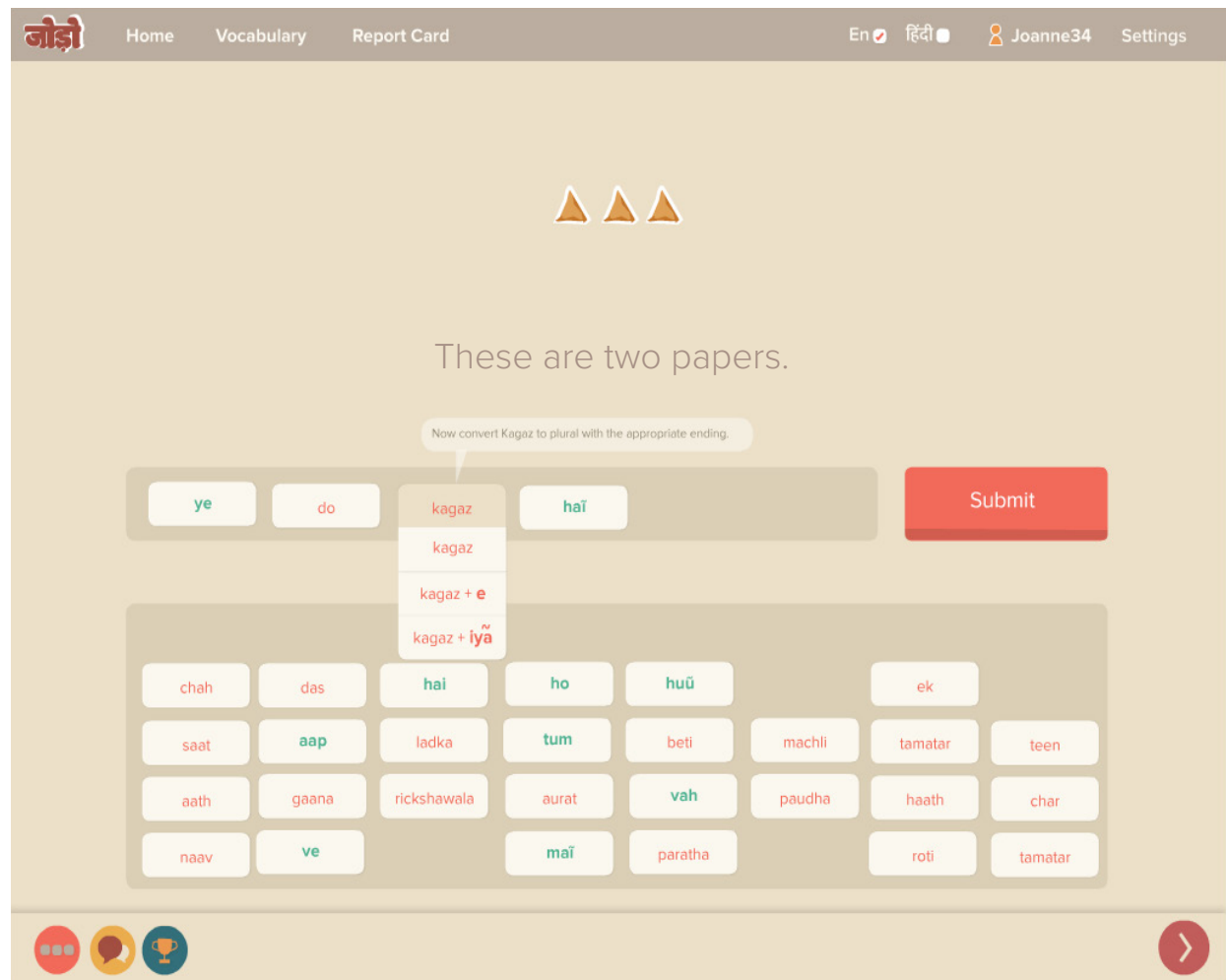
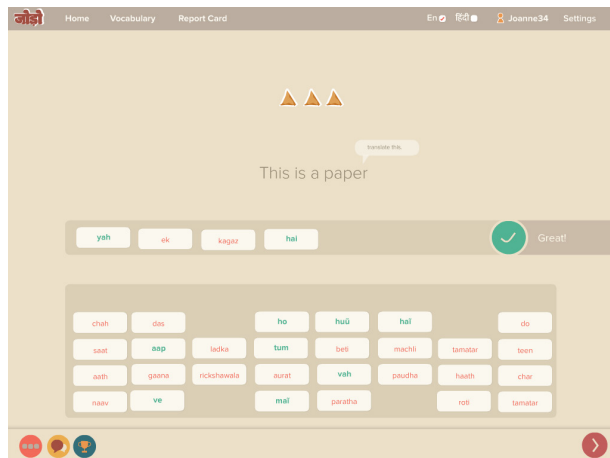
becomes

ये दो लड़की( ) हैं.

The user must then select the appropriate plural suffix(ending) for लड़की, from a drop-down list.(इयाँ)

The rest of the game play is similar to Level 1 Test Stage.





# Level 3 Test

Can be played single player or two player.  
The user gets points for building sentences.

During a turn, the user can do ONE of the following two things, before hitting Submit.

1. Build a new correctly constructed sentence on the board, connecting to a sentence already on the board.
  2. Modify a sentence on the board, by clicking on one of the changeable orange noun tiles. (In a sentence already existing on the board), AND, managing the dependencies that get affected due to the change.
- (Both moves give full points for the sentence constructed/modified).

## Components on screen:

**Scoreboard:** In case of 1 player, there is a single scoreboard. In case of 2 player/multiplayer, multiple scoreboards are up for display.

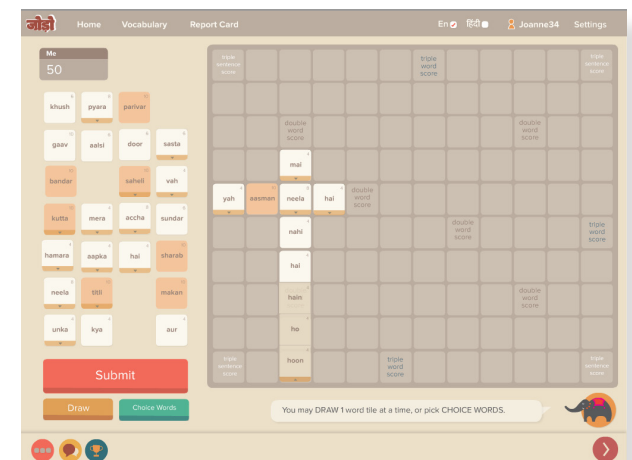
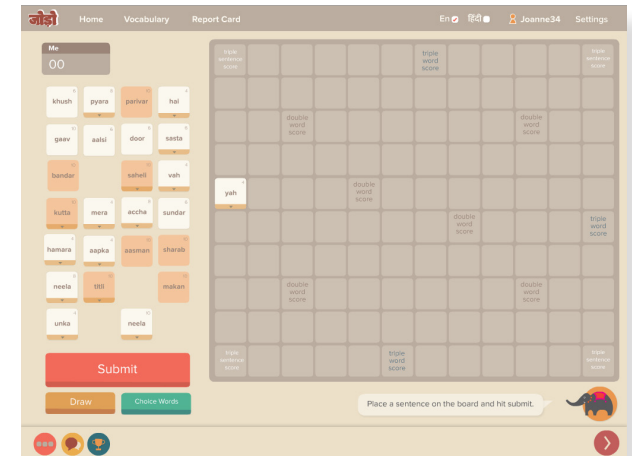
**Word tiles:** These square tiles contain words, and clicking them reveals their meaning. The orange tiles are changeable/modifiable tiles, which when placed on the board in a sentence, can then be changed during a turn. Some word-tiles with multiple forms have a drop down menu, and any form can be accessed. Eg: mera, meri, mere.

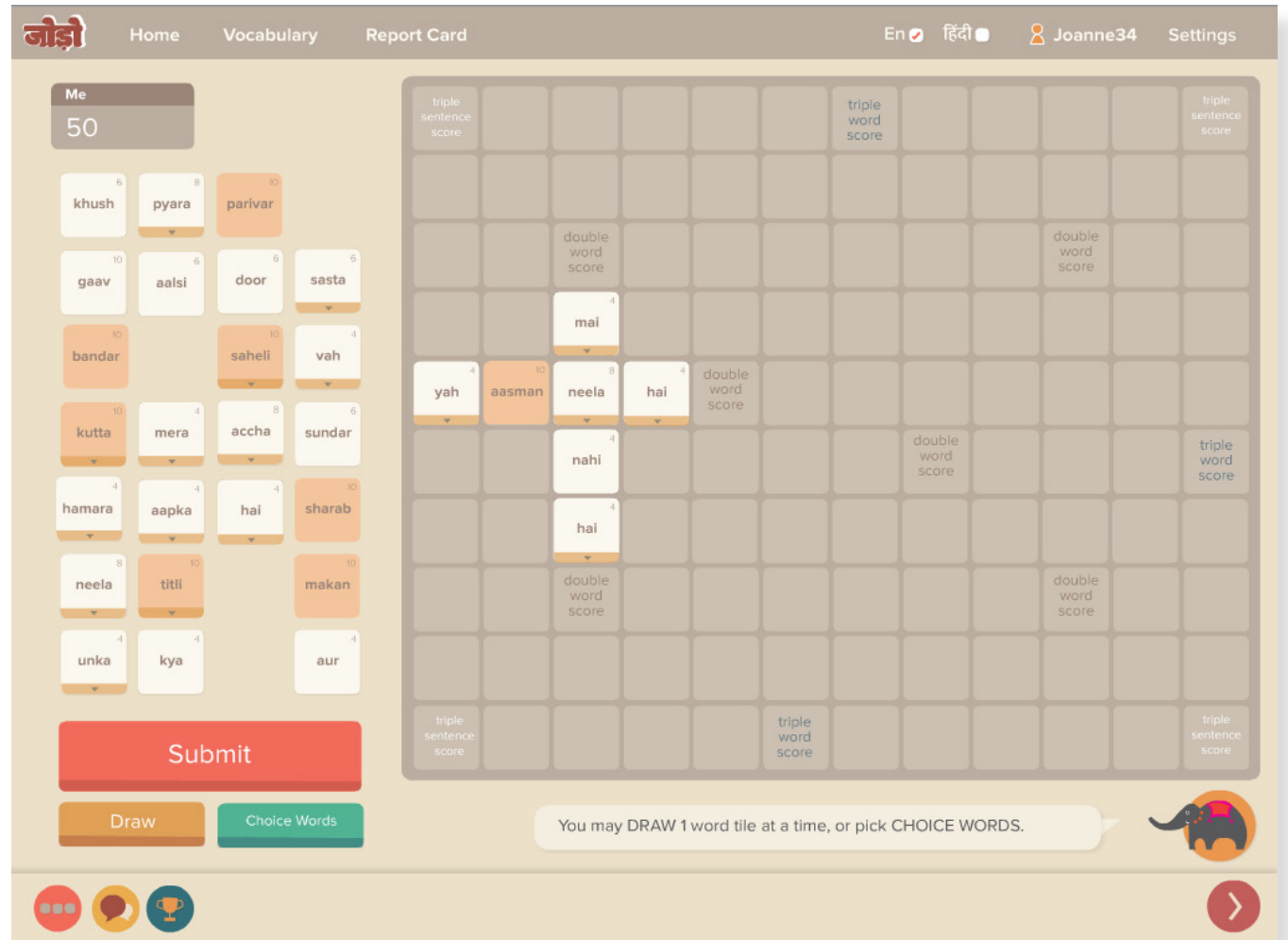
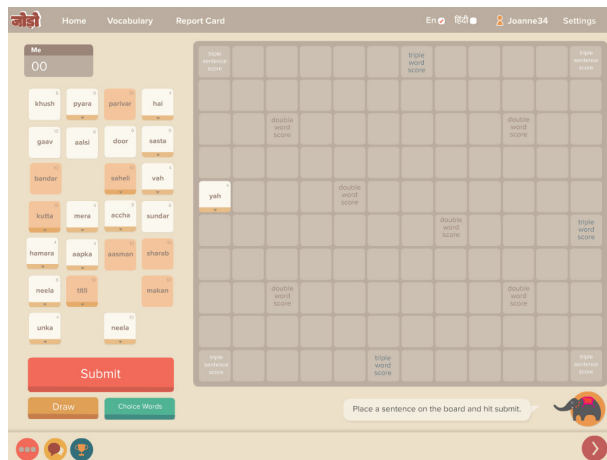
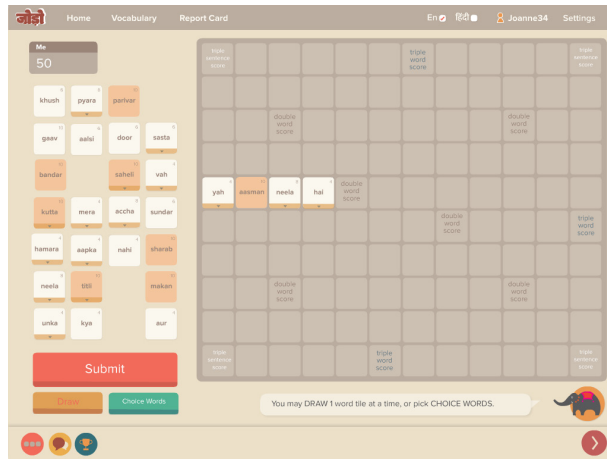
**Board:** This board contains incentives like triple bonus.

**Tips:** The little elephant provides instructions and tips for turns.

**Draw:** The user can opt for random draws, of tiles during a turn.

**Choice words:** Users can exchange words that they want for 10 points each, and make sentences of their choice.

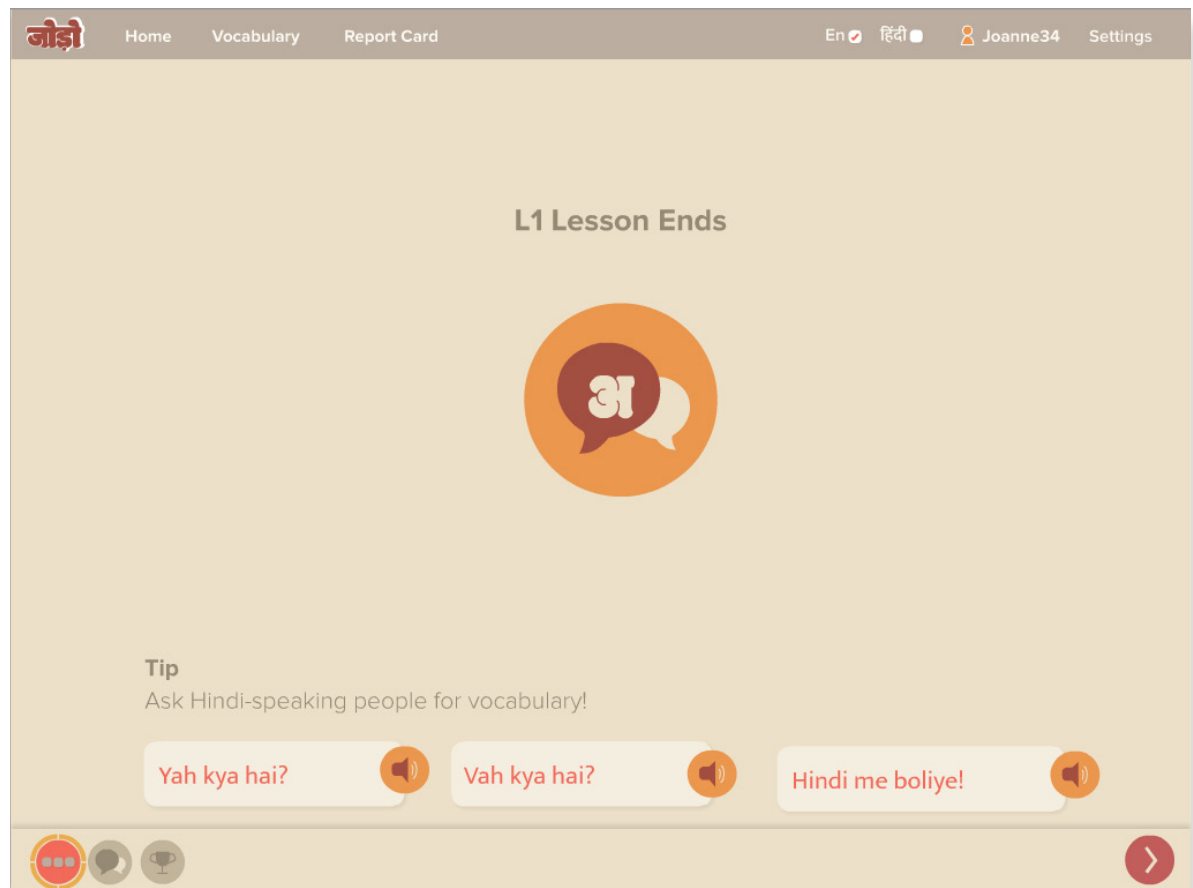
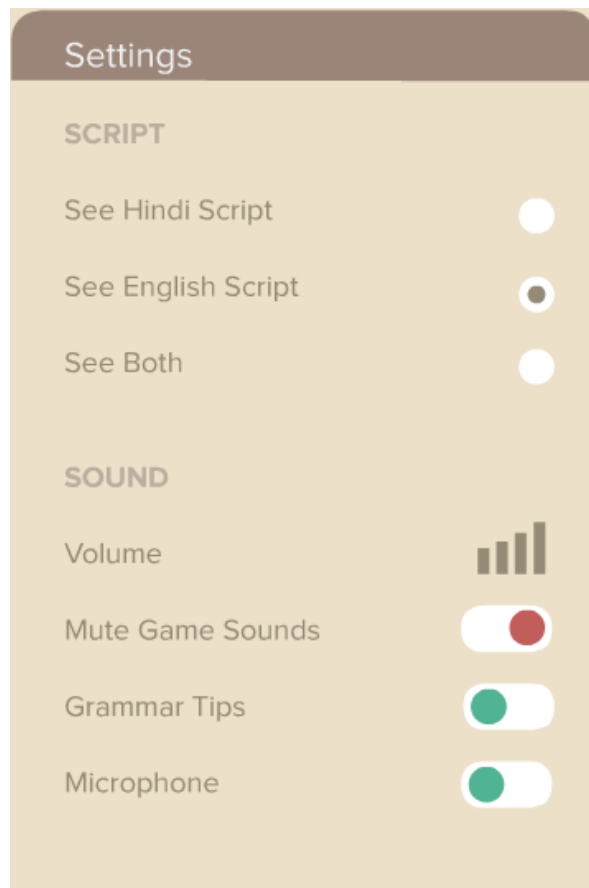




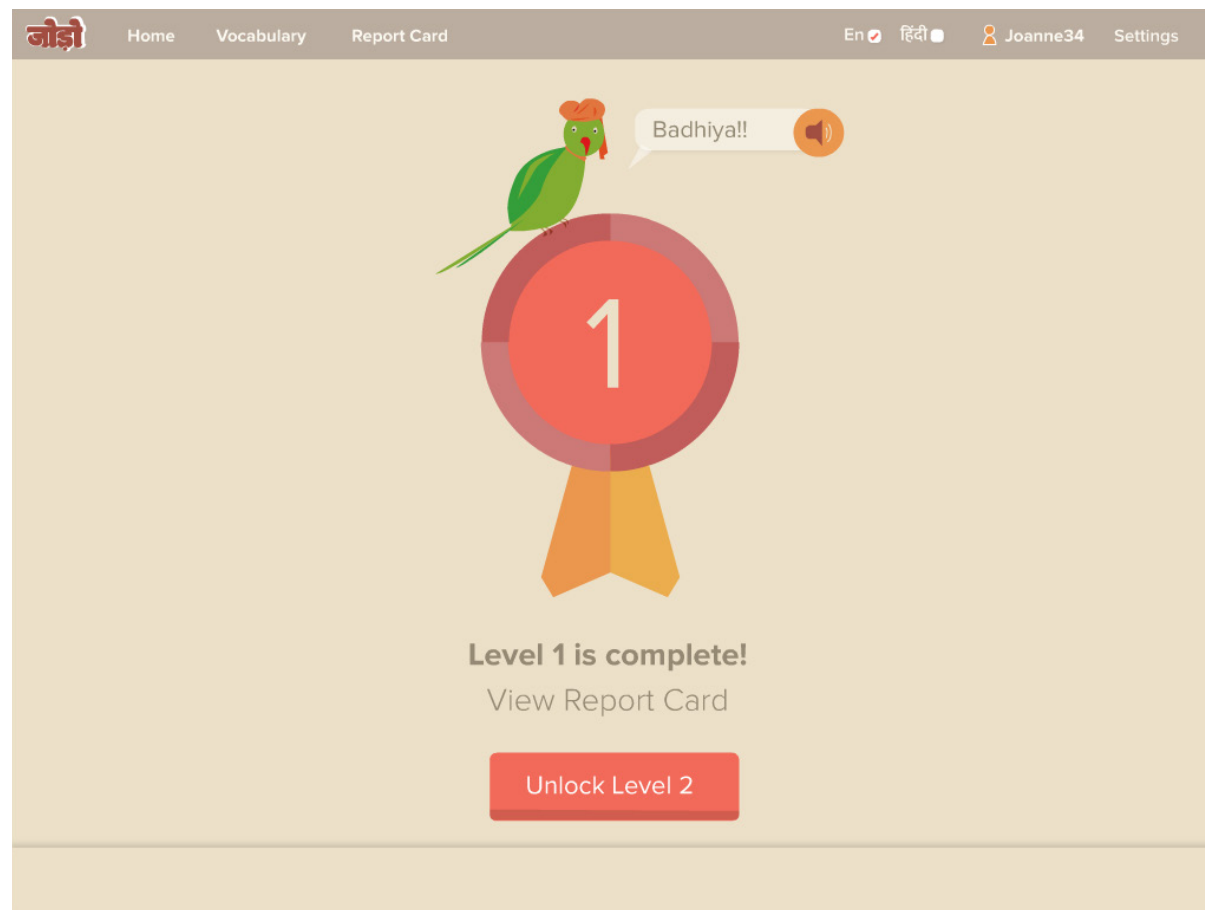


**Settings:** A switch between Devanagari and English are available on the top bar at all times. This may be of use to learners of Devanagiri who still need to switch to transliteration to verify. Other settings include Volume control, Game sound control, Switching off grammar tips, and enabling/disabling Microphone.

At the end of each learning level, certain words/ phrases which would further equip the user for better and real conversation, are provided.

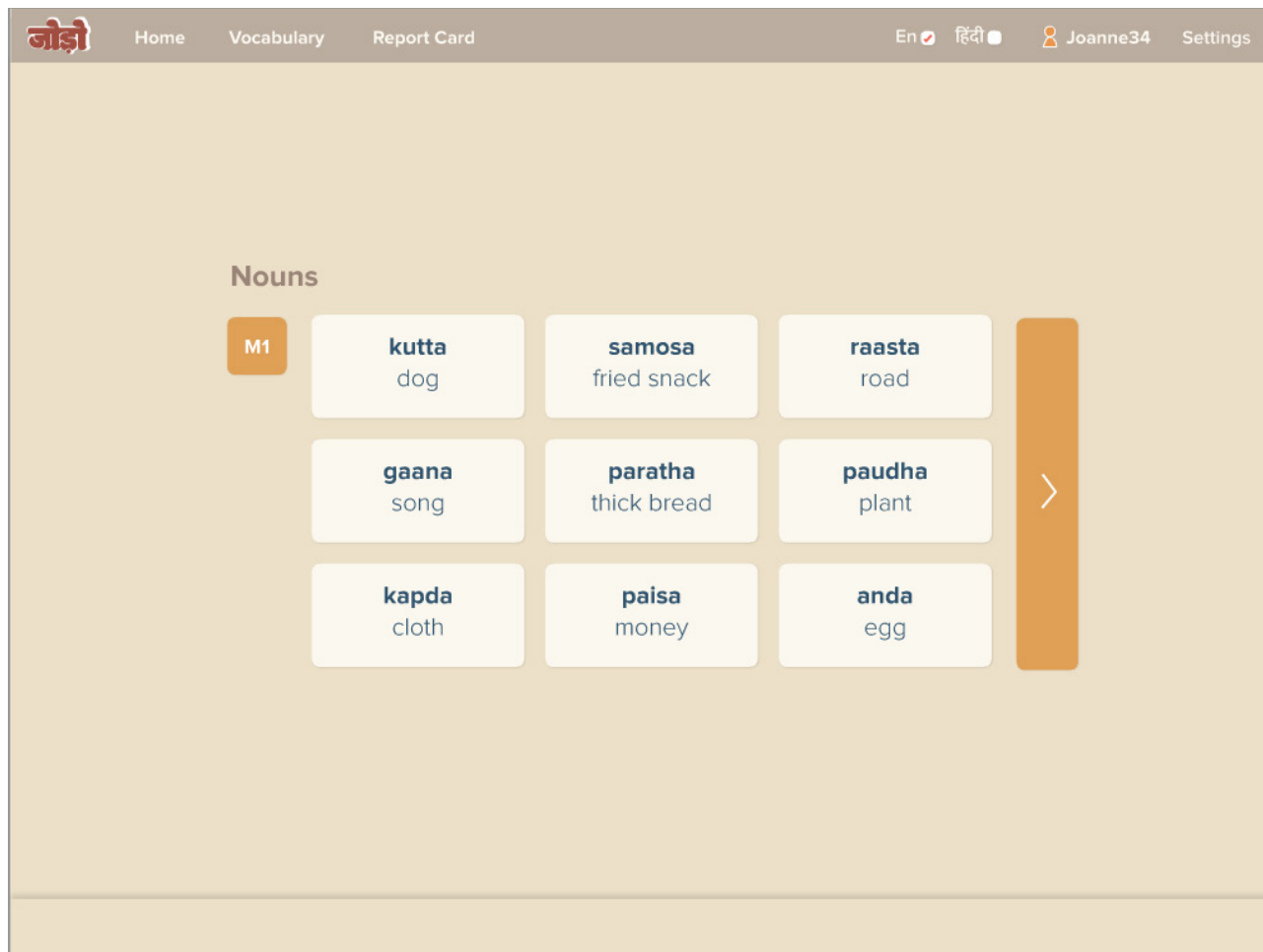


**Level Ending:** The user is provided with encouraging words at the end of each level. They may also view their report card before proceeding



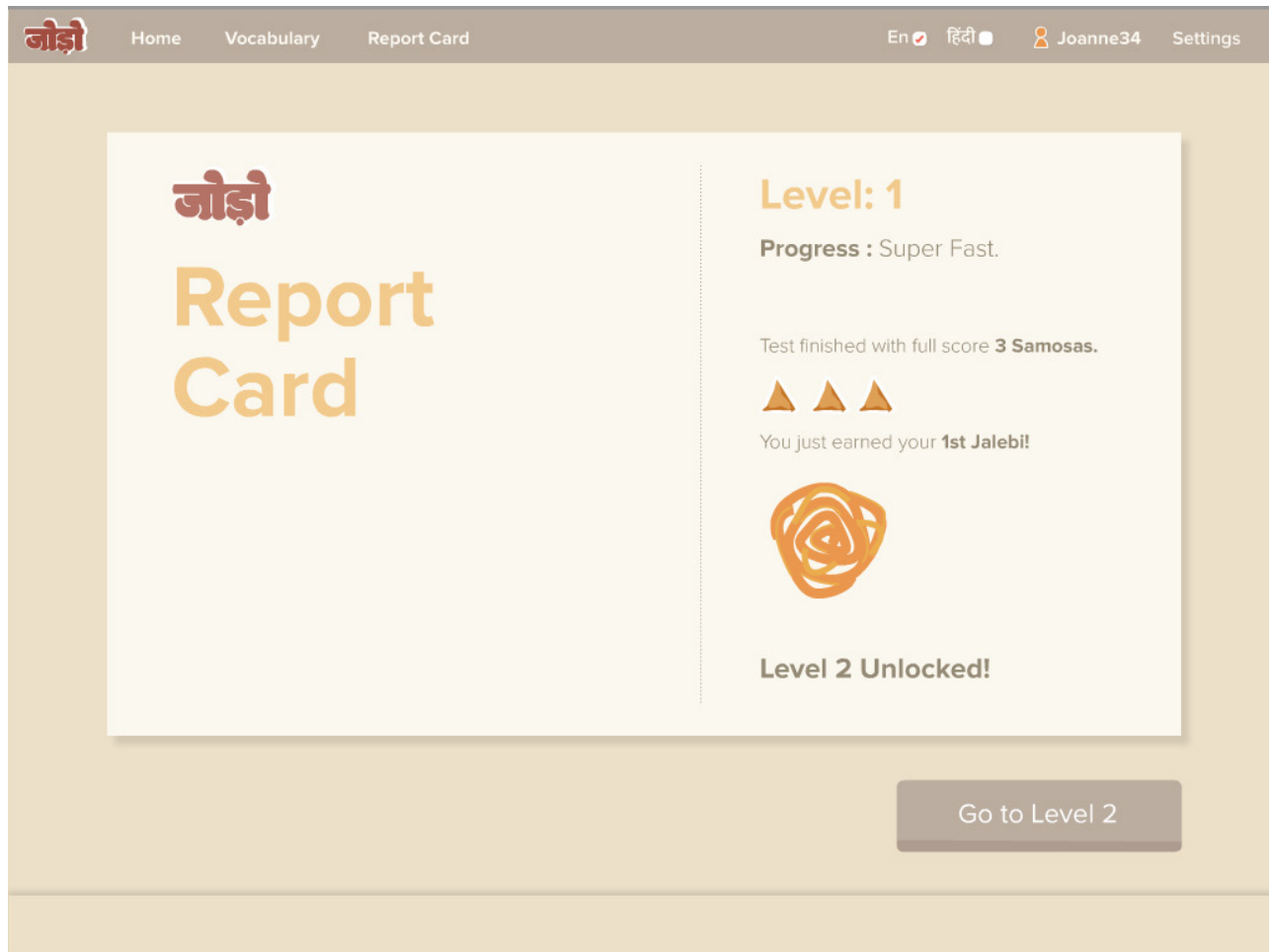
**Vocabulary:** The vocabulary section contains additional vocabulary, sorted according to the word types in the learning stages. The user may access this separately, if they want to learn new words, their meanings, and their grammatical points.

A full-fledged vocabulary tool can be integrated into Jodo as a future scope.



### Report:

The user can track their own progress using the report card.



# Pilot Testing

## Pilot Evaluation

To test run the tool as it was being developed. The Level-1 (Learning, Dialog, Test) were pilot evaluated. In addition, Level 3 Test was also evaluated using a paper prototype.

## Goals:

- To test if the product is usable.
- To test if the user is able to learn from the method developed for learning. I.e, interact with, explore, listen to the sentences.
- To test if the users can compose sentences in response to the questions on screen.
- To test if the users are comfortable with speaking in the dialog stage.
- To test if the game of Level 3(Word Scrabble) is understood, and whether they can manage the game play.

## Observations

- Users could not understand slot types.
- Users were giving random answers, i.e, they could not compose the sentence to be answered based on the cue provided.
- They struggled and got stuck with conversation. They needed to know that it was okay to intervene English, especially nouns, into conversation in colloquial Hindi.
- They did not understand which tiles were clickable.
- They tended to pronounce more on what they read(transliterated) than what they heard. So if hain was transliterated as hain, then they made

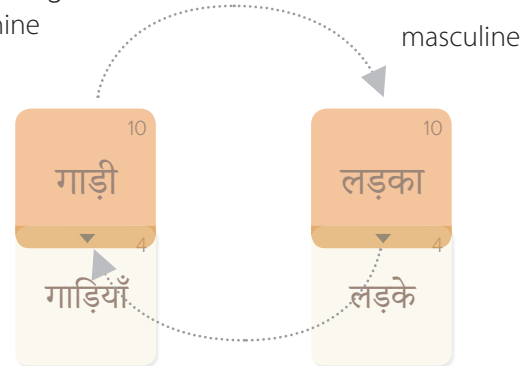
**Preliminary Testing** with users revealed the following Insights about the word-scrabble test of Level3:

The process of playing the game is quite engaging. Users wanted to play it on, for a time more than 20 minutes, and were quite disappointed when the tiles from the pilot prototype ran out.

Users often 'wanted' particular words, especially nouns, adjectives and verbs, to be there in the bucket, because by making a sentence with those words, they wanted to 'express' something in the sentence that made.

The point where the users 'change' the noun tiles on the board, and the whole meaning of the sentence changes, was found to be interesting.

Users enjoyed modifying a sentence that that opponent had made. The changing strategy for the changable noun tiles was finalized.

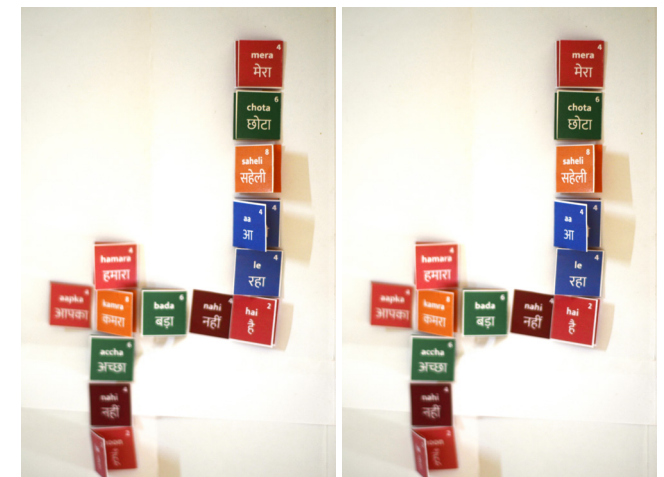


there is always an available option for changing into plural form.

the n sound very prominent.

## Changes after Pilot

1. Additions to the Scrabble Game (Choice Words Section)
2. Insertion of English Words
3. Disabling of hona word tiles making them non-clickable
4. Grammar slot explanations were added and made more descriptive.
5. Cues were made more detailed, such that only translation would be needed.
6. Keeping both Hindi and English interactively available
7. Usability problems like navigation was improved
8. Addition of more vocabulary. (At hand, during learning stage)
9. Using transliteration notation ~ for anuswar sound.







# 9. Evaluation

Based on the **Kirkpatrick 4-level Training Evaluation Model**, the first two levels of the model were taken for the scope for evaluation.

1. Learning
2. Engagement[15]

## 1: Learning

Here, it was measured what the users have learned. How much has their knowledge increased as a result of the learning? The specific learning objectives of the tool were be evaluated. Changes in knowledge were evaluated using post-tests after each level.

## 2: Engagement

This measured how the learners react to the training, If they thought the learning was a valuable experience. It also attempted to find if the users were motivated enough to continue with the learning.

## 9.1 User Criteria

Adult, English Speaking Foreigners (with a medium to high proficiency in English) with an intent to learn the Hindi Language, were chosen. They were informed upfront about the purpose of the evaluation, and as they signed up for it, the intent was confirmed.

No. of users : 3

Three levels of Jodo were ready for evaluation. The prototypes for evaluation were build such that they could fulfill the evaluation goals stated.



## 9.2 Evaluation Goals

### Goals of Learnability

#### Learning Stage

1. The user must internalize and learn the grammar concept taught.
2. The user must be able to SPEAK the sentence, repeating the audio and by reading support.

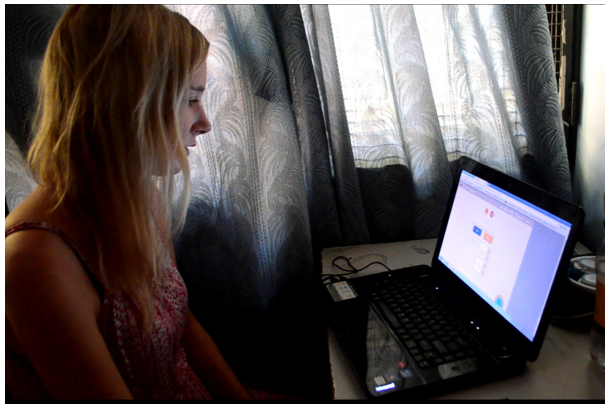
#### Dialog Stage

1. The user must be able to compose or answer the appropriate sentence based on the cue / question asked by character.
2. The user must be able to SPEAK the sentence, based on the learning stage and the sentence pattern on screen.

### Goals of Engagement

#### Learning Stage

1. The user must be motivated enough to click through and listen to sentence structures repeatedly.
2. The user must be engaged enough to repeat after the sentences.



### Dialog Stage

1. The user must respond positively to the characters speaking, their voices, and what they say.
2. The user must be motivated enough to respond by composing and speaking.

### Test Stage

1. The user must enjoy the game, and find it challenging.
2. The user must finish playing the game.

## 9.3 Evaluation Method

### Schedule

A four day schedule was laid out, for a short evaluation of the first three levels of Jodo.

Day	Plan	Learning Evaluation - Post Test	Engagement Evaluation
Day 1	<b>Level 1</b> Learning, Dialogue, Test		
Day 2	<b>Level 2</b> Learning, Dialogue, Test		
Day 3	<b>Level 3</b> Learning, Dialogue, Test		
Day 4	<b>Final Test</b> Conversation test		

### Initial: Recruitment

#### Initiation Brief: (5 mins)

"Jodo is a tool to help you learn Hindi with a grammatical approach. It will teach you where words go into a sentence, and also help you make your own sentences, as and when you learn more and more words. You could learn them using the vocabulary section, or by other means.

It is divided into 7 grammar levels, which would help you have general conversations with ease. In this session, you will be learning the first 3 levels.

I am trying to find out if what I have made, works, and helps you to learn and speak Hindi that you will be able to use everyday, during your stay in India."

### Procedure

#### Level1/2/3 Learning Stage (15-25 minutes)

The user was given the tool on a laptop device, with speakers connected. The user would navigate through it based on their understanding of the interface.

#### Level 1/2/3 Dialogue Stage (5-7 minutes)

The user was given the tool and asked to reply to the characters based on the cues on screen.

#### Level1/2/3 Test Stage:

(10 minutes- 20 minutes)

Paper prototype of the test was used for evaluation. It easily captured the engagement and game-play of the actual digital game.



## Learning Evaluation

1 Post test (work-sheet) for each level was provided, to be completed after the day's evaluation session ended.

## Engagement Evaluation

Engagement was observed in terms of the user's body language, time that they spend in the exploration in the learning stage, whether they chose to go over the same patterns again and again, or not. Also, the tool was provided to the user post the evaluation session, and it was found out if the user used the tool again, in the course of the day, before the next session.

For the Learning stage, good engagement is anywhere between 10-25 minutes per level. For the Dialogue stage, 1 successful run of the dialog indicates a sufficiently engaged user. For the Test Stage, finishing the game-play is an important factor indicating engagement - along with other factors mentioned above.

## Post Tests

All post test exercises were designed according to the learning goal of that level. The users were asked to speak out the answers, since writing was not a targeted skill in Jodo.

### Level 1

**Ask user to re-order the sentences correctly :**

नहीं क्या हूँ डॉक्टर मैं  
हूँ टीचर मैं  
डॉक्टर वह है नहीं

**Ask user to translate the sentences to Hindi :**

Hello, are you Indian?  
Thankyou, this is good.  
I am a girl.  
We are good people. Given: अच्छे लोग

You are great! (To an older person)  
You are a kid.  
These are good people. Given: अच्छे लोग  
Are those mangoes?  
This is not a good boy.

### Level 2

**Translate the sentences to Hindi. (Nouns, given)**

These three rooms.  
Those five flowers.  
half dozen eggs.  
These papers.  
6 female friends.  
good clothes.  
good brother  
nine holidays.  
fifty chairs.  
good house.

### Level 3

**Translate the sentences to Hindi. (Adjectives and Nouns , given)**

My elder brother.  
Your lovely wife.  
Their yellow cars.  
Our new clothes.  
His content life.  
Her first husband.  
Their heavy dog.  
His village is far.  
The bird is free.  
The hospital is empty.



# Final Evaluation : Day 1

## 1. Initiation Brief: (5 mins)

### Level1 Learning Stage

The user was given the tool on a laptop device, with speakers connected.

#### Observations:

They were repeating after sentence patterns without being told.

They were revisiting and repeating conjugations.

They were recording what they had learnt in a small diary, out of choice.

They got the difference between तुम and आप, because French follows a similar honourific system.

### Level 1 Dialogue Stage

#### Observations

They were able to build correct sentences based on the cues.

They could recall the structures, and vocabulary learnt in the Learning Stage.

They were hesitant to speak out, but they were responding positively to the characters and their replies.

Pronunciations, sometimes, were often were off the mark. Also, in places, transliteration was actually contributing to wrong pronunciation.

### Level1 Test Stage:

1. The user was given the game tiles, and is instructed as to what they had to do: ie, Translate these given 10 sentences into Hindi, using the tiles.

2. They were not allowed to refer to the learning /dialogue prototype, or their notes.

3. I would evaluate the sentence construction, and my feedback would be correct / incorrect.

#### Observations

User 1: 9/10 correct sentences

User 2: 8/10 correct sentences

User 3: 10/10 correct sentences.

### Post Test: Day 1

In addition to the test stage(which is a part of the learning tool),

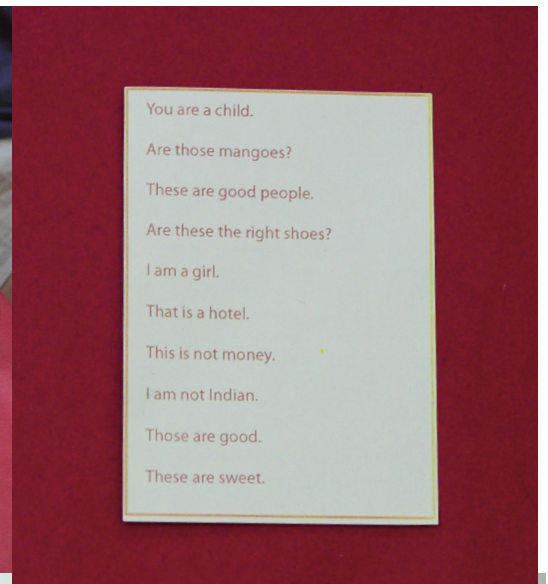
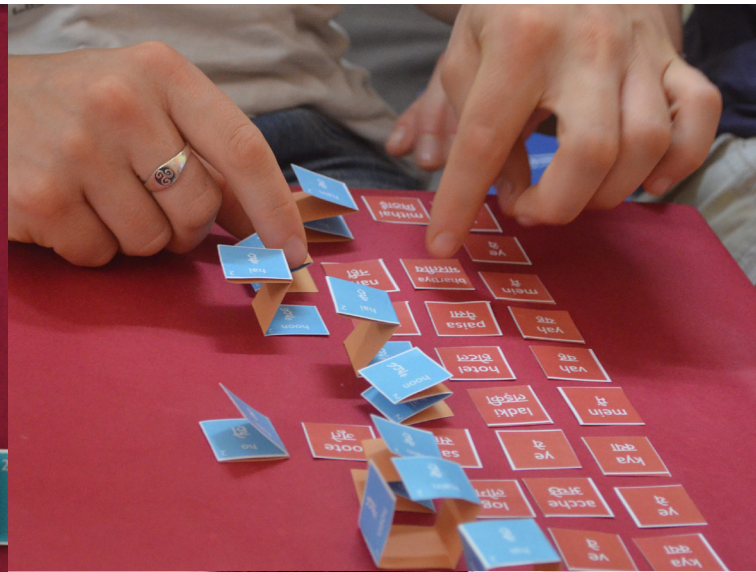
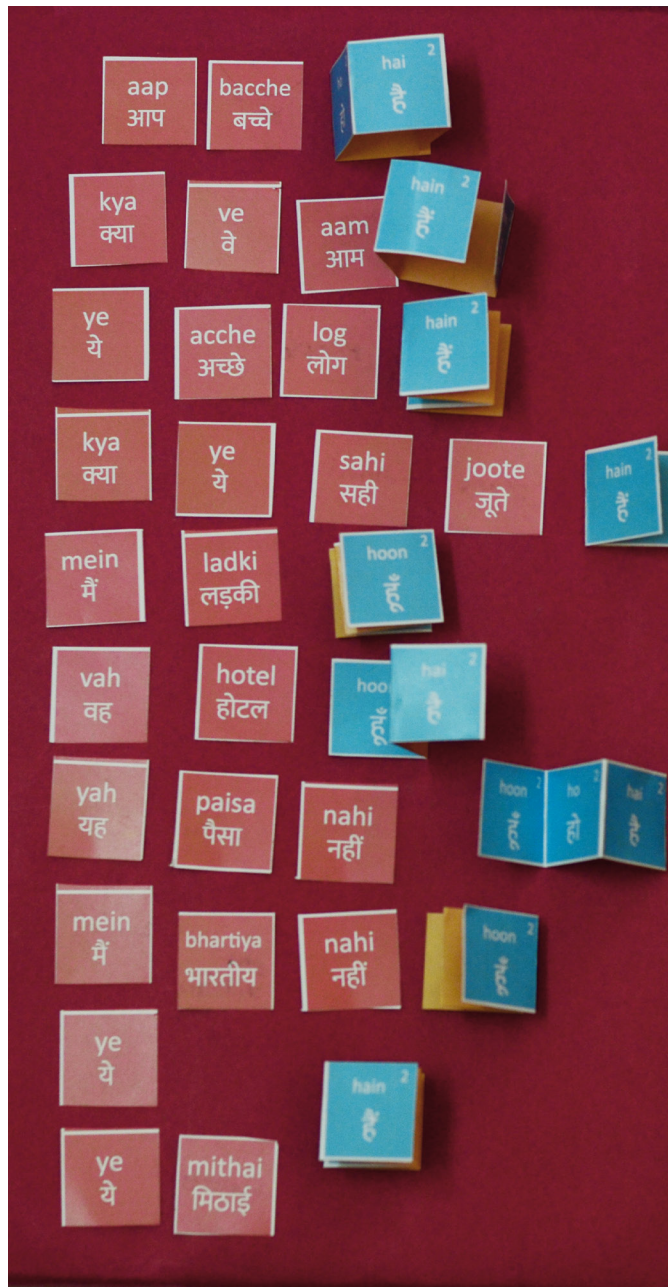
1. Users were be asked to speak the 10 sentences.

2. Users were asked to speak all the singular pronouns.

3. Users were asked to speak all the plural pronouns.

### Conclusion of Day1

By giving the users a copy of the Level 1 Learning Stage and Level 1 Dialogue Stage Prototype.



# Final Evaluation : Day 2

## Level 2 Learning Stage:

The user was given the tool on a laptop device, with speakers connected

### Observations

- They were repeating after the nouns.
- They understood the concept of noun types, and checked its description using the (?)

## Level 2 Dialogue Stage:

### Observations

They were building full sentences correctly, according to the learning of level 1.  
They were able to make noun plurals, given the gender of the new nouns.  
They were recalling vocabulary learned in the Learning Stage correctly.

## Level 2 Test Stage:

1. The user was asked to construct the sentences in Hindi one at a time, given the game tiles.
2. They were not allowed to refer to the learning /dialogue prototype, or their notes.

After they constructed the sentence in

Hindi, I toggle the number tile from singular to plural, and they have to pick the right word ending for the noun associated. (Between 'no change', 'ए', 'इयाँ')

I evaluated if they were correct or wrong, and let them proceed to next sentence.

## Post Test : Day2

Users were given 4 new nouns of each type (Total 16), and asked to make plurals, by speaking them out.

### Observations

User 1: 15/16 correct sentences  
User 2: 14/16 correct sentences  
User 3: 14/16 correct sentences.

## Conclusion: Day 2

By giving the users a copy of the Level 2 Learning and Level 2 Dialogue Prototype.





# Final Evaluation : Day 3

## Level 3 Learning Stage:

The user was given the tool on a laptop device, with speakers connected.

### Observations

They were repeating after the adjective phrases

They found it simple to conjugate accha, as it sort of rhymes with the noun sound, in most cases.

They were changing between singular directly on the target sentence.

## Level 3 Dialogue Stage

### Observations

They were able to change the new adjectives according to the nouns and speak full, correct sentences.

They could figure out which of the suggested adjectives was Inflicting, and which was Non-Inflicting.

## Level 3 Test Stage(Word Scrabble):

The user was given the game tiles, and explained the rules of the game.

User 1 would construct the first sentence, on the board. User 2 would follow, according to the rules of the game.

I would act as an evaluator to see if they make constructions and modifications correctly. I also kept a calculation of the points.

### Observations:

The users tried to build long sentences of 6-7 words by using the conjunction और (and) An example sentence:

"क्या यह छोटी मछली अच्छी और पीली है?"

They found the choice words feature added, very useful. They kept asking for vocabulary for sentences that they wanted to build.

In each turn, the users built grammatically correct sentences. They took their time to process the structures and compose a sentence, but with the time at hand, they could build correct sentences.

Users needed to be prompted to use the sentence-modification during a turn. Each time, they preferred to build a new sentence.

### Conclusion: Day 3

By giving the users a copy of the Level 3 Learning and Level 3 Dialogue Prototype.







# Final Evaluation : Day 4

## Conversation Test

Day 4 was a final conversation test - where the users were immersed in a real life conversation.

Upasana( A local Hindi speaker) was the conversation facilitator, and she was briefed about the syllabus that the users had covered, and that she must stick to extremely simple and short sentence structures. She must use English nouns wherever possible, in consideration to the user's limited vocabulary exposure.

She had never met the users before.

The users were briefed that they would soon meet my friend, and they must get to know each other.

Both sides must compulsorily use Hindi as a language for conversation.

This is an excerpt from the conversation that occurred.

Upsaana: आपका नाम क्या है?

User1: मेरा नाम लौर है.

User 2: और मेरा नाम मरीन है.

Upasana: आप बहुत सुन्दर है!

User2: शुक्रिया!

Upasana: आप कौनसी country से हैं?

User 1: हम फ्रेंच हैं!

Upasana: क्या आप दोनों students हैं?

User 1,2: हाँ!

Upasana: कौनसे department से हैं आप?

User 2: हम mechanical engineering से हैं!

Upasana: यह हॉस्टल कैसा है?

User 1: (Hesitates) यह हॉस्टल यहाँ है?!

User 1: (After correcting herself)  
यह हॉस्टल ठीक है.

User 2: तुम्हारा नाम क्या है?

Upasana: मेरा नाम उपासना है!

User 2: आपका रूम नंबर क्या है?

Upasana: मेरा रूम नंबर 317 है.

Upasana: IIT कैसा है?

User 2: IIT सुन्दर है!

Upasana: क्या आपके siblings हैं?

User 1: हाँ!

Upasana: कितने siblings हैं?

User 1: मेरे दो brothers और एक sister हैं!

Upasana: अच्छा! मुंबई कैसा शहर है?

User2: मुंबई बहुत बड़ा city है!

Upasana: चलो dinner करने चलते हैं!

User 1: अच्छा!

Upasana: चलो!..

It was an interesting exchange, halting, hesitant, but fairly successful. The atmosphere that such an exchange brings about is unique, and a natural happiness at the cultural exchange is evident at both ends. The group went on to have dinner in the hostel mess, as discussed in the conversation.



### Observations:

The users had overcome the speaking barrier, and attempted to speak self-made sentences, albeit hesitatingly.

The users could, mostly decipher what Upasana was saying. She spoke in a normal, speed and tone, slightly deliberately, but with no noticeable difference than she would while speaking to another native.

They composed answers correctly, within the limitation of the sentence structures that they

had learned.

Lack of vocabulary turned out to be a huge limitation in their expression. They used अच्छा or ठीक as an adjective in places where they probably wouldn't have, but for lack of vocabulary known.

Pronunciation was a problem area, and they struggled to pronounce words that they had learned.

Overall, the group got through fairly well. They did not have to resort to English sentences, and were able to make a decent conversation, given the constraints in their learning.

A week after Day 4, the pair of users went out to watch a Hindi movie, and went out shopping. They said that they could catch words and phrases, and carry out a small need based conversation with ease.

Two weeks after day 4, a user was observed writing out two Hindi comments on a social media post :

(a) Yah trip accha hai.

(b) Tum sundar ladki ho!

# 10. Conclusion

The pilot and the short final testing revealed that Jodo was easy, intuitive and helped the user learn.

## Grammar Learning

Users could grasp what grammar concept was being learnt - and could internalize the sentence structures quite easily, after exploring through all the options, a couple of times. (In the Learning Stage.) After the first two levels, they could predict what forms new words would take - for eg, a user predicted that मेरा would change to मेरी while describing a feminine noun किताब, based on their learning of the previous adjective form अच्छा/अच्छी/अच्छे. The listening-pattern approach of Jodo worked - and the users internalized the grammar patterns well enough.

## Speaking

They could retain the Hindi word order correctly, and made use of the learning in the previous levels, during the current level, and made full sentences.

The dialogue stage also revealed that the users could change forms (dependencies) of

new, unknown vocabulary, based on the base vocabulary learnt.

However, there was a clear gap where the nuances of speaking were concerned - The user's pronunciations were often way off the mark, because the current design for Jodo does not focus on that aspect of speaking. The transliterated words on screen sometimes added to the problem, where the users spoke words as they read them.

## Vocabulary

The limited evaluation time meant that the users were equipped only with the base vocabulary - Which proved to be a major limiting factor for conversation. Vocabulary is as important as grammar, in language - and for the goal of effective communication, the lack of vocabulary made it difficult for the users to say what they felt. Moreover, the users had problems retaining the vocabulary - they misinterpreted words, spoke them wrongly, or did not remember them, in spite of the learning.

## Tests

The paper prototypes of the games turned

out to be engaging for the users. They scored a high percentage of correct answers about 95% of the time - given the unlimited time for answering. This suggests that Jodo was successful in teaching the users sentence building - which was the primary identified user's need.

## Learning Method

The three-stage approach of Jodo provided an interesting variety to the users - and did not make learning monotonous.

With more provision for vocabulary learning, retention and pronunciation in the design, Jodo has the capability of being a stand-alone tool for Hindi Language learning, for a self-motivated learner.

# 11. Future Scope

## Contexts

The vocabulary and content of Jodo is not particularly user specific, at this point. More insights from the user study, and more foreigner-specific contexts, could be incorporated into the content.

**Content:** Usage of यह-ये वह-वे can be discarded, to be replaced by ये and वो. यह and वह and वे, appear only in textual Hindi, and never in conversational Hindi.

## Pronunciation:

Jodo started off as a tool limited to sentence construction. With the addition of the dialog section, the scope moved beyond constructing grammatically accurate Hindi sentences, to actually learning to speak them.

Not much stress was laid on speaking however. Jodo relies on listening, comprehending, and speaking out what has been 'listened to' or heard. But the sound of Hindi being very different and unfamiliar, only listening often falls short in facilitating accurate speaking. More aid for pronunciation must be added, such as

pronunciation tests, feedback, phonetic videos, step-by-step pronunciation guides, predicting user's problem areas in terms of pronunciation, etc.

## Motivation

Currently, the gamefied point system for Jodo is the motivating factor for learners to learn ahead, into new levels. Also, the idea of equipping users for 'real world' conversation, outside of this tool, with real people - as they learn, is an added motivating factor.

However, there could be more features for building motivation, and keeping it sustained.

## UI and Usability

The User Interface of Jodo is quite colourful. The animals, conversations with them, and the storylines could be described as child-like. Though the users tested responded positively to the characters, there could always be a more mature, adult oriented approach while designing characters, content, and conversations.

Better UI design, better icon design, and better

usability for the tool, was suggested.

space for it, already.

### **Game Design**

Game Design could be improved, especially for the word scrabble game.

### **Transliteration**

Transliteration is a dicey choice for a Hindi learning tool, for the following reasons:

It fails to capture some of the Hindi phonetic sounds.

It sometimes combats the effect of listening to an audio transcription, because the users end up memorizing and recalling what they read (In a familiar script) as against what they hear (which is an unfamiliar sound).

Transcription notations are useful for capturing Hindi phonetic sounds. But reading them, too, requires training or reference to a legend. They can very easily be mis-interpreted if there is no training to read them.

### **Devanagiri Script**

To aid better pronunciation, a section where the users could learn the script could be provided. This could minimize the ill-effects of transliteration.

### **Vocabulary:**

Vocabulary makes communication richer, and more expressive. At the beginning of the project, a vocabulary-heavy approach was discarded, in favour of a grammar-centered approach. However, a full-fledged vocabulary-learning section could well be integrated into Jodo, with specific mechanism to learn, find, and remember vocabulary. Moreover, there is

# Appendix 1: Design Specification

## Level 1 Learning

Stage-1

मैं हूँ  
हम हैं  
तुम हो  
आप हैं  
यह है  
वह है  
ये हैं  
वे हैं

The user can move between stages by using the forward and backward arrows. Each stage has all the functionality of the previous stage.

Stage 1

(मैं/हम/तुम/आप/यह/वह/ये/वे) (हूँ/हो/है/हैं)

Stage 2

(मैं/हम/तुम/आप/यह/वह/ये/वे) (ठीक/डॉक्टर/मर्द) (हूँ/हो/है/हैं)

The second word could be a Non/Inflicting Adjective/ M2 type noun / English word

Stage 3

(मैं/हम/तुम/आप/यह/वह/ये/वे) (ठीक/डॉक्टर/मर्द) नहीं (हूँ/हो/है/हैं)

Stage 4

क्या (मैं/हम/तुम/आप/यह/वह/ये/वे) (ठीक/डॉक्टर/मर्द) नहीं (हूँ/हो/है/हैं)


I am

Click to see slot type

maĩ huũ

maĩ I	hum we	huũ am	haĩ are
tum you	aap you	ho are	
yah this	vah that	ye these	ve they
		hai is	

Watch how the form of 'hona' ('to be') changes with different pronouns.



I am not fine


maĩ theek nahi huũ

maĩ I	hum we	theek okay	nahi no/not	huũ am	haĩ are
tum you	aap you	doctor		ho are	
yah this	vah that	ye these	ve they	hai is	
		Jonanne			

Additional Word

Haĩ Yes

'Nahi' (No, comes just before the verb.




I am fine.

maĩ theek huũ

maĩ I	hum we	theek okay	huũ am	haĩ are
tum you	aap you	doctor	ho are	
yah this	vah that	ye these	ve they	
		Jonanne	hai is	

Watch how three word sentences work! The order is Subject Object Verb

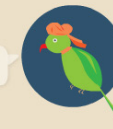


Am I fine ?

kya maĩ theek huũ

kya ? marker	maĩ I	hum we	theek okay	huũ am	haĩ are
	tum you	aap you	doctor	ho are	
	yah this	vah that	ye these	ve they	
			Jonanne	hai is	

'Nahi' (No, comes just before the verb.



## Level1 Dialogue

Dialogue with Mitthu, the talking Parrot

Words that the user might not know, are provided at the user prompt to speak.

Mithu: नमस्ते! मेरा नाम मिट्ठू है. आपका नाम क्या है?

"Tell Mitthu your name."

User: मेरा नाम ( ) है.

Ganesh enters..

Mithu: यह मेरा दोस्त है.

Mithu (To Ganesh) तुम कैसे हो?

Ganesh: मैं ठीक हूँ, मिट्ठू!

"Ask Mitthu's friend his name."

User: आपका नाम क्या है?

Ganesh: मेरा नाम गणेश है!

क्या आप भारतीय हैं?

"Tell Ganesh that you're not Indian."

User: नहीं, मैं भारतीय नहीं हूँ!

Ganesh: मैं हाथी हूँ! आप कौन हैं?

"Tell Ganesh that you're a human." Given:

manushya

User: मैं मनुष्य हूँ!

Mitthu: और मैं पंछी हूँ!

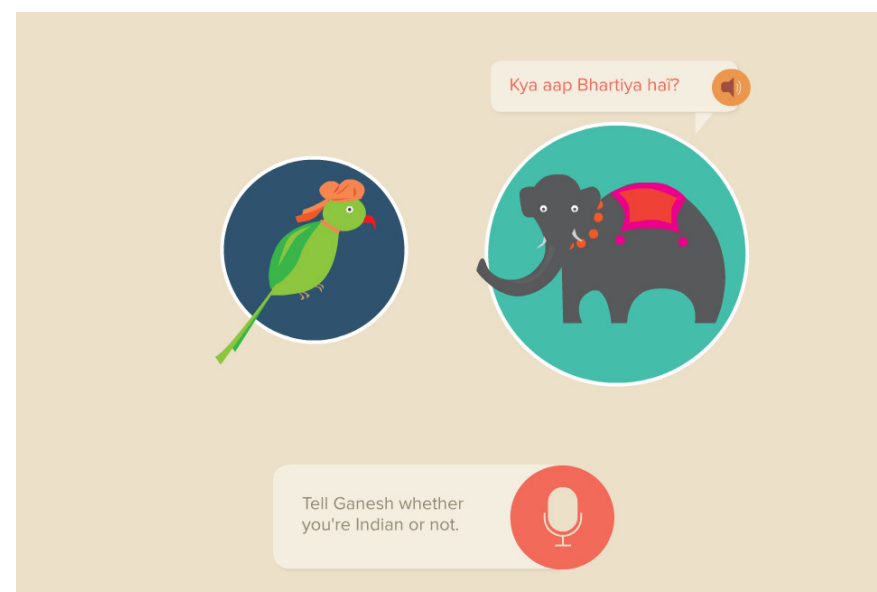
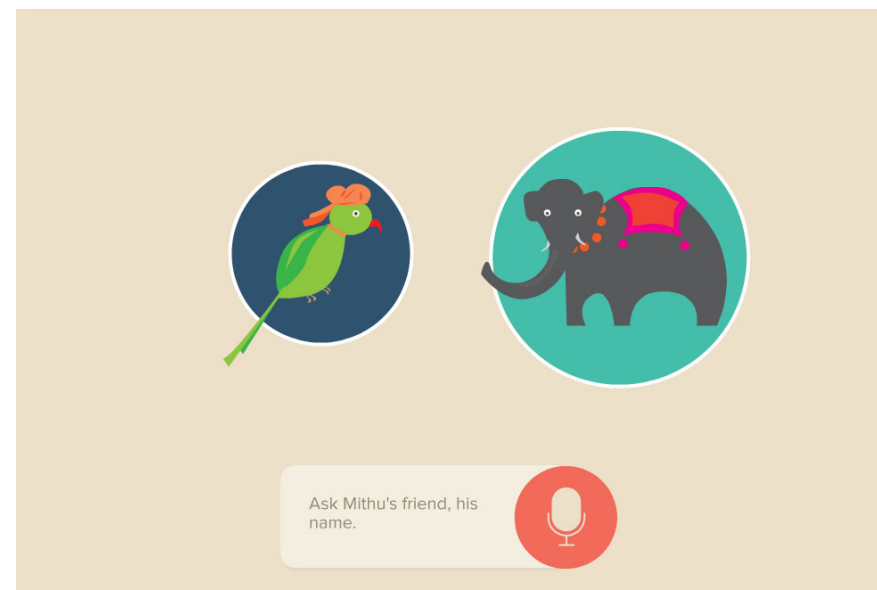
Ganesh (points at airplane) क्या वह भी पंछी है?

"Tell Ganesh that it is not a bird."

User: नहीं, वह पंछी नहीं है!

Mitthu: आप अच्छी हिंदी बोलती हैं!

"Say thank you to Mitthu!"





### Level 1 Test:

Users are given 10 sentences in English. This is a one-player game.

They are required to translate the sentences into Hindi, using the tiles provided.

This game tests hona conjugation, vocabulary skills, and word order.

One wrongly translated sentence results in the loss of 1 samosa, out of 3.

3 wrongly translated sentences, and the user must play the game all over again.

10 sentences:

Hello, are you Indian?

Thankyou, this is good.

I am a girl.

We are good people. Given: अच्छे लोग

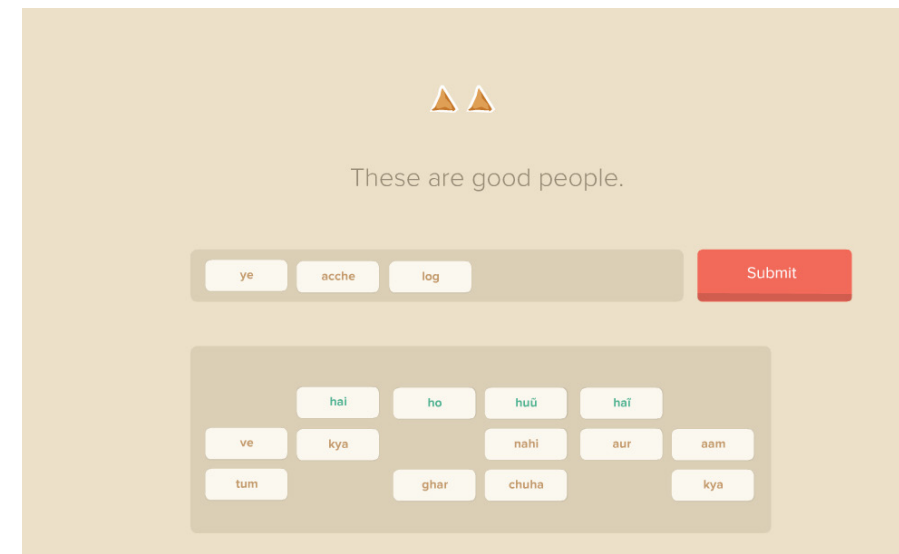
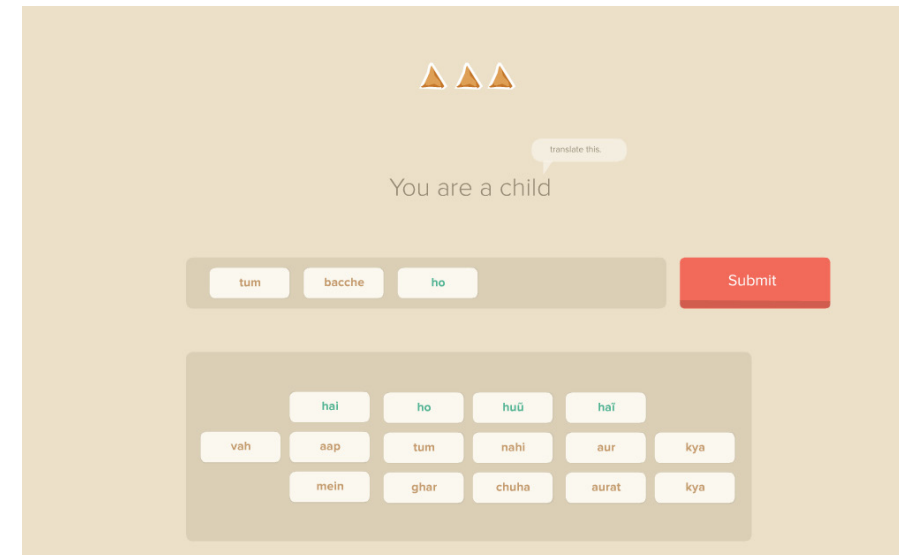
You are great! (To an older person)

You are a kid.

These are good people. Given: अच्छे लोग

Are those mangoes?

This is not a good boy.



## Level 2 Learning

Stage 1 (M1)

एक लड़का

दो लड़कें

एक कमरा

दो कमरे

एक/दो लड़का/कमरा

User can shift between singular and plural by either clicking on ek/do or by using the number changer on the tile.

Stage 2 (M1+M2)

एक/दो लड़का/कमरा+घर/दोस्त

Stage 3 (M1+M2+F1)

एक/दो लड़का/कमरा+घर/दोस्त+लड़की/छुट्टी

Stage 4 (M1+M2+F1+F2)

एक/दो लड़का/कमरा+घर/दोस्त+लड़की/छुट्टी+किताब/दुकान

1 boy


Click to change number

ek ladka

ek do  
1 2

M1 ladka boy  
kamra room

Watch how M1 nouns change from 'aa' endings to 'e' endings in plural.



1 house

ek ghar

ek do  
1 2

M1 ladka boy  
kamra room

M2 ghar house  
dost friend

M2 nouns don't change in the plural! See more M2 nouns in the Vocabulary section!



1 girl

ek ladki

ek do  
1 2

M1 ladka boy  
kamra room

F1 ladki girl  
chutti holiday

M2 ghar house  
dost friend

F1 nouns end with an 'i' sound. They change to a nasal 'iya' sound in the plural!



1 book

ek kitab

ek do  
1 2

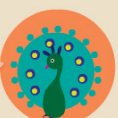
M1 ladka boy  
kamra room

F1 ladki girl  
chutti holiday

M2 ghar house  
dost friend

F2 kitab book  
dukan shop

F2 nouns end with anything except an 'i' sound. They change to an 'e' sound in the plural!



## Level 2 Dialogue

Dialogue with Mor, the peacock.

Mor: मैं मोर हूँ. और यह कुछ चीज़ें हैं. बताओ, कि ये क्या हैं?

Mor: यह क्या है? (Points at chair) Given: Kursi

User: यह एक कुर्सी है.

Mor: अब बताओ, ये क्या हैं? (points at 3 chairs)

User: ये दो कुर्सियाँ हैं.

Mor: अच्छा, यह क्या है? (points at an egg) Given: anda

User: यह एक अंडा है.

Mor: ये कितने अंडे हैं? (points at 3 eggs) Given: 3

User: ये तीन अंडे हैं.

Mor: मुझे बताओ, यह क्या है? (Points at 1 rupee) Given:

Rupaya

User: यह एक रुपया है!

Mor: और अब, कितने रुपये हैं? (points at 10 Rs coin)

User: ये दस रुपये हैं.

Mor: ये क्या हैं? (points at 3 cars) Given: Gadi

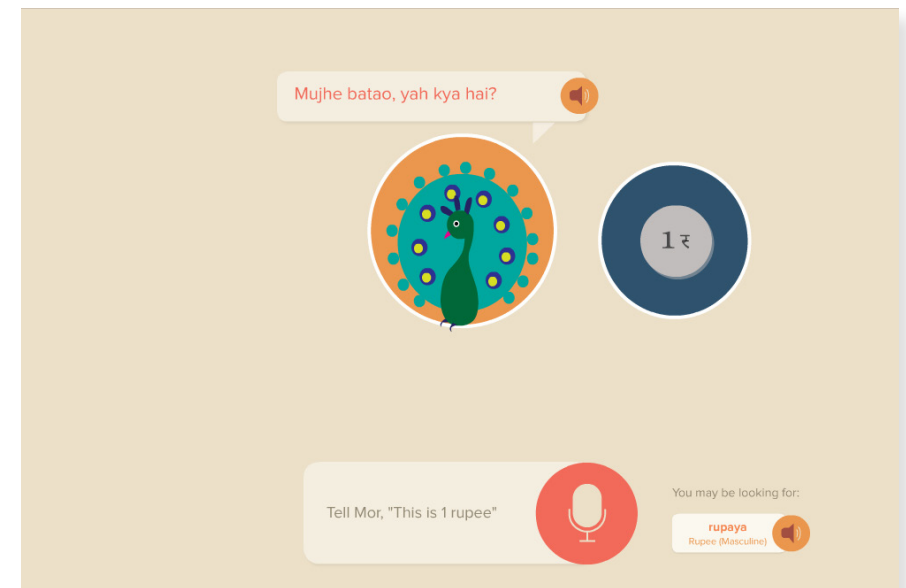
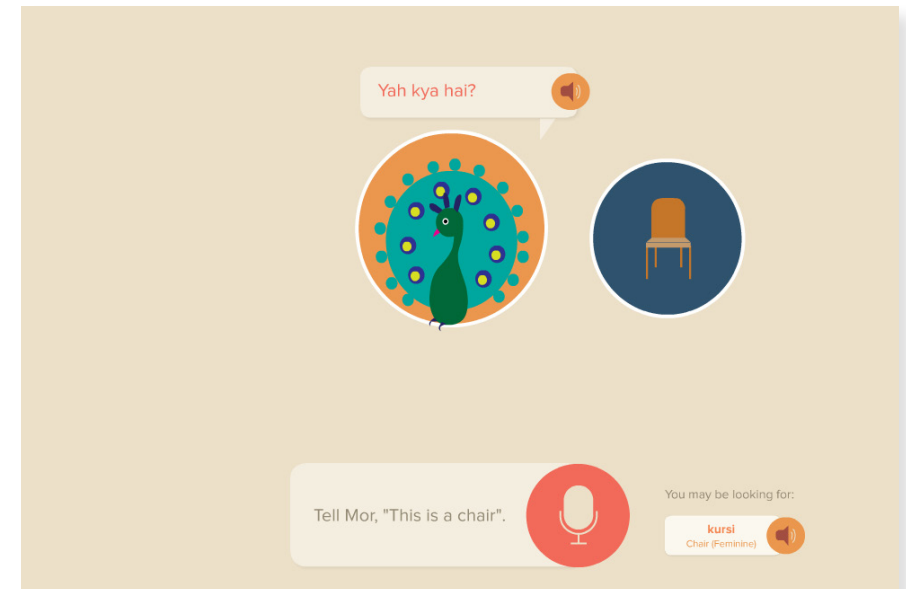
User: ये तीन गाड़ियाँ हैं!

Mor: कितनी सब्जियाँ हैं? (points at 3 vegetables)

Given: sabzi

User: ये तीन सब्जियाँ हैं!

Mor: धन्यवाद!



## Level 2 Test:

The game for level 2 includes tests for conjugation, word order, and vocabulary (Just like level-1), but has the added test for noun ending in its plural form.

Given that a noun is M or F, and its meaning, the user must suffix it with the appropriate plural ending after recognizing it to be M1/M2 or F1/F2. 10 such sentences form the game, with rules similar to level-1 game.

These three rooms.

Those five flowers.

Those are half dozen eggs.

These are papers.

These are 6 female friends.

Those are good clothes.

You are a good brother

These are nine holidays.

Those are fifty chairs.

This is a good house.

The screenshot shows the Level 2 Test interface. At the top, there are three orange triangles. Below them, the sentence "I am a woman." is displayed. A word bank contains the words: mai, ek, aurat, hu, and a red Submit button. Below the word bank is a grid of words: chah, das, hai, ho, ha, do, saat, aap, ladka, tum, beti, machli, tamatar, teen, aath, gaana, rickshawala, vah, paudha, haath, char, naav, ve, kagaz, paratha, yah, roti, tamatar.

The screenshot shows the Level 2 Test interface. At the top, there are three orange triangles. Below them, the sentence "Now convert Kagoz to plural with the appropriate ending." is displayed. A word bank contains the words: ye, do, kagoz, ha, and a red Submit button. Below the word bank is a grid of words: chah, das, hai, ho, hu, ek, saat, aap, ladka, tum, beti, machli, tamatar, teen, aath, gaana, rickshawala, aurat, vah, paudha, haath, char, naav, ve, mai, paratha, roti, tamatar. A dropdown menu is open over the word "kagoz", showing the options: kagoz, kagoz + e, and kagoz + lyā.

## Level 3 Learning

### Stage 1

#### Inflicting Adjectives

अच्छा+(आ/इ/ए) (लड़का / घर / लड़की / किताब)

### Stage 2

#### Non Inflicting Adjectives

साफ़ (लड़का / घर / लड़की / किताब)

### Stage 3

#### Personal Pronouns

(मेरा/हमारा/तुम्हारा/आपका/इसका/उसका/इनका/उनका)+(आ/ई/ए) (लड़का / घर / लड़की / किताब)

good books

acchi

kitabē

accha  
good

ladka  
boy

ghar  
house

ladki  
girl

kitab  
book

View more such adjectives!

bura  
bad

bada  
big

Adjectives with 'aa' endings change according to the noun.

### Level3 Dialogue

Conversation with Sundari, the cow.

Sundari: यह घड़ी कैसी है? Given: महँगा/चमकीला

User: यह घड़ी महँगी / चमकीली है.

Sundari: ये पेड़ कैसे हैं? Given: हरा/बड़ा

User: ये पेड़ हरे/बड़े हैं!

Sundari: यह मेरा घर है. मेरा घर कैसा है? Given: साफ़/प्यारा


User: आपका घर साफ़ / प्यारा है.

Sundari: यह मछली कैसी है? Given: छोटा/सुन्दर

User: यह मछली छोटी / सुन्दर है!

Sundari: धन्यवाद! फिर मिलेंगे!

Yah ghadi kaisi hai?



Tell Sundari how the watch is.

Use any of the words below:

mehenga  
expensive

chamkila  
shiny

Yah mera ghar hai. Mera ghar kaisa hai?



Tell Sundari how her house is.

Use any of the words below:

saaf  
clean

pyara  
lovely

# References

- [1] List of Indian Languages. [Online] [http://en.wikipedia.org/wiki/List\\_of\\_languages\\_by\\_number\\_of\\_native\\_speakers\\_in\\_India](http://en.wikipedia.org/wiki/List_of_languages_by_number_of_native_speakers_in_India)
- [2] Top Languages in the World [Online] [http://www.vistawide.com/languages/top\\_30\\_languages.htm](http://www.vistawide.com/languages/top_30_languages.htm)
- [3] QOTFC The Clinical Educator's Resource Kit - Adult Learning Theory and Principles [Online] <http://www.qotfc.edu.au/resource/?page=65375>
- [4] Differences in Hindi and English [Online] <http://www.yale.edu/hindi/language.html>
- [5] Sam Gendreau, "Lingoholic.com "[Online] <http://www.lingholic.com/>
- [6] Benny Lewis, "Fluent In Three Months Blog" [Online] <http://www.fluentin3months.com/Reviews/>
- [7] Rupert Snell, Teach Yourself Beginner's Hindi, 2009
- [8] A Short Introduction to Hindi, Poul Williams, [Online] <http://www.itu.dk/people/pfw/hindi/index.html>
- [9] Hindi Verb Conjugation [Online] <http://www.geocities.ws/lordvaruna/>
- [10] Rupert Snell, Teach Yourself Complete Hindi, 2013
- [11] Sonia Taneja, McGrawHill, Practice Makes Perfect, Basic Hindi, 2013
- [12] Differences in the Languages, [Online] <http://esl.fis.edu/grammar/langdiff/hindi.htm>
- [13] Hindi Language [Online] <http://www.yale.edu/hindi/language.html>
- [14] Stephen D Krashen "Principles and Practice in Second Language Acquisition", University of Southern California, 1982
- [15] Mindtools, Kirkpatrick Training Evaluation Model [Online] <http://www.mindtools.com/pages/article/kirkpatrick.htm>



