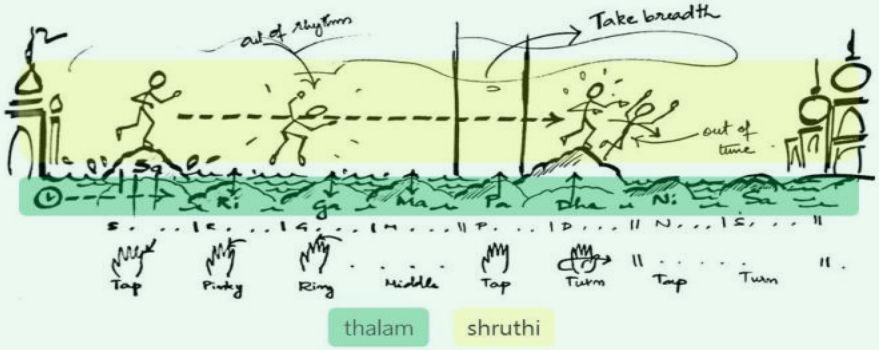
Interactive and Game-based
Carnatic Music Lessons
for Beginners

M. Des . Project 2



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Guide: Prof. Pramod Khambete

IDC 2013

Declaration

The research work embodied in the written submission titled "Interactive and Game-based Carnatic Music Lessons for Beginners" has been carried out by the undersigned as part of the post graduate program in the Industrial Design Centre, IIT Bombay, India under the supervision of Prof. Pramod Khambete.

The undersigned hereby declares that this is his original work and has not been plagiarized in part or full from any source. Furthermore, this work has not been submitted for any degree in this or any other University.

I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action if need arises.

(Ramprasad S)
126330011

Approval Sheet

This interaction design project entitled "Interactive and Game-based Carnatic Music Lessons for Beginners" by Ramprasad S, 126330011, is approved in partial fulfilment of the requirements for Master of Design Degree in Interaction Design.

Project Guide: 

Chair Person: 

Internal Examiner: 

External Examiner:  SHASHANK DESHPANDE

Date: 30 · 11 · 2013
Place: IDC IIT BOMBAY

Acknowledgement

I'm sincerely grateful to my guide,
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Special thanks to all those who took time out and participated in the interview sessions during the preliminary stages of research. Interactions with Dr.Visweswara Rao, Prof.Milind Malshe, Sitar Maestro - Pt. Nayan ghosh, Mrs. Shanthi and Mrs. Sudha Ragunathan, helped greatly in the design process.

I would like to thank my best friends Anusree, Glen and Anil for all the support and encouragement and also for all the honest reviews they have been giving about my designs since my under-graduation days. Last but not the least, I would like to thank my parents for all the love, support and freedom they have been giving me right from school days.

"….even had Newton or Leibniz never lived,
the world would have the calculus.
But if Beethoven had not lived,
we would never have had the C-minor Symphony"

– Albert Einstein

Table of contents

Abstract

In Southern India, traditional music training follows Carnatic music - a genre of music performed by an ensemble of musicians (vocalists, instrumentalists and percussionists) in which singing (usually) provides the main focus of the musical performance. Vocal Carnatic music is taught and learnt starting from basic graded exercises, simple songs to more and more increasingly intricate and challenging compositions. These advanced compositions in Carnatic music demand more skills and hence are taught and learnt only after one attains mastery over understanding the fundamental concepts in Carnatic music by performing the basic graded exercises.

This project presents a learning environment to support novice students, learning Carnatic music, understand the fundamentals of music like pitch and rhythm and also learn the foundation-level graded exercises in Carnatic music along with sight reading the exercises' music notation via an interactive platform. More specifically, the design solution aims to provide an interactive system, which will take advantage of recent advances in the areas of gaming, visualization and music technology to cater to the specific needs of users with no prior music knowledge.

Though the solution is intended to serve beginner-level students, it can also benefit amateurs and advanced-level students as it encourages them to practise with more constraints to improve their singing skills (for example, singing the same exercises in different ragas and vocal sounds).In addition, the solution aims to be particularly suitable for areas such as voice culture improvement, music education, cultural integration and social network.

Need for this Project

Music has become one of the fundamental components in our life. Whether musically trained or not, most people sing or hum to themselves during their day-to-day activities. However, to master the art, formal music education often helps learners to grasp concepts and perform progressively better with the needed hard work and practice each individual may require.

Why Carnatic music?

In India, formal music education is mostly via Classical music training. Although currently being a part-time film-score composer and Carnatic singer myself, I had a very rough and frustrating experience during my early Carnatic music training months that I had even thought of giving up learning music several times. One of the important reasons for choosing this project comes from my personal experience of struggling with it so much during my childhood days.

Need for the Users?

Learning to sing in tune and rhythm and comprehending the Carnatic music notation system and Sanskrit terminologies are most problematic in the initial years. Most of the learners get acquainted to the learning culture in their music classes after a few months or years, depending on the skills and interest levels each one of them has. Hence, this makes the novice learners of Carnatic music the target audience for this interactive design solution.

Nature of Users

The major chunk of the current population who will start learning Carnatic music belong to the younger population (observed during primary research) and are comfortable with interactive media like T.V, PC games, Mobile Games etc. This is a big opportunity in exploring electronic options to support the music learning experience as well as facilitate the working of a service design around it.

About Carnatic Music

In India, classical music can be generally classified into two major sub-genres, namely Hindustani music and Carnatic music, based on their origins from the northern and the southern regions of the Indian sub-continent respectively.

The basic elements that form the foundation of improvisation and composition in both Hindustani and Carnatic music[1] are :

śruti (the relative musical pitch),
swara (the musical sound of a single note),
rāga (the mode or melodic formulæ) and
taala (the rhythmic cycles).

In Carnatic music, the main emphasis is on vocal music; most compositions are especially *kriti*'s or *kirtanai*'s [1] – a form developed between the 14th and 20th centuries by composers such as Purandara Dasa, Tyagaraja, Muthuswami Dikshitar and Shyama Sastri. These compositions are written to be sung and even when played on instruments, they are meant to be performed in a singing style (known as gāyaki)[2]. Improvisation in Carnatic music is also given great importance.

Image: The carnatic music Trinity

Learning Carnatic Music

The learning structure

Carnatic music is traditionally taught and learnt according to the system believed to be formulated by the composer-saint Purandara Dasa[3].
This system follows involves

1. Graded exercises called *varisais,*
2. Exercises called *alankaras* based on seven different rhythm cycles/*talas,*
3. Simple songs called *geetams* and *Swarajatis.*
4. Complex songs called *varnams* and *kritis.*

The learning structure is arranged in increasing order of complexity. Typically, it takes several years of dedicated learning and practice before a student is expert enough to perform at a concert.

The learning tradition

In the past, Carnatic music education followed the traditional *gurukula* system, where the student lived with and learnt the art from his *guru*/teacher.
In recent times, with changes in lifestyles and the need for young music learners to simultaneously pursue a parallel academic career, this system has found few takers.

In modern times, though technology has made learning Carnatic music easy via audio CD's, online videos etc., most of the learners visit their teacher for Carnatic music education on a weekly or daily basis.

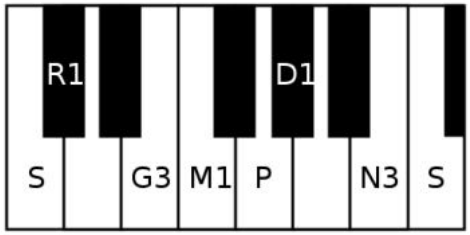
Beginner-level Lessons

For beginners, the learning structure followed in teaching Carnatic vocal music starts from the graded exercises called *varisais* as mentioned earlier. These exercises have to be sung and practised until the learner gains perfection.

These *varisai*-exercises[4] in their increasing order of complexity are as follows:

1. *Saralivarisai,* - sequences of musical notes to help the student sing & understand melody and rhythm.
2. *Jantavarisai* - sequences of musical notes to help the student understand sing with dynamics in the voice.
3. *Dhattuvarisai* - zigzag sequences of musical notes that increase the students' overall command in singing.
4. *Melsthayivarisai* - sequences with higher octave notes included to improve the students' vocal range.

These exercise-sequences are sung and practised in the raga* *mayamalavagowlai*[5], that involves a heptatonic scale – seven different musical notes chosen from an octave[6] of twelve. The notes involved in the scale of the raga mayamalavagowlai are Sa, Ri1, Ga3, Ma1, Pa, Dha1, Ni3 shown marked in an octave of the musical keyboard layout below[5].



Source: wikipedia.org/wiki/File:Mayamalavagowla_scale.svg

These exercises are practiced in 3 different speeds/tempos each and once perfect, the learners are encouraged to practise them in other ragas having heptatonic scales like *Kalyani, Thodi, Lathangi, Shankarabharanam* [4].

* Ragas are the melodic modes used in Indian classical music which express different moods in certain characteristic progressions, with more emphasis placed on some music notes than others.

Scope and Objectives

Scope of the Project

The project tries to identify a way to make beginners of Carnatic Music understand the fundamental concepts like pitch and rhythm and learn to sing through the graded exercises and practise more and more to gain perfection. The solution should make it easier for beginners, learners and music lovers to learn Carnatic music, by evaluating their performance and communicating them on how much they have progressed and also helping them in sharing the knowledge gained, accomplishments, etc., with their friends or relatives.

Objectives

The general objective of this project is to make users understand the basic concepts of Carnatic music and learn to sing the foundation-level exercises along with comprehending the corresponding Carnatic music notations.

i. To design an interactive tool for learning to sing and practise beginner-level Carnatic music lessons.

ii. To design audio-visual, task based interactions that help in understanding concepts in Carnatic music that are difficult to comprehend when recited or written as text.

iii. To bring in elements of healthy competition, sharing and encouragement through social network.

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Design Process followed

August

- Finalising of topic
- Defining the need of the problem
- Secondary Research
- Existing products

September

- User studies with Music teachers
- User studies with Music learners
- Understand the current learning process
- Analysis and personas

October

- Analysis and personas
- Redefine the brief
- Concepts
- Scenarios

November

- Design
- Report writing
- Prototyping and testing

Secondary Research

Existing Product 1

GAONA – an Online Karaoke Application

Gaona, utilizes technology for evaluating singing quality. The technology uses novel signal processing techniques for computation of the user's melody from his/her singing, extraction of the reference singer's melody from the original song and comparative evaluation of singing quality in multiple musical dimensions such as sync with tune, rhythm and expression[4].

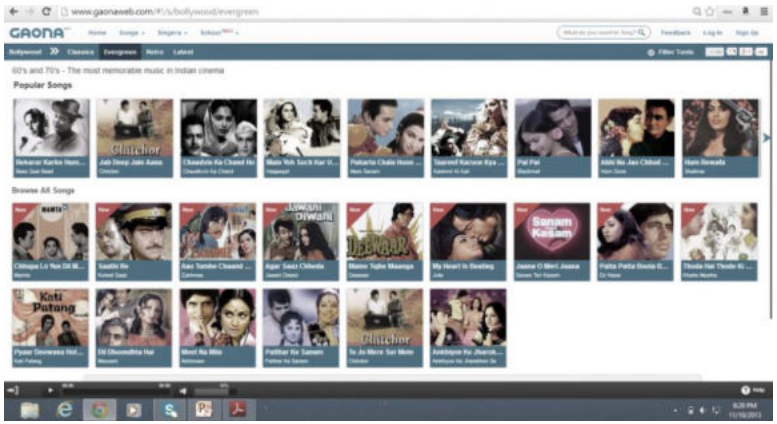


Image: Screen shot of Gaona songlist | Source: www.gaonaweb.com

Salient features

- Gaona compares user's singing to the actual melody as sung by the original singer and renders live feedback, score and analysis of the performer's singing based on sync with tune, rhythm and expression.
- Gaona has karaoke programmed for Bollywood songs, Carnatic and Hindustani music lessons.
- Saves user's profile in Gaona' s website directly or links with the user's Facebook profile.
- Encouragement for sharing recordings, high scores and also for challenging friends via Facebook.

What it cannot do?

- It cannot detect the pronunciation of the lyrics to be sung for the songs.
- Tapping the taalam or the rhythm cycle, which is an important aspect of Carnatic music, is not taken care of in the online lessons.
- Gaona does not teach the learners about Carnatic music notation, which is also an important aspect.

Secondary Research

Existing Product 2

Shankarmahadevanacademy.com

Shankarmahadevanacademy.com[8] provides online paid music education in different genres like Carnatic Music, Hindustani Music and Bollywoood Film music by having online chat sessions and classroom sessions with students from across the globe by in-house music teachers and experts. The recordings are evaluated to give feedback to the learners.

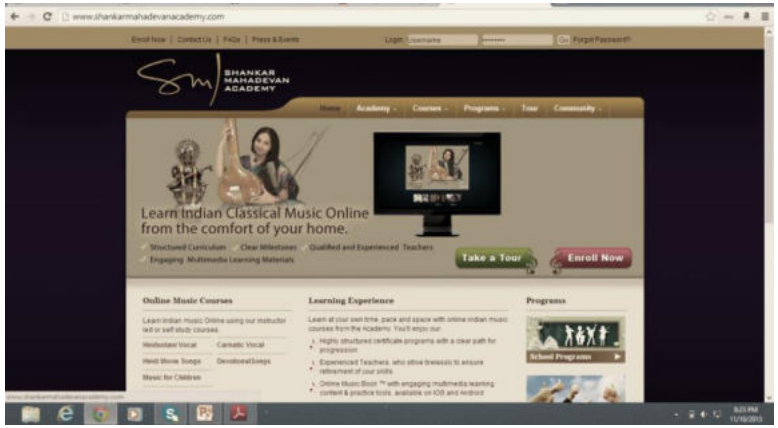


Image: Screen shot of Homepage | Source: www.shankarmahadevanacademy.com

Salient features

- The website works for different types of users based on their age, levels of expertise and professional background and also for different genres like Hindustani, Carnatic, Film and Audio Engineering.
- The course sometimes follows one-to -one education and interaction via video/audio chats.
- An evaluation of each student's performance is done by the in-house experts and a certificate of completion is issued that helps learners gain confidence and keep proceeding to further challenges in music.

What it cannot do?

- Real-time live feedback of the singing is not present all the time and available only when the in-house music teacher is online.
- Tapping the taalam or the rhythm cycle, which is an important aspect of Carnatic music, is not evaluated since most of the evaluation/ assignment recordings are all audio files.

Secondary Research

Existing Product 3

iCarnatic

iCarnatic[9] is an android Mobile app that supports beginners of Carnatic music, who have already started learning from their gurus, in practicing their singing lessons while at home/in the absence of their gurus.

Image: Screen shots of Mobile interface | Source: iCarnatic, Googleplay

Salient features

- The app helps in practicing the basic lessons in Carnatic music to be sung along with the tonic note's drone called shruti[10] (which can be set according to the user's preference based on his/her vocal range).
- The app helps the user to record his/her voice for self-evaluation and further improvement.
- Preferred language for the music notation can be chosen by the user.

What it cannot do?

- Automatic Real-time live feedback of the singing is absent.
- Supporting the users in tapping the taalam or the rhythm cycle, which is an important aspect of Carnatic music, is not considered in the app.

Primary Research

User studies

While interacting with the users(– beginner-learners of Carnatic Music), a lot of them expressed their good and bad learning experiences. These experiences, statements and thoughts almost defined their overall rating on Carnatic music learning experience. Shadowing technique[11] was the method employed to collect primary data. A total of 7 users of different age groups starting to learn the basic music lessons were studied using the Shadowing technique. Apart from this technique, semi-structured interviews were done with both Carnatic music learners as well as stalwarts and teachers. A total of 4 teachers/experts in the field were interviewed.

Data was collected with 1 Music school (Kalaikaviri, Trichy), 4 home-based classes in Trichy & Pondicherry. Along with these, some of the interviews were also conducted with music exponents in IIT Bombay Campus, Mumbai.

Shadowing

Shadowing is a technique wherein the user is shadowed throughout the course of the activity. The observer and the observant may or may not converse with each other. This method helps in uncovering detailed insights into a specific task, activity which in this context is to learn to sing[6]. This involved observing the learners during their first days of classes and trying to understand their struggles, actions and decisions during their learning-to-sing process.

Primary Research

What the Music Gurus say?

"In their first class of music, very few gifted children have "refined" ears that can easily grasp the correct pitch of the note to be sung along with. It takes some time for some of them to concentrate and understand while a few children might never get it right."

"Some of the kids sing really well when they don't depend on their Music Notation book. But some depend too much on their books for singing."

"Constant practice and perseverance can make any interested individual, a good musician/singer. But students today just don't seem to invest the time."

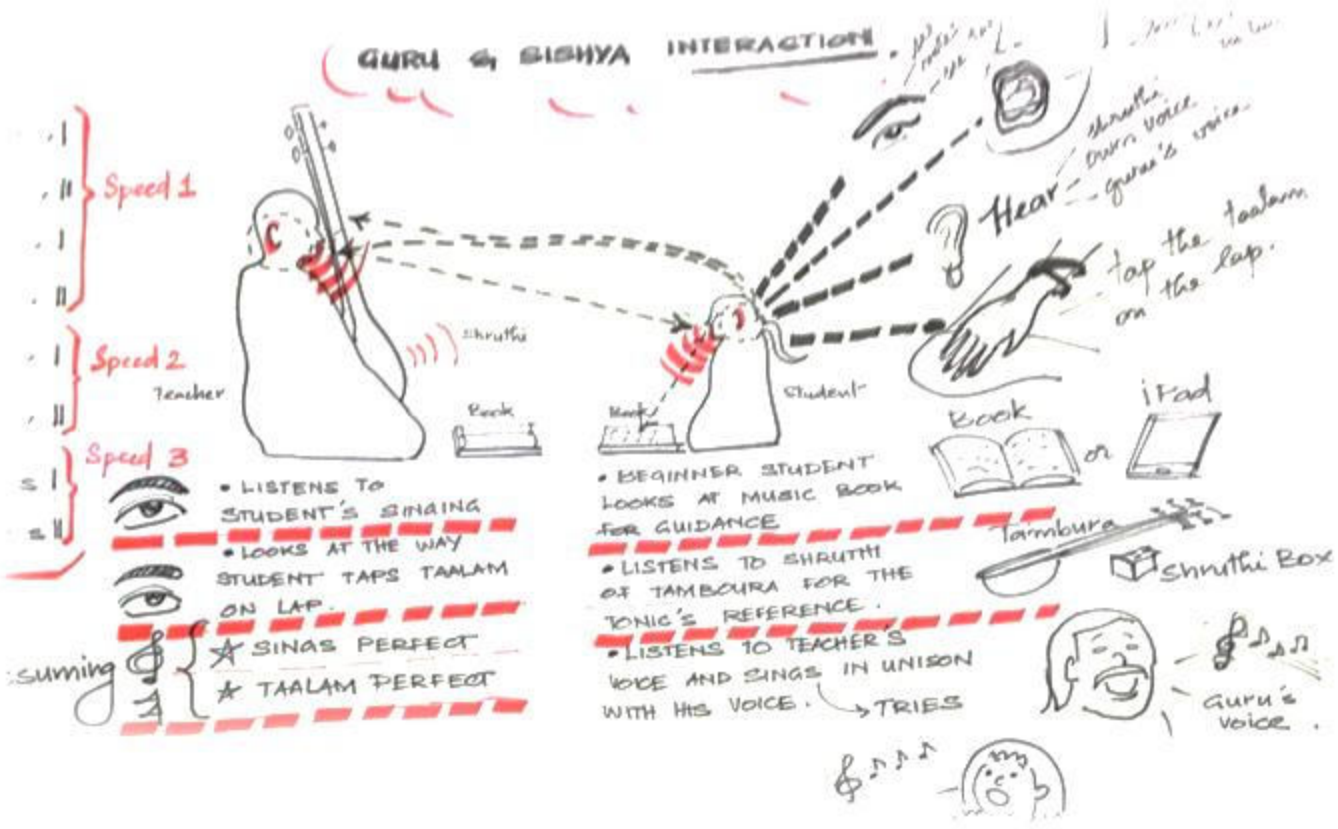
"Some children find it difficult to practise singing in the absence of the Music Guru."

"We try our best to encourage the individual when he/she feels frustrated after many attempts to sing say, a complex phrase flawlessly. While some don't give up, some of them might even drop out from the training!"

Image Source: http://musicclassonline.in/

Primary Research

Observations



Primary Research

Observations

The following were the activities observed, employing shadowing, in all of the learners during their music class sessions. While these are major activities, facial expressions like excitement or frustration were also observed in some.

Sing

Sing along with the teacher or sing alone as the case may be.

Ask for help, convey difficulties if any to teacher..

See

See the Music Notation on the text book.

See the Teacher's face (also expressions) and his hands tapping Taalam

Understand content/ tips/ score etc

Listen

Listen to the shruthi/tonic drone from tanpura

Listen to Teacher's voice as a reference to one's own singing.

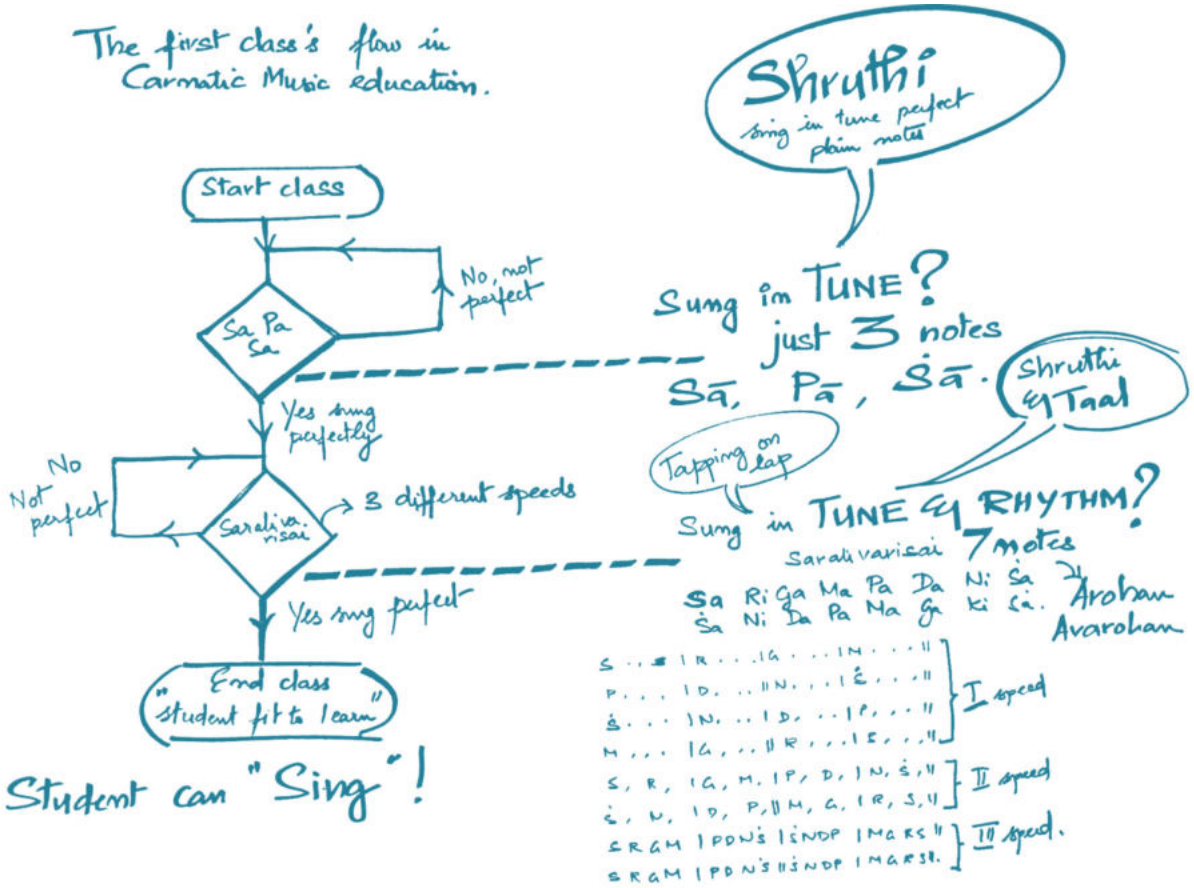
Listen to one's own voice.

Tap/turn

Tap and turn according to Teacher's instructions/Notation.

Understand vibrations for errors.

First lessons in Carnatic music



First lessons in Carnatic music

Insights

It was observed that although the printed textbooks of Carnatic Music[4] start with the *Saralivarisai*, the teacher always started with a warm-up voice exercise which included singing the first note of the scale, Sa. The students have to either sing along with their teacher or sing the same after he/she has paused for the student to catch up. Once perfect, the students then have to sing the notes Pa and the higher octave's Sa in an order. During these exercises it was observed that the teacher expected the students to prolong the note until each one of them got perfect in tune with each other (in unison).

After this, the students are taught to tap the rhythm cycle or the *taalam* (Aadhi taalam)* based on which the first few singing lessons are based on. Once in sync with respect to the tapping, the teacher begins teaching to sing the *saralivarisai* according to the tempo set by the tapping already taught. The students follow their teacher and sing and tap both at the same time as expected and progress to the 3 different speeds gradually as they attain more perfection.

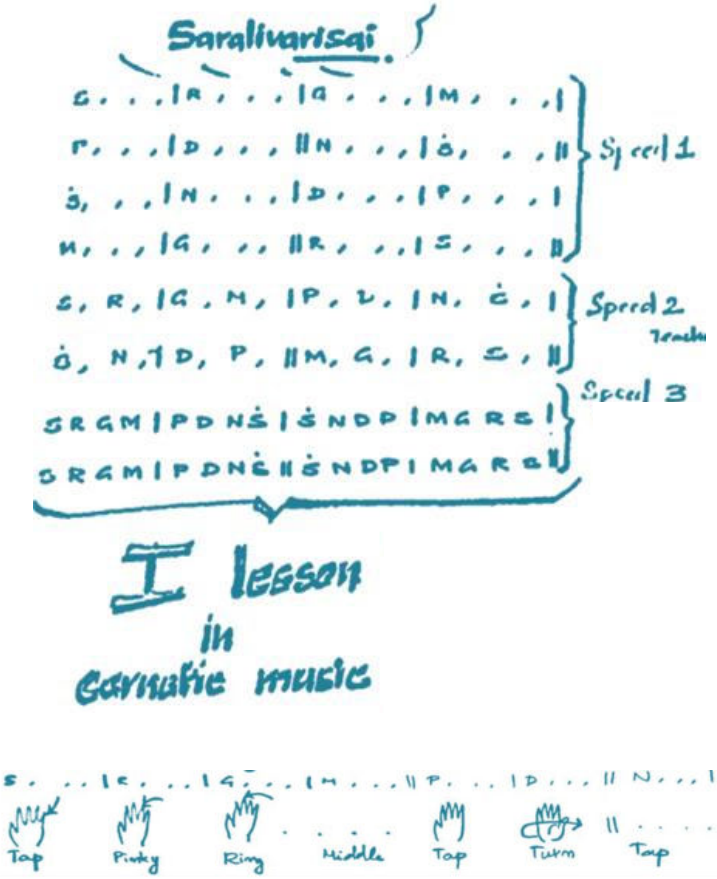
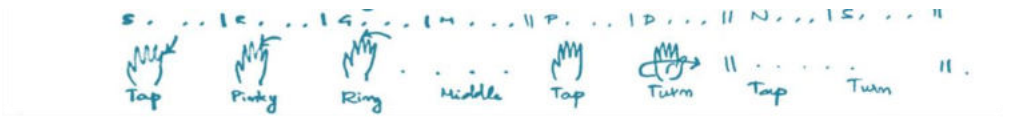


Image: Carnatic Students Tapping the Taalam | Source: the Hindu, Friday Review, 28 December, 2009



Insights

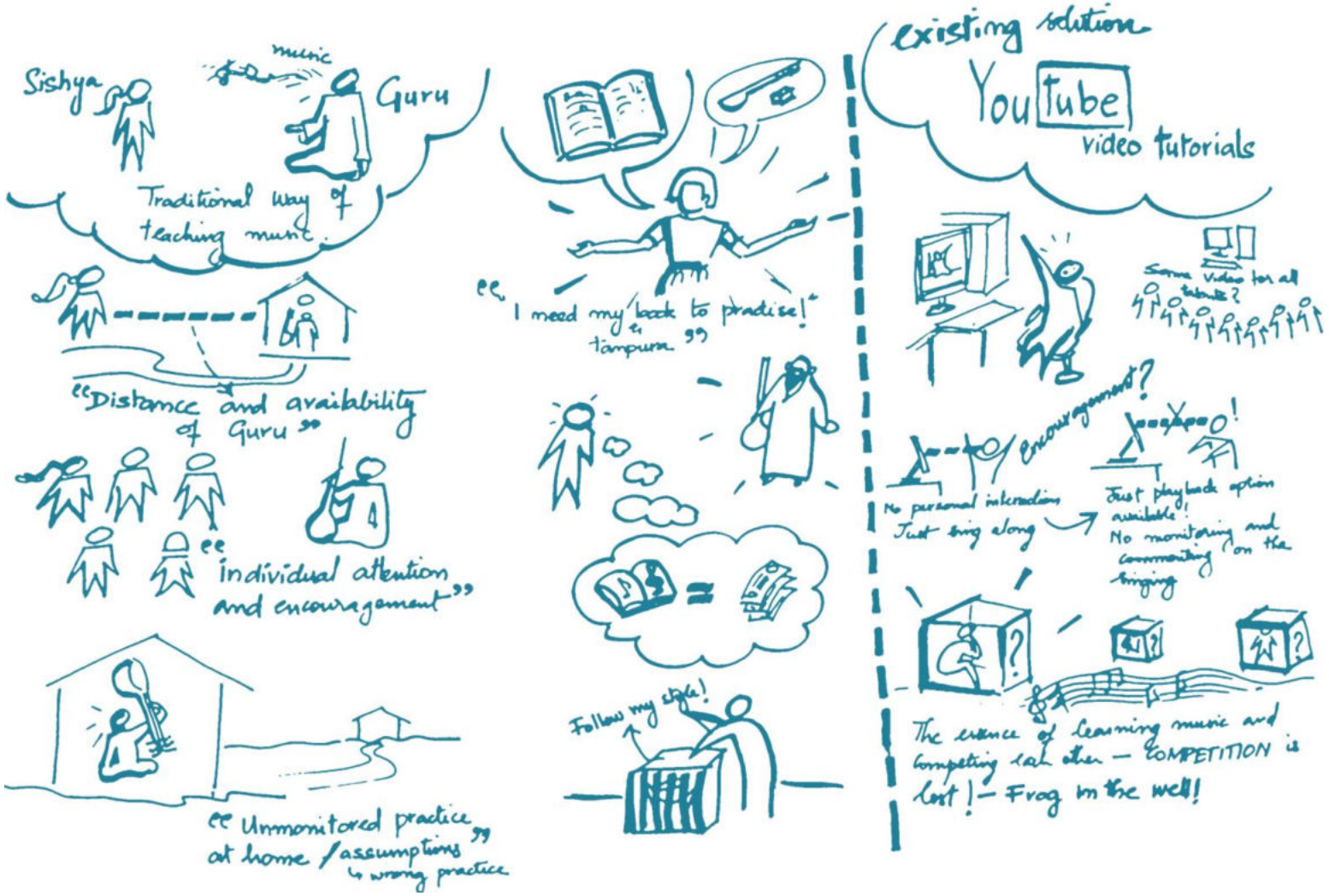
These are the major insights from the primary data collection, which could lead to design interventions.

- Most of the learners of Carnatic music fall in the category of age group 7-15, who are majorly school-going kids.
- In case of group Carnatic Music classes, individual attention is not given to the learners.
- In the absence of the music teacher at home, unmonitored singing sometimes leads to wrong practice.
- Some of the learners drop out because of non-affordable tuition fees, frustrating experience caused because of the teacher's temperament and reasons like shifting, distance from home etc.
- Even after mastering the graded exercises and having progressed to the next level, the students are advised to practise the same exercises in different other ragas with heptatonic scales and also sing the same exercises as just sounds like "aa", called *akara sadhana* to help them later in singing complicated songs.[13]
- The society in South India has a general disinterest and assumption towards Carnatic Music that it is meant only for the elite. Most of them often prefer Indian Film Music to Carnatic music as they do not understand the meaning of the *Swaras*/notes and the Sanskrit lyrics of the latter.
- Most of the video-based tutorials online lack real-time live feedback of the learner's singing and hence do not match the scope for learning present in conventional Carnatic music education with the guru.

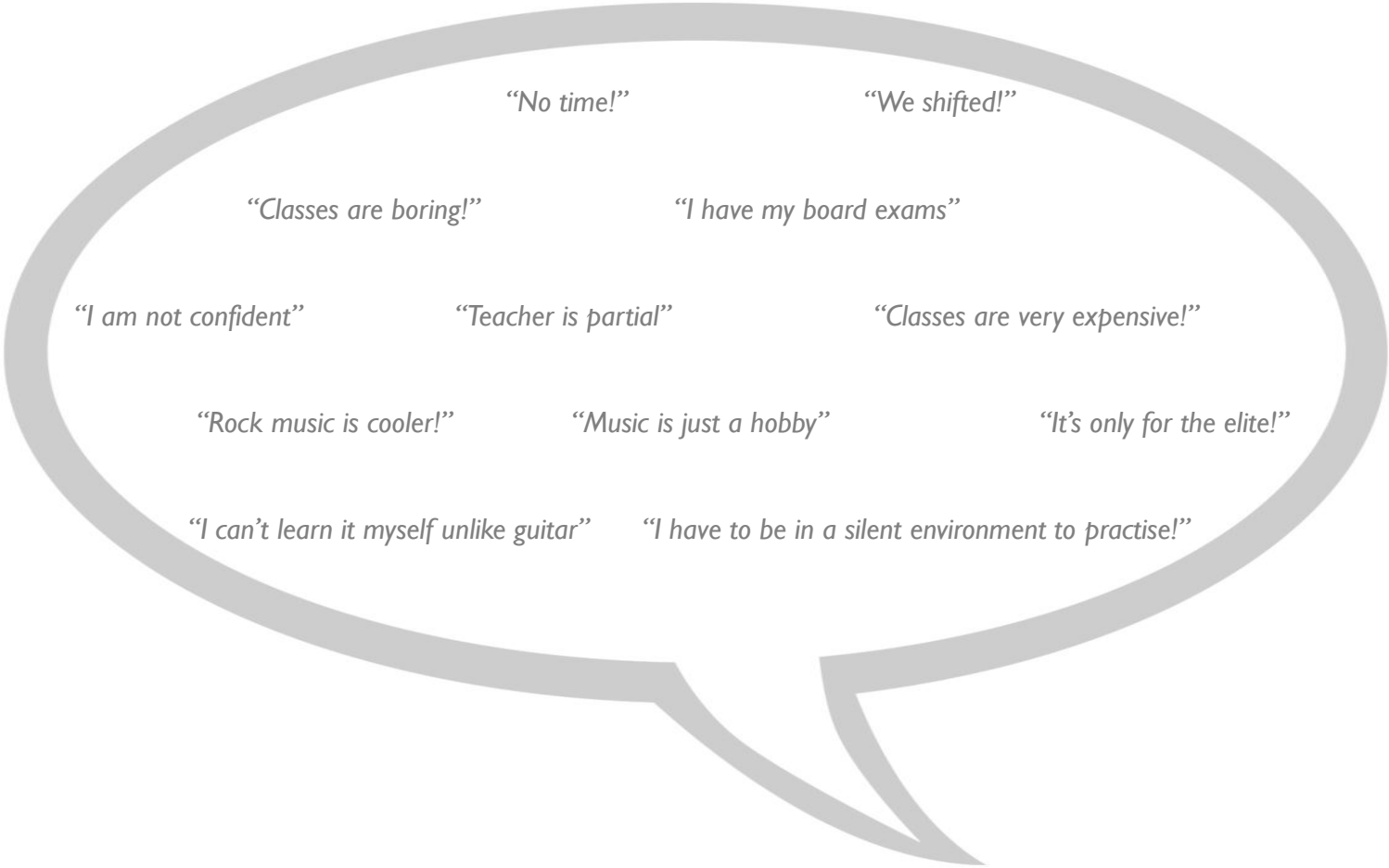
Major Problems faced by learners

- Singing in tune.
- Singing in rhythm.
- Learning to tap the *taalam* while singing.
- Pronouncing the apt notes/*swaras* without error.
- Learning to Sight-sing[7] the music notation.
- Singing in different speeds.

User statements



User statements



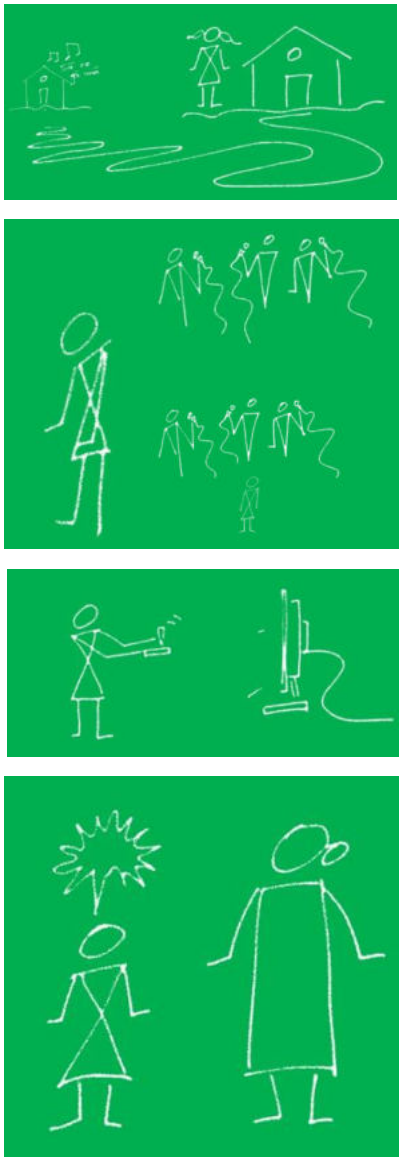
Primary Persona

Name : Janani

- 8 years old
- Studying 2nd std.
- Recently shifted to Bangalore
- Loves to sing
- Dropped plans of starting to learn Carnatic music vocals from her aunt in Hosur because of her family shifting to Bangalore

Scenario

- Janani has a new classroom environment
- Her class friends have been learning carnatic music from a guru in their locality.
- After coming back from school, her favorite activity is playing video games 1- 2hours.
- Janu's mother wants her daughter to join the same music class her friends are attending in their locality.
- But the music class is very far from her locality.
- Janu wants to sing like her friends and tries hard.
- Her friends say she should improve singing in tune and in rhythm.
- Janu conveys her mother about the problem.



The project

What is it?

An interactive system which facilitates users (who are primarily children between the age group 7 – 15) who are beginners in Carnatic Music Vocals to learn, practise and understand the basic singing lessons.

Known Assumptions

The system assumes that establishing the back end operations like the following will be possible.

1. Live Detection of the musical note the voice produces and visually representing it on a live display.
2. Programming the interactions so that they react based on voice command, touch and gestures.
3. Facial expressions and Head gesture Recognition by suitable camera and equipment.

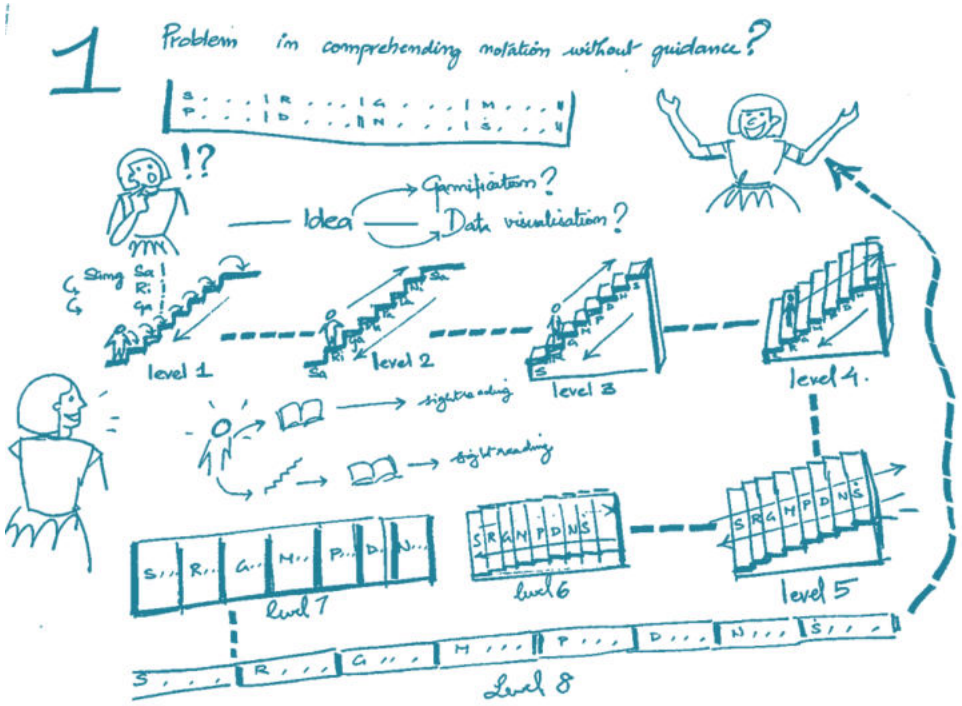
Project Brief - What should it do ?

- The platform should simplify the learning process of Carnatic music singing lessons for beginners.
- Also a platform to help users, who are already into conventional music training, to practice singing the same graded exercises in other ragas and vocal sounds to sharpen their singing skills. This practise may go on for many years as attaining mastery over singing the exercises in the other ragas, vocal sounds and speeds demands very high level of expertise[13].
- Guide the users to
    - Sing in tune.
    - Sing in rhythm.
    - Learn to tap the *taalam* while singing.
    - Pronounce the notes/*swaras* without error.
    - Learn the Carnatic music notation.
    - Sing in different speeds.
    - Provide feedback & encouragement.
    - Nurture healthy competition between different users and help in feedback from experts, all by recording and social sharing.
    - Practise in other ragas, Akara sadhana.[13]

Initial Concepts

Concept 1: Visualizing music lessons

The idea is to visualize the musical notes by hierarchical arrangement like the flight of stairs and make the user understand the value of each step as a musical note. As the user sings the first lesson of *Saralivaisai*, he climbs and comes down the flight of musical stairs. This idea can be a task-based interactive music learning application in mobiles, P.C and T.V. This idea also can be extended to teaching musical notation by gradually turning the flight of stairs from side elevation view to top view so that the notes slowly start to look like how they are written in every Carnatic Music Notation textbook.



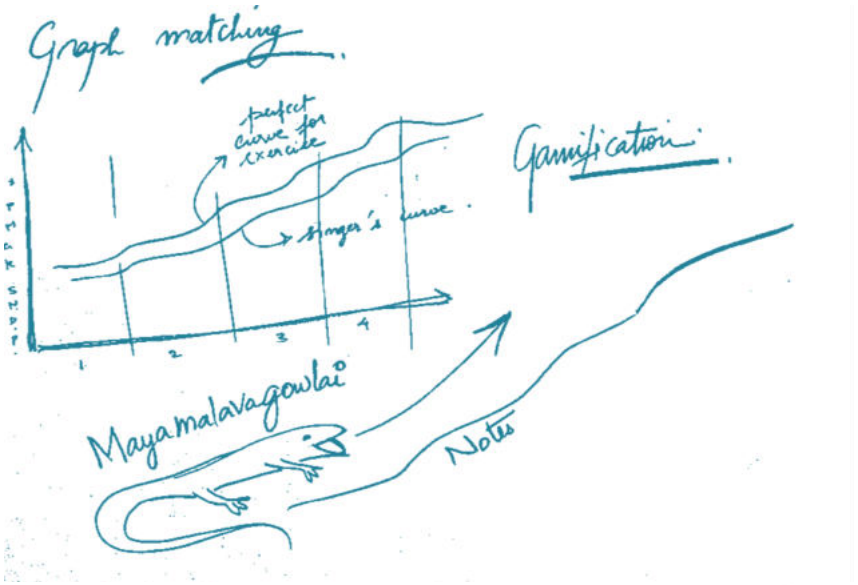
What it cannot do?

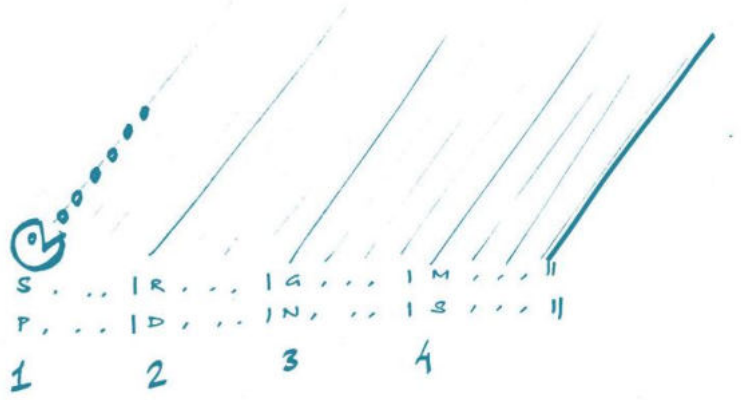
- This game cannot be extended to other zig-zag exercises which don't follow a gradually ascending and descending sequences.
- It does not teach Tapping the Rhythm cycle.

Initial Concepts

Concept 2: Game-based learning

Most of the potential users of the interactive design solution being children, I have ideated on a few game-based concepts to interest and attract them more into the Carnatic Music learning process. One of these ideas was having a visual game like the famous Pacman[8] where the user in the form of a friendly Lizard(inspired from meaning of the raga *mayamalavagowlai*) or Pacman consumes the right notes as he/she sings it perfectly and gets points based on the accuracy of his singing. He/she also has to do things at the right timing based on the live moving music notation below in the game interface and the corresponding game rhythm/beats.





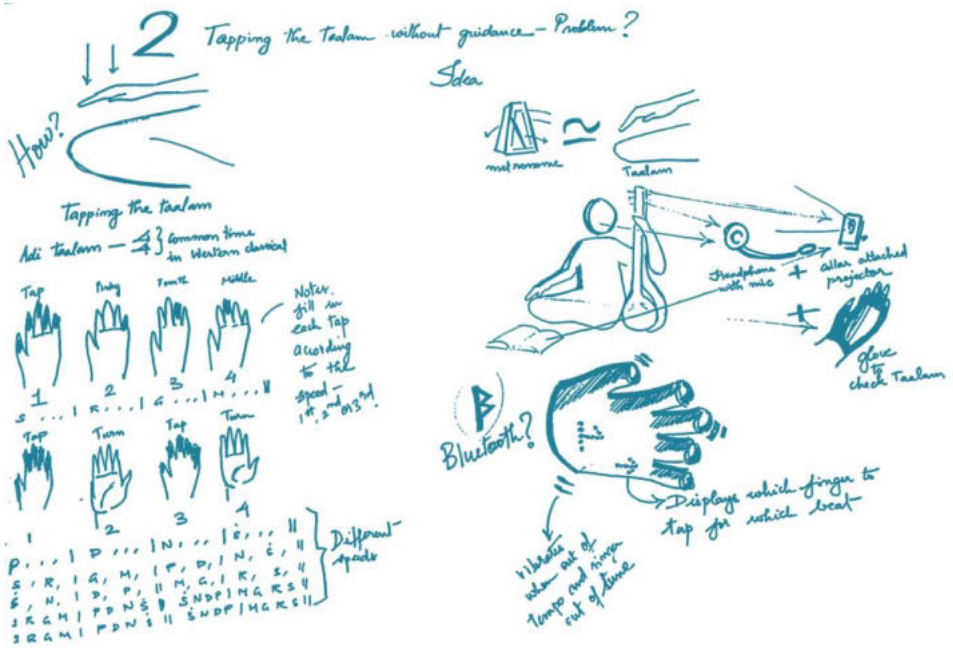
What it cannot do?

- It does not teach about tapping the rhythm cycle or the *taalam*.

Initial Concepts

Concept 3: Wearable devices

The prime idea is to teach the users to tap the taalam correctly as they sing. An interactive glove worn around the right hand should help in guiding which finger to tap and when to turn, etc based on the rhythm cycle that is set before starting the performance. These signals about errors can be given either by embedded LED lights or by vibrations caused around the particular fingers and palm, whenever needed. Combining this glove with an audio feedback system for the singing, through microphone and headphone, will serve almost all the needs of the learners except for learning about Music Notation. Also this system encourages singing-by-ear practice.



Connecting the Dots

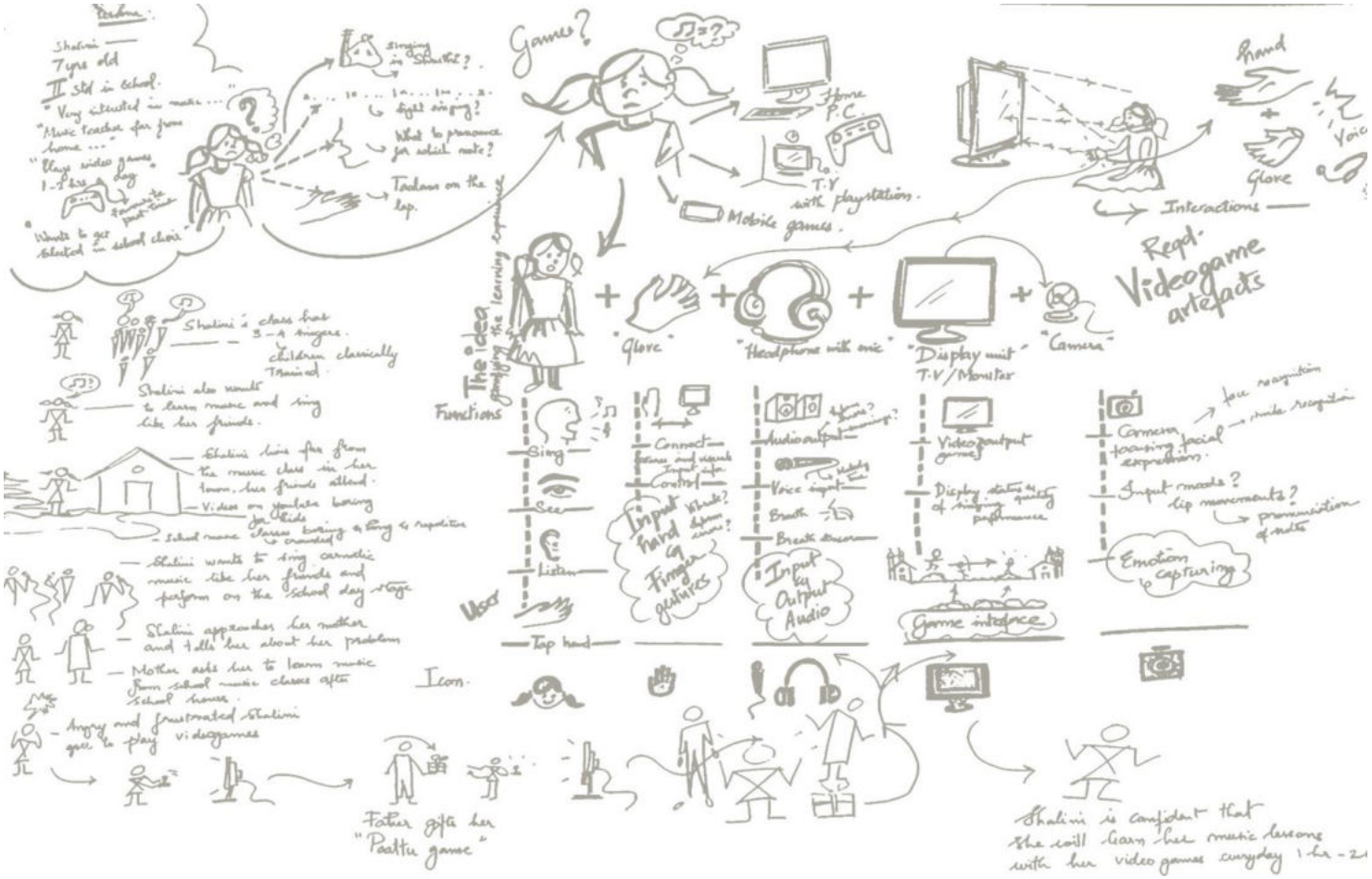
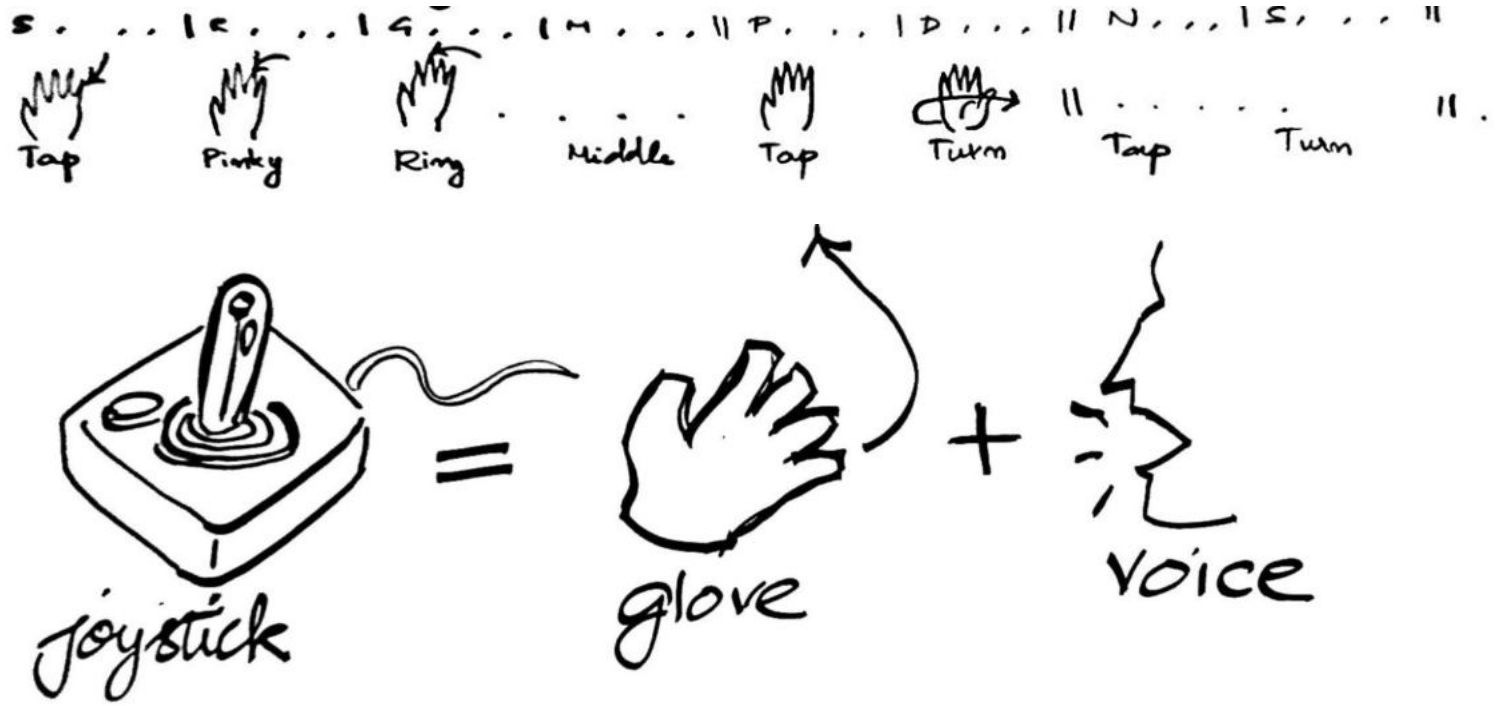


Image: A rough sketch of the Interactions | Source: Author

Connecting the Dots

A Hybrid Concept

An interactive system which takes into account content visualization, Game-based learning and wearable input and output devices together.



The final concept

Applying Insights from Observation

User

Sing

Sing along according to the game instructions

Give Voice command wherever required

See

Watch the real-time game proceed as one performs different activities.

Understand content/ tips/ score etc

Listen

Listen to the shruthi

Listen to reference track.

Listen to one's own voice

Listen to game sounds.

Tap/turn

Tap and turn according to game instructions/ Metronome value.

Understand vibrations for errors.

The final concept

How it works?

Input Hand &
finger gestures

Help in tapping the thaalam/
Control elements in the display/
Vibrate suitably to inform about errors

phones – output audio
Mic. – input voice

Help in listening to the game audio/
Help in inputting voice/ breath/
Inform errors, encourage through audio

Game interface
TV / Comp. monitor

Video output/
Real-time display of performance quality/
Scoring/ Encouragement/ game story

Emotion capturing

Capture facial expressions/emotions/
Analyze lip movement, body gestures/provide tips
Capture performances and share with parent/

The final concept

Concept Inspiration

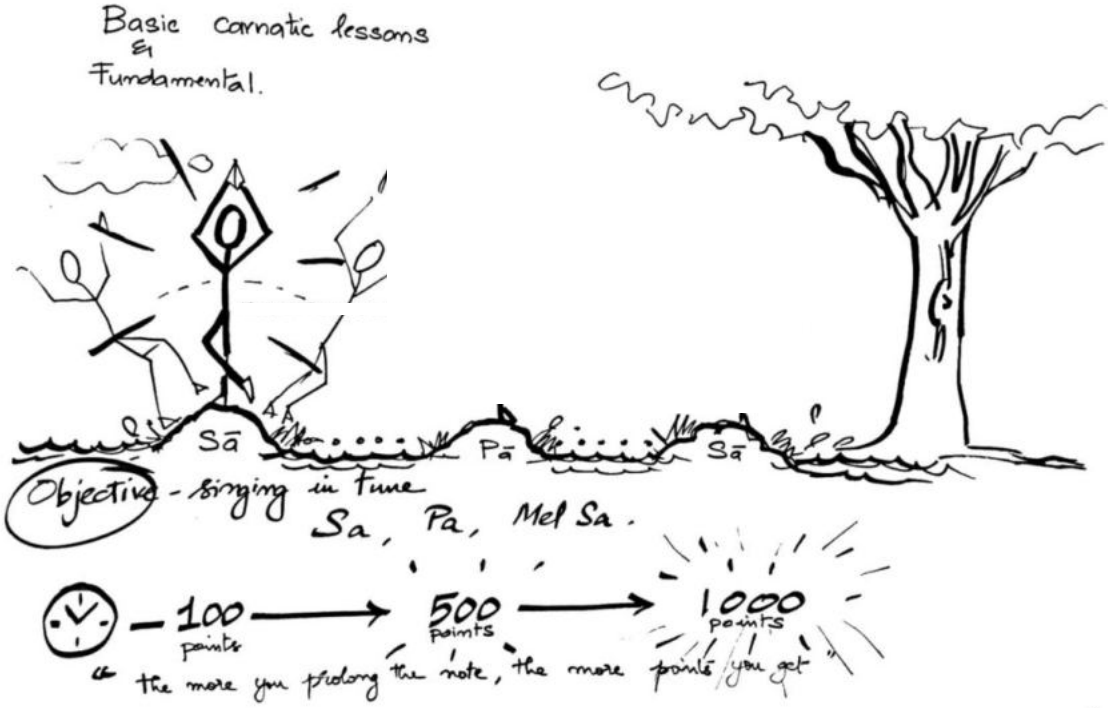
When one sings a note, even the slightest sway up or down the note to be sung is an error. Singing a single plain musical note requires humongous concentration to control the voice from swaying to other notes. This is literally very similar to Yoga and meditation.

The balance

In Yoga, there are many Asanas or body positions where one has to stand in one of his/her legs and meditate. This inspired me for “the balance” factor that one requires while singing. Assuming that the ideal balanced Yoga posture – “One-legged meditation” is going to be the visualization for perfect singing of a musical note, the errors and swaying in frequencies, can be mapped to the meditating character swaying left and right in the visualization. This may give a clear mental model to the singers singing the notes as they observe the visualizations change accordingly.

The final concept

Singing in Tune



The final concept

Concept Inspiration – Mythology

Muthuthandavar, a famous Tamil Composer and Carnatic musician who lived in the 14th century is believed to have performed many magical miracles as he sang. Once, he had to cross a flooded river and reach another place that he had to visit. As he started singing, huge stones and tree logs paved a temporary pathway for him to cross the river.

Applying it for the lessons

Inspired by the story, I decided to map his journey of crossing the river as every singing lesson that has to be completed flawlessly. While "the balancing act" over the stones would visualise singing in tune, the stones appearing from the river bed to the surface (–for helping the character cross the river) would represent the beats or the rhythm that the user creates by tapping the taalam on his lap(with the glove).

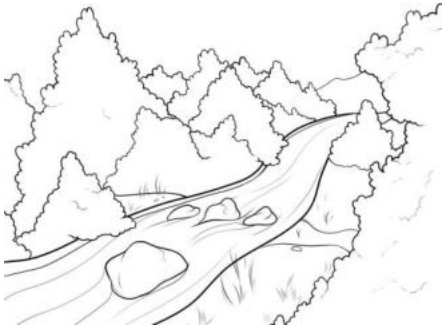
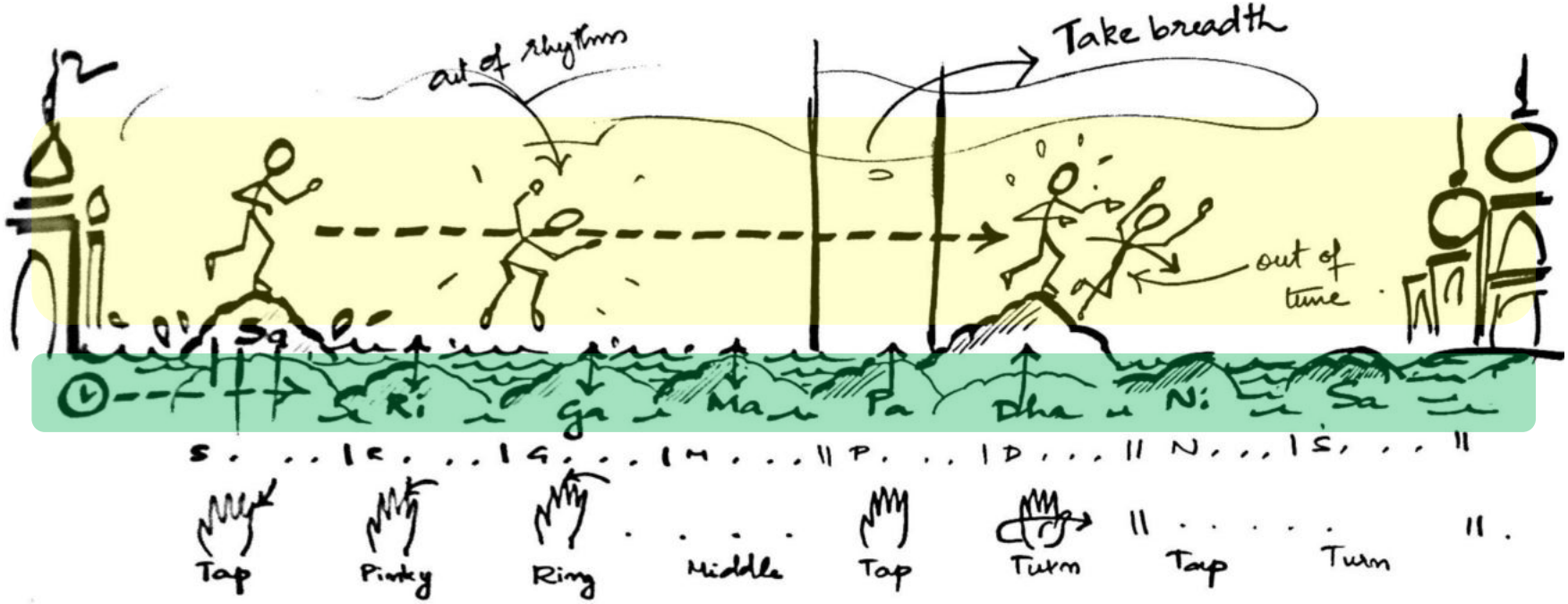


Image: Muthuthandavar(left) | Source: http://www.carnatica.net/

The final concept

Mythology



thalam shruthi

The final concept

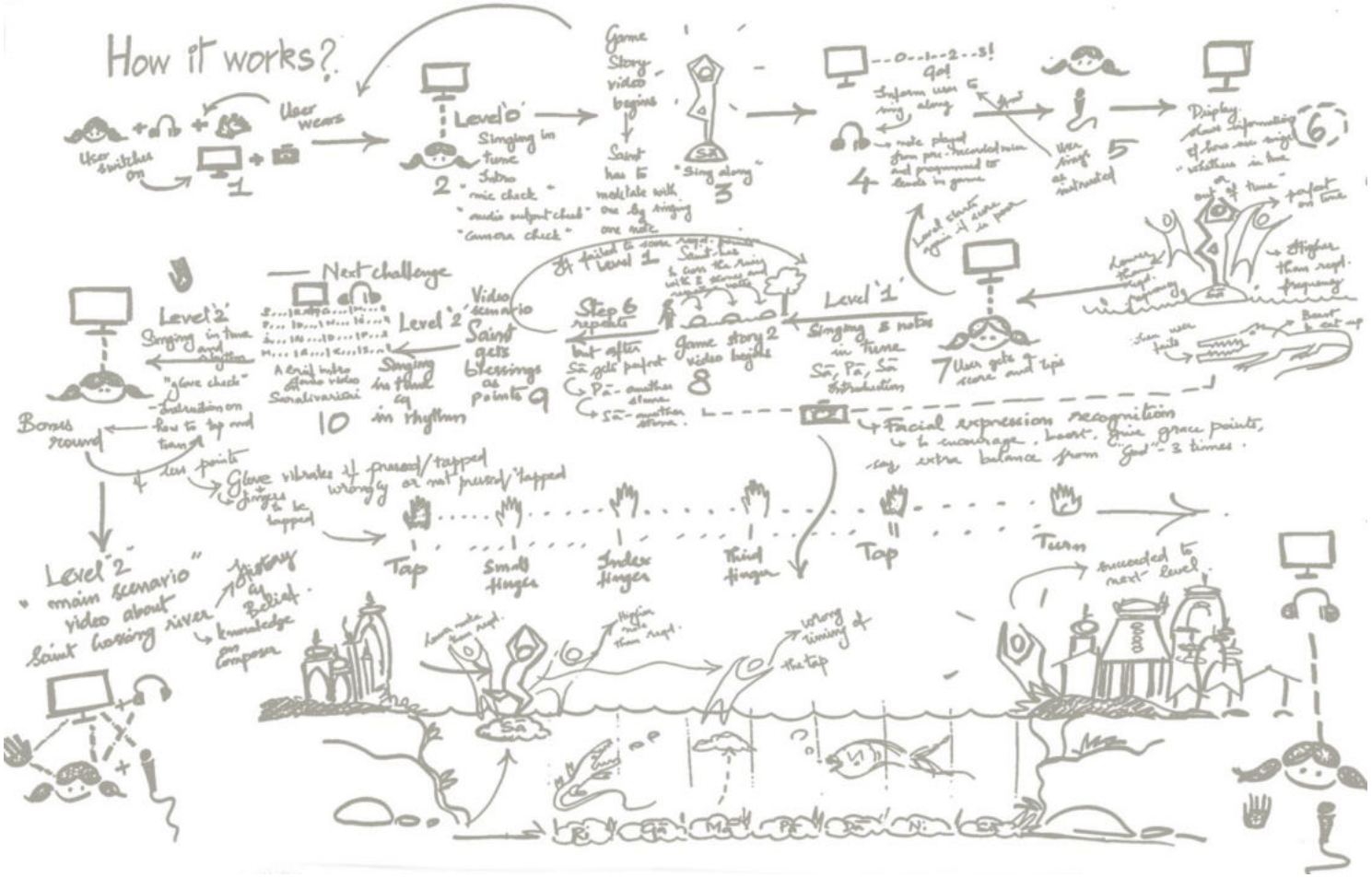
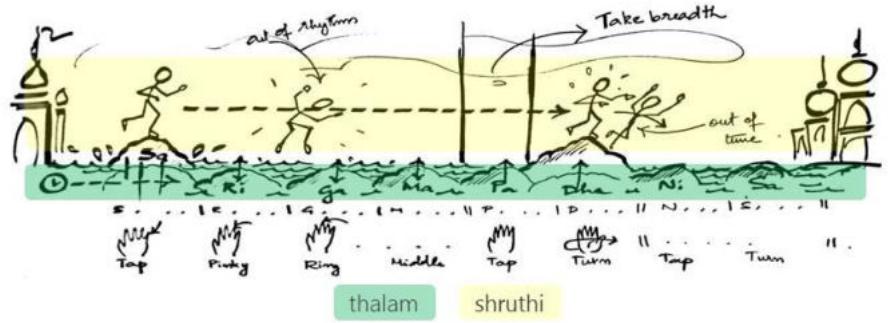


Image: A rough sketch of the Interactions | Source: Author

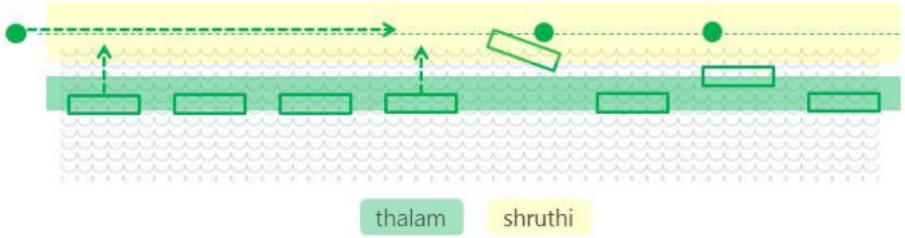
Final Design

Abstracting the Characters

While designing the game interface, I had to take care that the experience caters not only children learning Carnatic music but also other ages interested in learning music. After discussions with professors on avoiding literal representation in the form of real life characters, I chose to abstract elements like in the figures shown on the right.



Mood Board for Visual design



Final Design

Prototyping and Testing

Key Questions

… Is the user able to find out whether he is singing in tune, from the visuals?

… Is the user able to understand the correct timing of the taps and the number of notes each tap is assigned based on the speeds of the rhythm cycle, from the visuals?

… Is the user able to comprehend the visuals with the corresponding music notation?

Method - "Wizard-of-oz Prototyping"

...simulating machine behaviour with human operators[12].

...simulating visualisation changes according to the user's singing pitch with a music expert behind the frame.

…by making a Hi-fidelity front-end interface design to make users think it's more real and observing & getting feedback from the users.

Prototyping and Testing

Wizard of Oz

Where and how the wizard will provide input?

…recognising the singing pitch and providing signals on whether tuning is perfect or not.

…checking if tapping matches the tempo of the exercise and giving signals for wrong timing.

The Users

… No prior Carnatic music Vocal training.
… 7 users - 4 kids (ages 9 - 14) and 3 adults.

Method

… providing tasks and taking notes.
… Facilitator and Wizard roles played by myself in most of the cases.
… Authentic results when wizard role is hidden and user is not informed

Method

…Pilot-tested with one participant and revised prior to use.

…test sessions averaged approximately 10 minutes.

…Data analysis involved the identification of common difficulties faced by the users because of inefficiencies in design.

…After singing or tapping, participants were also asked to perform a think aloud protocol in which they described their thoughts as they completed each task.

Prototyping and Testing

Task 1 – Singing In Tune

…The users were given the “SA PA SA” exercise where they had to sing just three notes
SA , PA and SA in tune.
… Relevant audio files were played for reference and they were given instructions to sing along

Key question 1

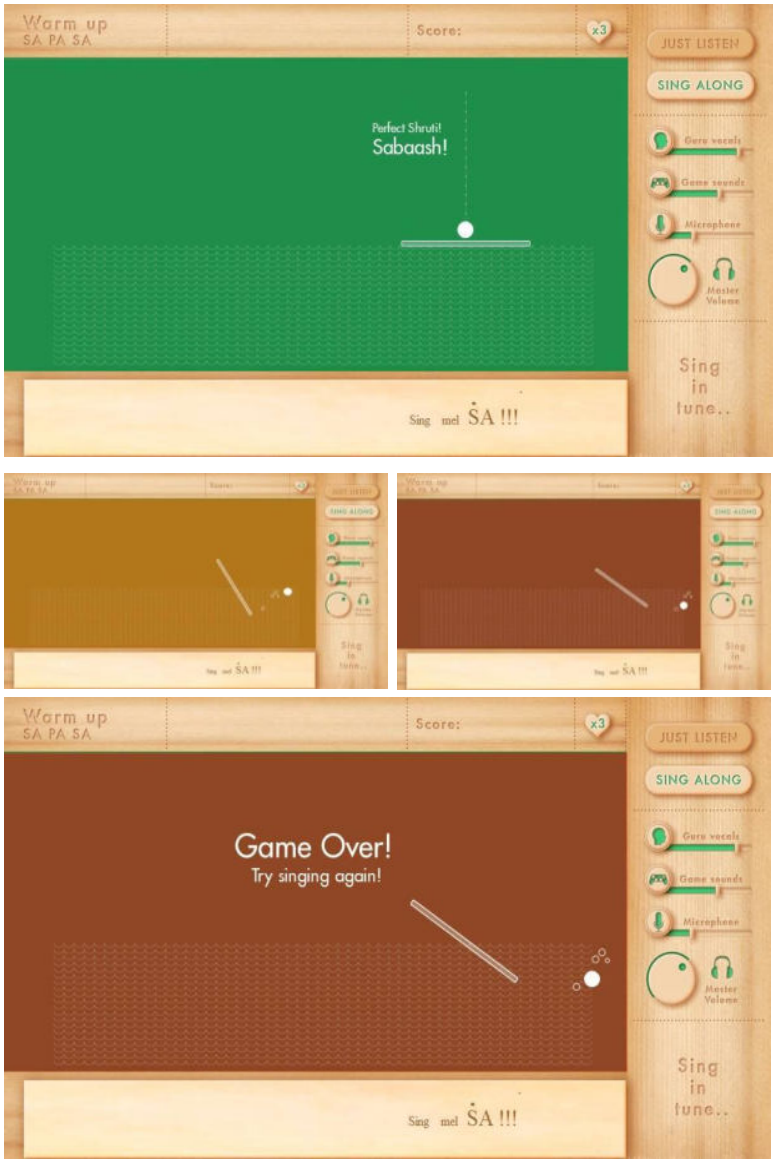
… Is the user able to find out whether he is singing in tune, from the visuals?

User Feedback

… In their first few attempts, 4 of the 7 users did not understand that the ball sliding left meant lower to the preferred pitch and right meant higher.

Insights

… Signal/instruction to sing lower/higher pitch to be added in case user keeps singing the wrong note for a long time.



Prototyping and Testing

Task 2 – Taps & Corresponding notes

…The users were given the first exercise in "Saralivarisai" exercise where they had to just keep tapping according to the rhythm cycle's metronome.
… Relevant audio files were played.
… Were asked to "think aloud" as they explore the interface and the visualisation.

Key question 2

… Is the user able to understand the correct timing of the taps and the number of notes each tap is assigned based on the speeds of the rhythm cycle, from the visuals?

User Feedback

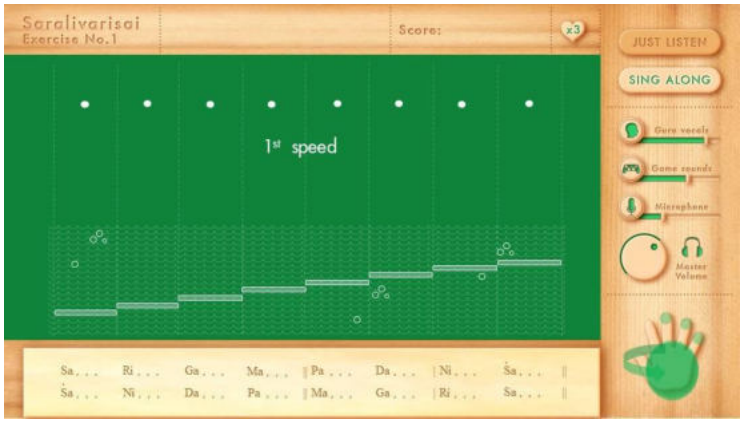
… All the 7 users understood the concept of when to tap according to the metronome of the exercise irrespective of speed 1, 2 and 3.

Other Insights

… The ball sliding along the surface of the brick bats would not mean "a steady note" since users expect realism in the physics behind the visuals.

Bat would not float steadily when a ball rolls on it.

... The ball sliding along the surface of the brick bats would not mean "a steady note" since users expect realism in the physics behind the visuals.



Prototyping and Testing

Key question 3

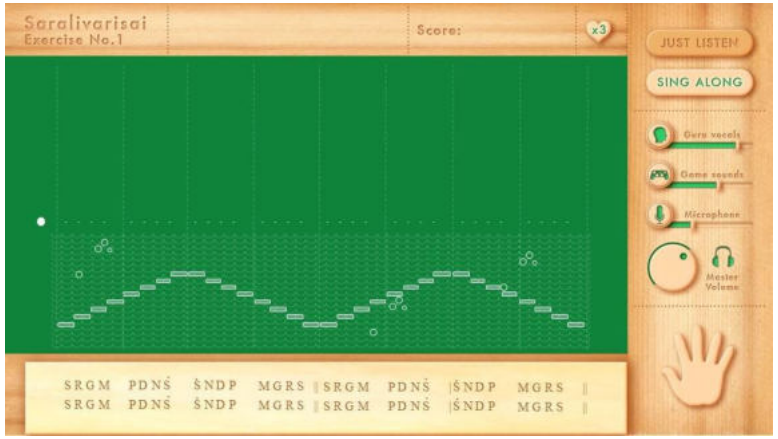
… Is the user able to comprehend the visuals with the corresponding music notation?

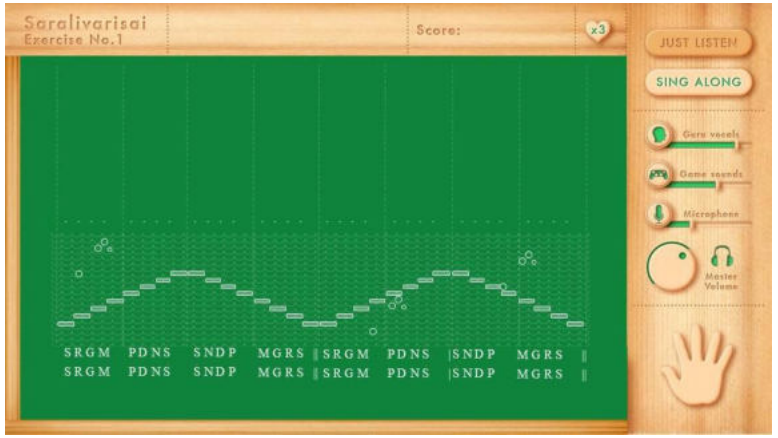
User Feedback

… During think aloud, to 5 of the 7 users the notation looked detached from the interface and the relationship of the grids & brick bats with the notation was not understood in the first glance.

Insights

… Extending the green space till the notation thereby making the notation and visualisation relationship more seamless.





Scope for Extended Use

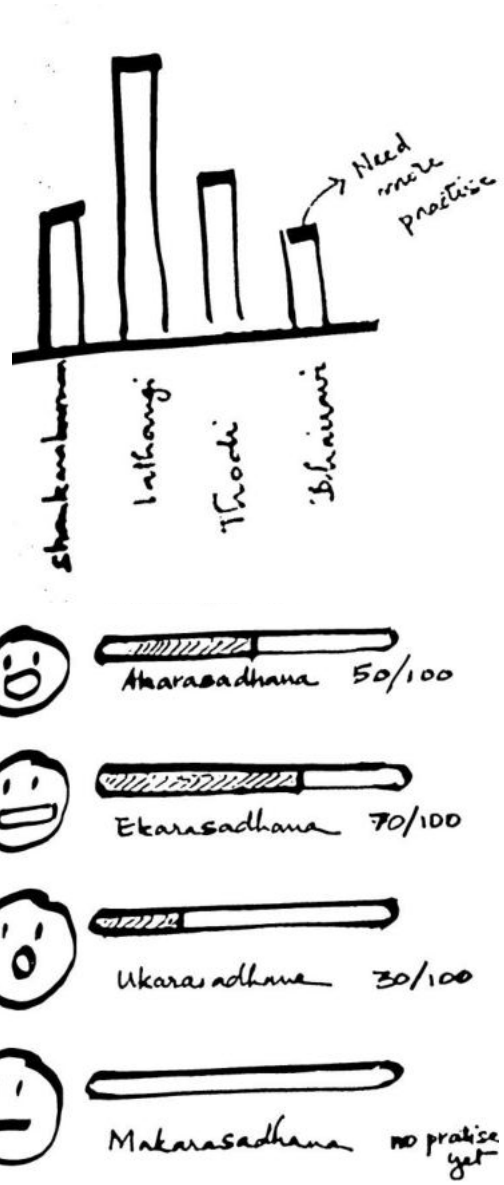
More Lessons

The same concept to train singers can be extended to all the graded exercises namely *saralivarisai, jantavarisai, dhattuvarisai* and *Melsthai Varisai*. Also all of these lessons have to be sung and practised in 3 different progressive speeds, on the basis of which the 3 difficulty levels in each lesson of the game shall be designed.

Life-long Practising

After mastering the beginner-level lessons, the users can practise the same exercises in different other ragas everyday using the designed application, along with their advanced-level lessons and *Kritis* learnt from Gurus or by ear.

They can also practise these lessons in akarasadhana, ukarasadhana, Makarasadhana[13] where the singer sings the whole lesson in a single sound instead of pronouncing the musical notes. This can help them greatly in singing compositions that are highly challenging, later in their musical journeys.



References

[1] Kriti - definition
http://en.wikipedia.org/wiki/Kriti

[2] Gayaki - singing style
http://en.wikipedia.org/wiki/Carnatic_music

[3] Purandaradasa - Father of Carnatic Music
V.Sreenivasa Rao, Hymns and Songs of Purandara Dasaru, Bottom Dog Press, April 2004.

[4] Varisais - Graded Exercises
A.S. Panchaapakesa Iyer, Ganamrutha Bodhini, Text Book for Carnatic Music beginner, Saralivarisai

[5] Mayamalavagowlai raagam - definition
http://en.wikipedia.org/wiki/Mayamalavagowla

[6] Octave - definition
http://en.wikipedia.org/wiki/Octave

[7] Gaona - Online and Android karaoke singing Game
http://www.gaonaweb.com/#!/home

[8] Shankarmahadevanacademy - Online Music Learning
http://www.shankarmahadevanacademy.com/

[9] iCarnatic - Android Mobile Application
https://play.google.com/store/apps/details?id=com.appchita.iCarnatic.android&hl=en

[10] Shruthi – Definition in music
http://en.wikipedia.org/wiki/Shruti_(music)

[11] Shadowing – Primary Research Technique
Studying Actions in context: A Qualitative shadowing method for organizational research, Seonaidh McDonald

[12] "Wizard of Oz" – Prototyping and testing
The Wizard Of Oz: A Tool For Rapid Development Of User Interfaces, Paul Green and Lisa Wei-Haas, University of Michigan, June 1985

[13] Other ragas and Akara Sadhana- Mastering singing
The Shaping of an Ideal Carnatic Musician Through Sādhana, Pantula Rama, Gyan Publishing House, Jan-2008 pp. 167 - 270