P3 Report

Understanding Folk Musical Instruments through Game Design

Guid: Prof. Venkatesh Rajamanickam
Co-Guide: Prof. Uday Athavankar

Submitted by:
Supriya Dutta
176330002
Interaction Design
2017-2019

Acknowledgement

I would like to offer my sincere gratitude to Prof. Uday Athavankar and Prof Venkatesh Rajamanickam for their guidance, support, and contributions.

I wish to acknowledge the help offered by Shilpika Bordoloi and Mukunda Bora from Brahmaputra Cultural Foundation.

I am also grateful to K.V. School, IIT Bombay and IIT Bombay Campus school for permitting me to carry out my pilot testing with their children.

My special thanks are extended to my batch-mates for their constant support, encouragement, and feedback throughout the course of the project.

Supriya Dutta
176330002

Table of content

Introduction

Folk musical instruments bind one's community together. Within a community, each instrument has its own specific uses, places and time to be played. They form an integral part of the community. However, with the popularization of new electronic musical instruments and music, the audience base of traditional musical instruments have decreased considerably.

To gather more information about the same we met with Brahmaputra cultural Foundation, an NGO who has been working with the conservation of similar instruments of the North-eastern states of India.

Brahmaputra Cultural Foundation

Brahmaputra Cultural Foundation is a non-profit organization with an initiative to preserve and promote cultural traditions of North East India and showcase performing and visual art over the world. "*Katha Yatra*", is one of their projects is aimed at a research-based understanding of river Brahmaputra[11]. The project involves documentation and re-imagination of the culture, identity and environmental landscape of the river.

Brahmaputra Cultural Foundation(BCF) has documented folk musical instruments in North Eastern states of India in the form of a documentary and book called "*Borluitor Barbaibhav*", authored by Rinumoni Baruah and Chandrasekhar Sarmah, published by Barbaibhav Production. The version of the book used is of November 2012, first version[1].

Figure 1: Projects done by Brahmaputra Cultural Foundation, Assam

Current projects of BCF:

Currently, the NGO is trying to popularize these instruments through a range of workshops and performances aimed toward adult audiences[11].

They include:

a)performances(dances and dramas) showcasing 25 tribes of the North East

b)Collection of 115 instruments

c) Lessons on folk songs, folk instruments and construction of those instruments

Barluitor Barbaibhav

Barluitor Barbaibhav is a textual and video documentation of 25 tribes of northeastern states of India. It contains records of different tribes, their festivals, traditional songs and dances, musical instruments used with the songs, dances, festivals and various events.

Communities share alluring relationships with their folk musical instruments. Folk musical instruments are not only associated with celebration but are used to mark events of the community. For example, in Assam, Doba is played in prayer halls, every morning and evening. It marks the time of the day and prayer time. During the spring season, Assamese community celebrates the new year and Bohag Bihu. Instruments such as Dhul, pepa, gogona, taal, toka, sutuli and bahi are played during this period of time.

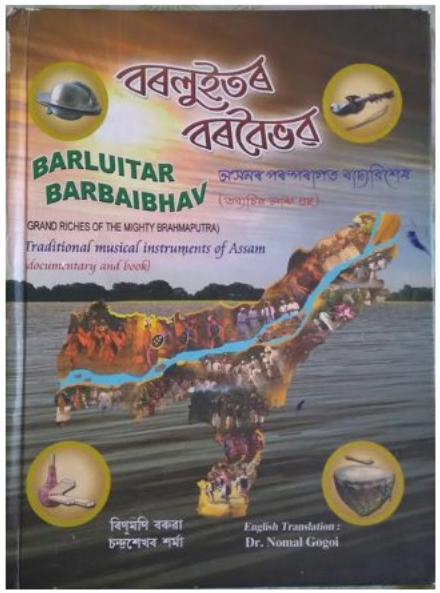


Figure 2: Book, *Barluitor Barbaibhav*

Figure 3: Documentary, *Barluitor Barbaibhav*

From the documentation available in "*Barluitor Barbaibhav*" we tried to extract different attributes associated with these musical instruments such as the sound of the instrument, occasions where they are played, materials that are required for construction, sources of these materials, folk musical instruments and their relationship with the village.

Can we target younger audience?

According to instructors at BCF, it is easier to teach a person of younger age or any individual who has had training before, than an adult who had no prior training. He also added that the potential time to introduce an individual to any musical instrument would be at the age group of 4-12 years. The students in this age group tend to be more adventurous and are willing to experiment. The enthusiasm and motivation can be due to the excitement of owning one's first instrument, and/or possible recognition from friends and family. Children with siblings, parents or other family members who practice music are more likely to do the same. They perceive music as a normal part of their lives due to the availability and access to musical instruments at an early age. Children with older siblings who play instruments have later as role models and provide more opportunities for learning the same[2].

Why Game Design:

To create an interactive environment and better engagement for the player/players a game design approach was taken. The presence of gameplay and a game world is expected to encourage users for repetitive play, helping them understand and learn better. To encourage collaboration we tried to design a prototype enabling connection between the players through a local network hot spot.

In the interview with Mukunda Bora, a teacher from BCF, he mentioned that these musical instruments have their own quirks and experiences which cannot be achieved through any virtual medium, but the physical instruments itself. Therefore, We aimed at a game which would focus on the construction of each of the musical instruments, raw materials needed, where they can be obtained from, how they sound like, and how to mix their sounds together to create traditional/custom soundtracks.

Objective

The objective of this project is to introduce folk musical instruments to an audience of the age group of 8years and above through game design. The prototype designed is expected to help them identify folk musical instruments through different properties such as sounds of the instrument, raw materials required for construction, their relationship with their native community, events or festivals they are used in.

The prototype designed will enable music mixing allowing the audience to experiment with the assembly of different instruments, but not music making or composing.

Research

Insights from BCF and their current work:

Students

In the interview with Mr. Mukunda Bora, music teacher in BCF, he stated that Folk instruments such as Dhul attracts an only seasonal audience. Students only attend these classes during Bihu season. Children who come to learn are mostly brought by their parents. These parents are already aware of such instruments or have had former experience with it. Hence, student-base is limited to these two main factors.

Best time of introduction of musical instruments

The best time of introduction of musical instruments to an individual as said by Mukunda Bora, is during one's youth. Any individual, at the age of
5-13 years are more adventurous and willing to adapt to new systems, than when older. Individual who have had experiences with musical instruments at a younger age are more likely to learn new instruments when they are older.

Wide range of workshops and performance are already been organized aimed towards adult audiences by BCF.

They include:

a) Performances(dances and dramas) showcasing 25 tribes of the North Eastern States of India

b) Collection of 115 instruments

c) Lessons on folk songs, folk instruments and construction of those instruments

Barluitor Barbhoirab:

Barluitor Barbhairab is extensive documentation of the musical instruments found in the North Eastern States of India. It contains a collection of folk musical instruments of Assam, and different tribes of North East, Karbis, Bodos, Rabhas, Tiwas, Sonowal-Kacharis, Morans, Deoris, Mishings, Hajongs, Tea tribes, Dimasas, Biate, Kuki, Hrangkhol, Bhaiphei, Hmar and Jemi Nagas. [1].

The documentation is done in two forms:

a) Book: "*Borluitor Barbhoirab*", authored by Rinumoni Baruah and Chandrasekhar Sarmah, published by Barbhairab Production. The version of the book used is of November 2012, first version.[1]

b) Documentary: produced under the same name which provides a visual account of different communities and use of their instruments.

The data from the book contains information about the musical instruments about 18 tribes, as follows:

a) Their musical instruments,

b) Where they are used,

c) When they are used

d) Construction procedure

e) Raw materials required for construction

f) Festivals or events associated with the time of the year, and musical instrument.

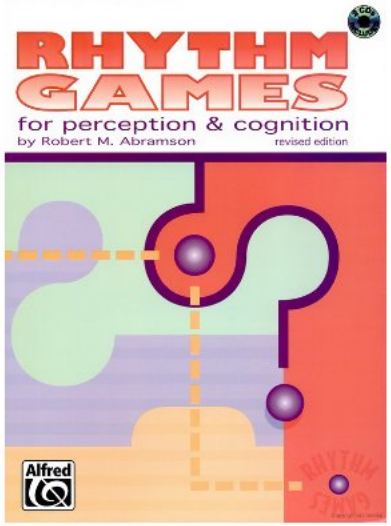


Figure 4: Rhythm games for perception and cognition

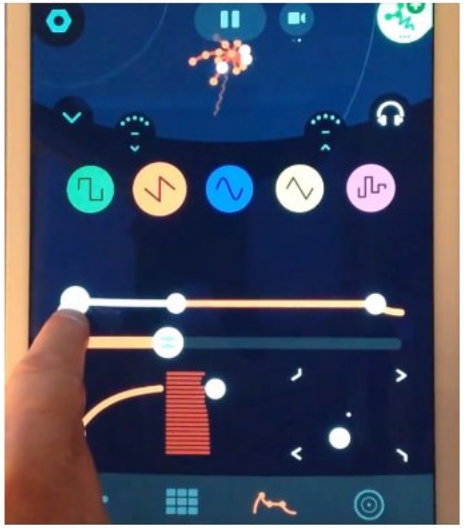


Figure 5: Seaquence

Figure 6: Incredibox

Classroom-based activities:

A set of game activities and games are followed before teaching any instruments as described in book Rhythm games for Perception and cognition. These games help students help develop a sense of rhythm.
[10]

Popular musical games and applications:

Seaquence:

Seaquence is a multi-voice synthesizer. It helps users to create, mix, modify and share musical compositions with an interface of a swimming "planktone" creatures. Each planktone creatures can be modified to create new musical notes. The interface is so designed to synthesize creativity among beginners.
[14][16]

Incredibox:

Incredibox is a music mixing application which lets users create a mix of hard-coded beats by drag-and-dropping beats in the form of characters. Players can record their mixes, and achieve rankings. Players can add their own sounds, create mixes, use combos to unlock new bonuses, and share it on social media[15].

Existing multiplayer games:

We also looked into multiplayer games, with new increased popularity, their mechanisms and interactions to understand multiplayer interfaces better.

XCOM, the board game:

XCOM is a roleplaying board game where a maximum of four players can take the role of different officers in the elite institution called XCOM and save humanity from an alien invasion.

The game incorporates a digital application into the core of its gameplay. The main function of the application is to create different missions, help coordinate different users, help manage tasks and gradually heightens the game's tension as it maps all the required tasks to real time[17].

Figure 7: XCOM-board game

Duelyst:

Duelyst is a turn-based strategy game, where two players fight over a strategic battlefield. Players take turns in arranging their avatars, minions, and spells in the form of cards to eliminate the other enemy general. Players can choose their army general from a set of six factions, each with their unique army powers[18].

Figure 8: Duelyst

Information from "Barluitor Barbaibhav"

Textual information from the book documentation is translated into an excel sheet and categorized further as below:

	A	B	C	D	E	F	G	H	I
1	Instrument	Type	Materials required	Additional information	Preparation	Played(by)	Played(how)	Played(at)	Places
2	Vesna	String	Coconut shell, Clay pot, Horse hair, hide of iguana or frog, muga thread		It is generally made of coconut shell, clay pot or wooden or bamboo handle about cubic long. The extreme end of the handle is grooved and fitted with a peg. The shell is covered with the hide of iguana or frog and connected with the peg with strong muga thread across a bridge on the hide.	Boiragis	Played with peg of strong muga thread across a bridge on the hide	individually, husori during Bohag Bihu	Goalpara district
3	Charinda or chorita	String	Wood, animal hide, muga thread, horse tail hair		Oval shaped wooden block three feet long. Both bigger and smaller ends are hollowed out. The bigger one is covered with animal hide while smaller one is fitted with four pegs. Four muga threads are stressed over the hide and the peg across the bridge on the hide. It is		Bow made of horse tair hair	Folk songs, satra namghar(religious places)	
4	Tokari	String	Mango or gamble wood, iguana hide, deer horn, muga thread		One end of the wooden frame is made hollow and covered with iguana hide. The frame is gradually made smaller towards the other end to grasp it and a cavity is made at the end to provide four number of pegs. There are four strings of muga thread rested on a bridge attached to the bridge to the pegs for tuning purpose. It is played by rubbing a knob made of wood or deer horn. The four strings of tokari are known as Ingola, Pingola, Chitra and Shushumna respectively.			Boiragiyaam, Dehbisar songs, Tokari, Jikir and Jari programmes.	
5	Ektara or Laaitokari	String	Bottle gaurd(hollow, dried), bamboo, muga thread		It is made from a hollow bottle gourd attached to a bifurcated bamboo cylinder closed at one end. The bottom of the gourd shell is covered with a thin hide fitted to the centre with a muga thread extended upto the peg near the node of the bamboo handle.		The thread is operated with forefinger of the right hand while the left hand pressing off and on the bamboo frame towards the node. It is used in almost every parts of Assam.	Dihanaam, Dehbisar songs.	
6	Khamak	String	Wooden frame, muga thread(ask)		Khamak is a variety of Ektara where the bottle gourd shell is substituted by a wooden frame. It is used in all over Assam			Dihanaam, Dehbisarar geet	
					one kind of Tokari. Made from wooden bottle gourd shell(?) the lower portion of				

Figure 9: Screenshot of spreadsheet

A detailed tabulation of this information is shown in the appendix.

Information about the instruments used for prototyping

Community and musical instruments:

Folk musical instruments are unique to the community and are designed to meet varied goals. While certain instruments are used daily for prayers, some are used only during special seasons or festivals and some only on specific occasions such as birth or death. There are different instruments with are believed to bring rain during the time of drought or fight back evil.

Time and events:

While playing some instruments is a perennial event, some, however, depends on factors such as time of the year, season, festivals, agriculture, death or birth in a family, etc.

Sounds:

Sounds associated with different instruments. Audio clips of the same are recorded with the help of BCF.

Construction of instruments:

For this project, we will only use the information available about raw materials used in the process of construction and not the procedure of construction.

Explorations with the visual style

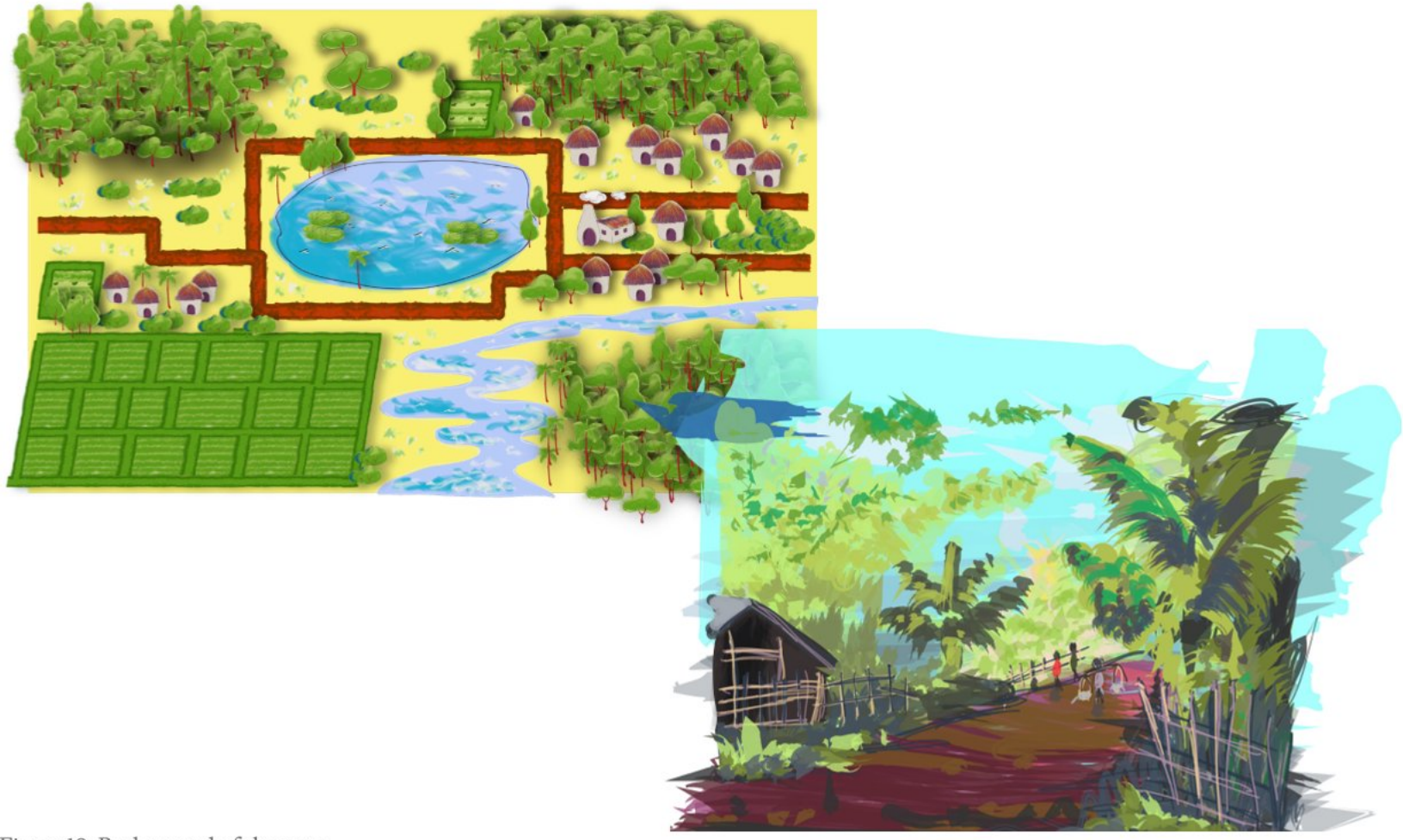


Figure 10: Background of the game

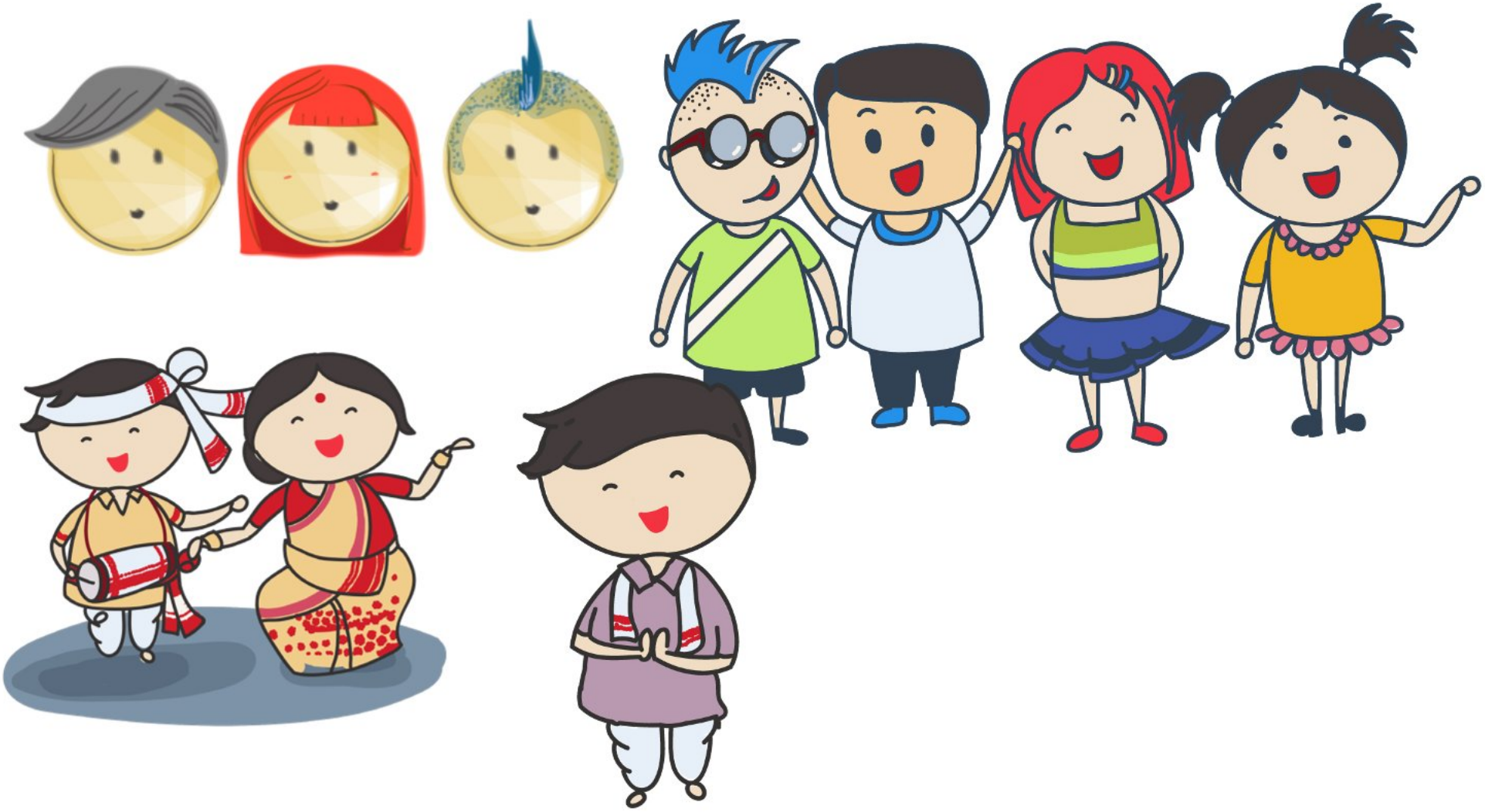


Figure 11: Characters

Concepts

Concept 1:

This game is two teams card-based game where players play against each other to complete a set of folk musical instruments either by constructing them or stealing from the opponent's assembly board. Teams with any number of players can interact, learn and use different musical powers to create new instruments, create challenges for the other team, or just race each other to completion of all the desired musical instruments.

A detailed description of the concept is added to Annexure 1: concept 1.

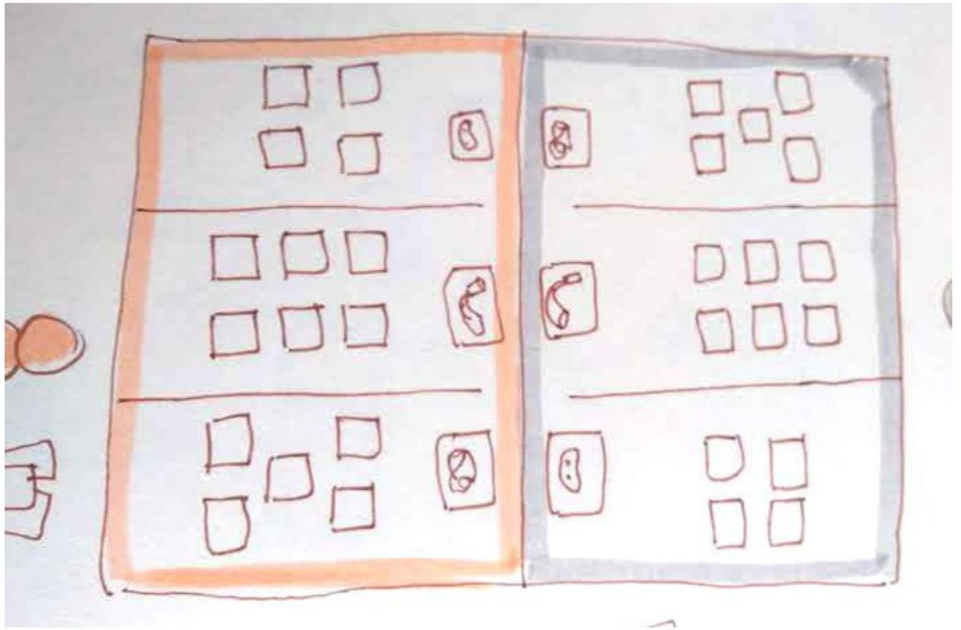


Figure 12: Concept 1

Figure 13: Concept 2

Concept 2:

A puzzle based, adventure multiplayer game. You are an explorer and a music artist. You want to travel to new places and experience their culture and festivals but need money. Hence every place you visit, you offer to help people with their musical instruments and festivals. In this game, players can explore different areas of the places at a different time of the year, experience different festivals and events, and construct musical instruments related to these festivals. He or she can create music, collaborate with friends online, get paid and explore new places again!

A detailed description of the concept is added to Annexure 1: concept 2.

Concept 3:

Single player, arcade game.

You are an explorer and currently at a village meeting. Villagers need some extra help with the celebration of their festivals. With the time running out you(Player) are their last hope. You are tasked with making of different musical instruments and get it ready by the time for the festival. Explore the village, visit different areas of the village, collect different raw materials and assemble them.

Players have to do a set of activities, including, construction of musical instruments, identification of sounds from various instruments in order to complete each challenge.

A detailed description of the concept is added to Annexure 1: concept 3.

Figure 14: Concept 3

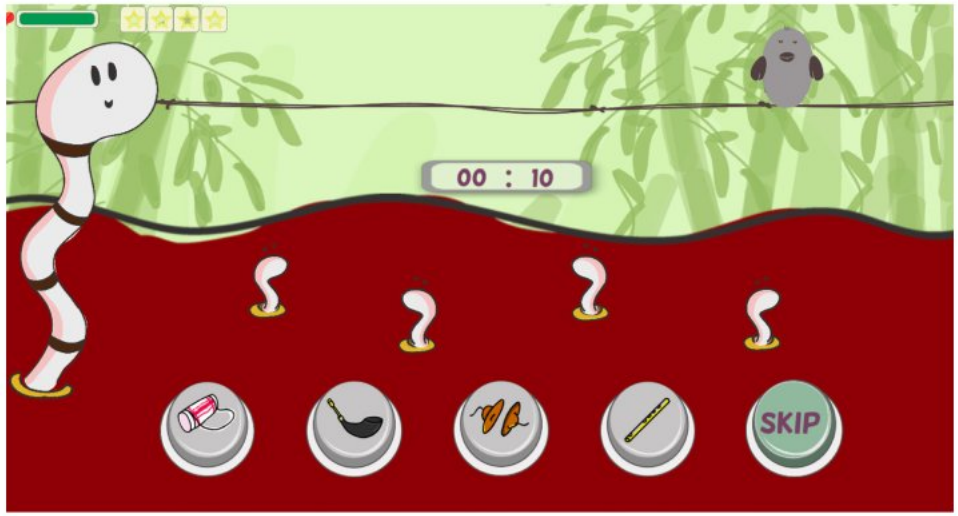


Figure 15: Concept 4

Concept 4:

A worm mother has four small worm kids. There are a set of sounds being played near their swamp. Worm mother wants her kids to learn them, for they have a big test coming along about musical instruments, the next day! Help the worm kids by choosing the correct instruments in the game.
The objective of the game is to help users identify with the sounds of different musical instruments. A collection of soundtracks are played in the background, and the player has to identify the correct instrument corresponding to the sound.

A detailed description of the concept is added to Annexure 1: concept 4.

Concept 5:

The objective of the prototype was to meet the following:

a) Show the relationship among different communities, their festivals and folk musical instruments

b) How and what resources are required to construct these musical instruments and where can they be obtained from.

c) Assembling different raw materials to construct musical instruments

d) To help identify with sounds of different instruments.

Phy-gital or hybrid game was chosen as a medium. Phy-gital multiplayer game encouraged more player interactions and engagement. It uses both advantages of a board game(interaction among players in the same space) and the digital platform(dynamic game-play, encapsulation of resources and features).

Game Overview:

Multiplayer Phy-gital turn-based strategy game

You and your friends visit a village or community during your school trip. The village is busy with the celebration of their yearly festival and needs some help. You and your friends are asked to help the villagers with the construction of some musical instruments that they will need for the festival.

This is a multiplayer board game where players play in teams of two to construct different musical instruments and create their own mixes. The game incorporates

a digital application as a part of the gameplay. The application is used to create different tasks for the player, keep information about the instruments to be constructed, time, special powers players posses and help players in the team to coordinate and communicate between them.

The game has two main parts:

Construction of instruments:

Players explore different areas, collect materials for their desired musical instruments and compete in a game of assembly.

Studio:

Once ready with their musical instruments the players can create mixes, download and share with friends and family.

Feature sets of the game:

a) Phy-gital game: Presence of a physical game board and a digital application to facilitate dynamic challenges, offers real-time player interaction in the same space and better engagement.

b) Players within a team communicate play the role of captain and apprentice. Within a team, the captain act as a guide. He/she has the knowledge about all the musical instruments and is tasked with coordinating the apprentice into the successful completion of all the musical instruments.

c) Apprentice, if you are one, you explore different areas of the village to collect the necessary raw materials, assemble and make your musical instruments.

d) Both the captain and the apprentice work together as a team, however, the only form of communication is through charades, gestures or enactment. You lose if you speak!

e) Check and affect the progress of the other competing teams with special power cards.

f) You can play your own music when the festival comes, download and share it with friends or create your own studio and create mixes of sound-tracks.

Construction of instruments

A) Game set up:

Genre: Multiplayer game phy-gital game.

Number of players: Players play in teams. Two teams are required for the game play. A team must contain 2 players(only).

Minimum players required: 4

Physical components:

Assembly board: is placed in the center of the four(or more) players.

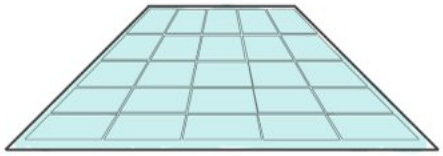


Figure: Assembly board

Raw materials card: Depending on the source of any raw material, raw material cards are placed in the village board. For example: Bamboo card will be placed at the forest area of the village board. This arrangement will be made by the players with help from the application(through a guided tutorial)

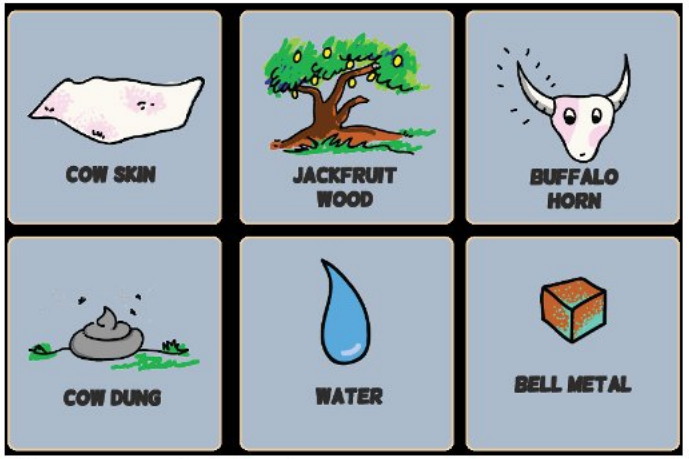


Figure: raw material card

Village board: Depending on the village to visit, players are required to set up their village board. The application will guide players to set the village board. (Please refer to village board setup section)

Players: This is a partnership game where one player, called Captain sits opposite to the other, called Apprentice.

Captain: Captain is the guide in the team. He/she has he knowledge about all the musical instruments. The main task of the captain is to communicate this knowledge to the Apprentice, who is in charge of construction of the instruments. The captain can't shout or use

source	materials	numbers required for each team to construct two instruments	numbers used in game
blacksmith	bell metal	2	2
	knife	2	1
	chisel	2	4
	fire	1	1
	hammer	1	2
fields	cow skin	1	2
	leather	1	1
	buffalo horn	1	1
	cow dung	1	1
forest	jackfruit	1	2
	Bamboo	5	4
	mango wood	1	1
	gamble wood	1	1
	coconut	1	1
swamp	water	1	2
	clay	1	2
	water hyacinth	1	1
	frog skin	1	1
	lily	1	1

Fig: Raw material cards can be arranged in this manner for Dhul, Taal na d Bahi

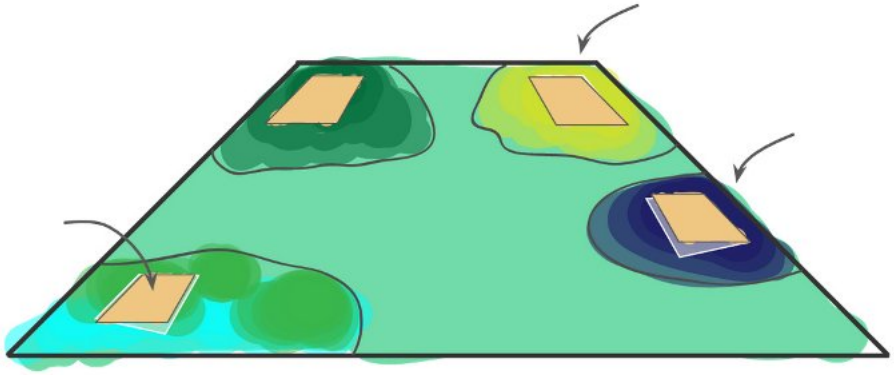


figure: Village board

any form of vocal feedback to communicate. The only way of communication is through charades, gestures or enactment.

Apprentice: Apprentice is tasked with retrieving and assembling raw materials for construction of the instruments. He/she can take help from their captain, or be continue the task on their own. The gameplay changes with every move made by the apprentice in the assembly board.

Digital components:

A digital application is incorporated into the game play. This application has two parts aimed at the two players in the team. They are:

Captain application: After a player decides to be the captain he/she will be given this application. It contains all the information about the instruments that need to be constructed. It helps players to coordinate and communicate between one another within and outside the team.

Apprentice application: The apprentice of the team after gathering the raw materials can choose to look into more information about the same in the application. Apprentice application contains a brief description about the raw material and the soundtracks of the possible instruments that can be constructed with the raw material.

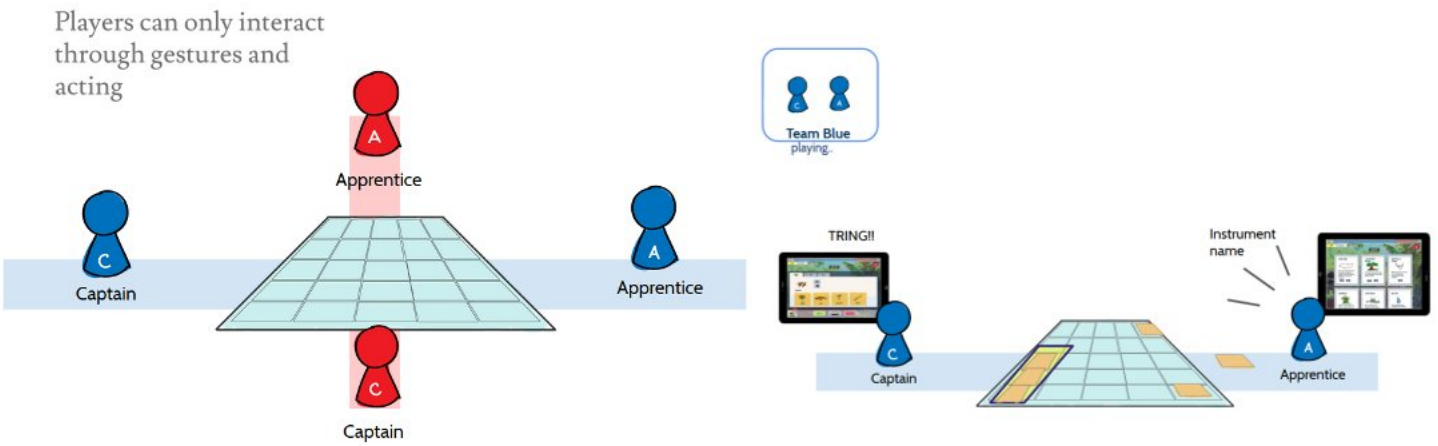


Figure: Players sitting arrangement

Figure:Captain application

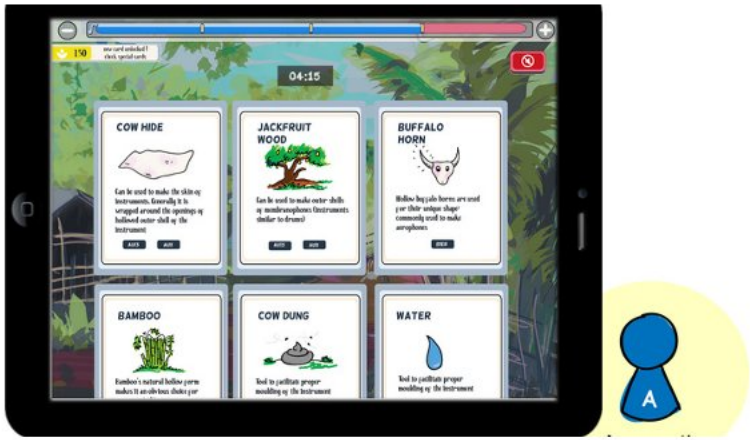


Figure: Apprentice application

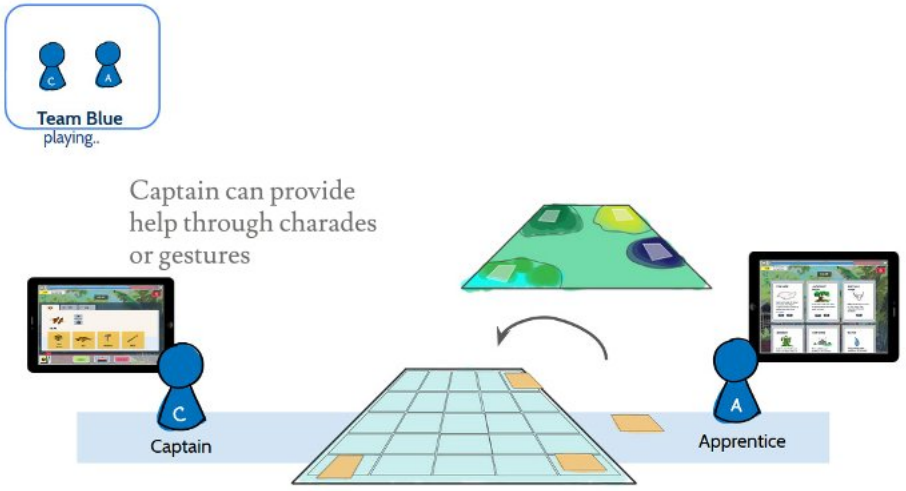


Figure: Apprentice arranging cards

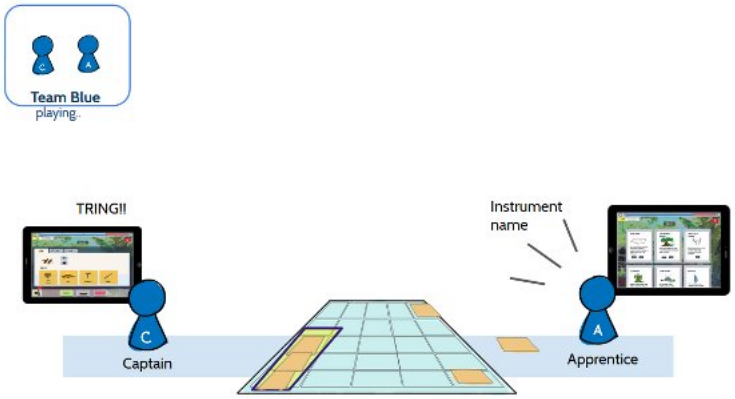


Figure: Instruemnt collection challenge

B) Player interactions:

Game start:

All of the teams are asked to collect a maximum of any four cards from the village board. Before beginning each turn each team must posses a maximum of four raw material cards.

For one round of play, each team gets one turn. Once the raw material cards are collected , teams can decide who will go first, and let the game begin!

Each turn:

When a team is playing their turn, they will be allowed three actions. These actions can be any of the following options:
1. place any raw material card on the assembly board
2. move any raw material on the board by a maximum of two squares in a straight line.
3. replace any existing raw material card on the board with new one form their own collection.

Make musical instruments:

Apprentice will check the information about each cards he/she has in the application, listen to the soundtracks that can be constructed with each material, and using these clues, try and assemble the correct combination of cards. If the assembly is wrong, or apprentice needs help he/she can communicate with the captain through charades, gestures or enactment. Once a correct combination of cards is arranged in a straight line on the board, players are to shout the name of the instrument. Whichever team does it first, wins the instrument.

Affect other team's progress:

Teams at any point in time can use their special cards to affect other teams. Special power cards contains powers through which players can both enhance their performances and affect their opponent's progress.

Winner: The first group to collect all the instruments win. If time is used as a constraint to complete the game, when the time runs out, player with maximum instruments wins.

Levels: Any game play can be combined with a a variety of constraints to create different levels of the game play. Players can choose to experiment with numbers of instruments to be constructed, time-limit for mission completion, information about the instruments, etc.

Stages:

Players can explore different festivals at different time of the year. They can also different festivities of the other villages present.

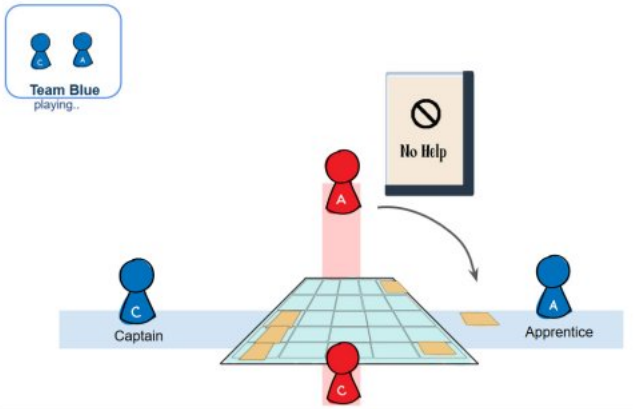


Figure: Opponent using special cards

Studio

After construction of all the instruments, players go to their studios. Each team is allowed all forms of creative liberty to create any mixes from the soundtracks of the instruments.
The only constraint however is the time limit. Players can experiment as long as they want within the time period.

Time for showbiz:

It's time to grade!Teams can judge each other's music mixes and send scores to each other. The group to have the most exquisite mix wins the studio game.

A detailed description of the concept is added to Annexure 1: concept 5.

Comparison of the concepts

All of the five concepts were playtested using paper prototypes. Players were observed during the gameplay and feedback were recorded. A summarized analysis of the same is as follows:

	Concept 1	Concept 2	Concept 3	Concept 4	Conncept 5
Pros	a) The gameplay emphasizes more on the construction of raw materials and identification of sounds of different raw materials. b)By the end of the playtest, players could remember the names and sounds of the instruments c)There was player interaction within a team	a)It captures the relationship of the village, different festivals celebrated during different times of the year with traditional folk musical instruments. b) Players can manipulate the timeline to experience new festivals and musical instruments. c) Interact with online players. d) Create music mixes, share and download them.	a) Players are allowed to explore different places according to their own will. b) Players were allowed to experiment with different sounds of musical instruments c) Players can take their own time in understanding the game-play	a) The objective of the game was to help people identify with different sounds of musical instruments, which was met. b) Has the potential to attract players if the reward system is improved, or new challenges are introduced.	a) It shows the relationship between villages or communities with their musical instruments. b) Relationship between different time of the year and festivals celebrated by different communities was highlighted. c). The presence of two roles in the gameplay makes it more interactive. d). The phy-gital medium chosen is expected to allow more player interactions within the game

	Concept 1	Concept 2	Concept 3	Concept 4	Conncept 5
Problems identified	a)Players had no clear perspective about what or why they were doing the task. b) Player interactions between the two teams playing against each other were very limited c) Replayability factors were limited.	a) If a player is not connected online, the game played against the machine can become stagnant after a period of time	a) Compared to a multiplayer game, the replayability and fun factors were less. b) Absence of competing partner in the game might turn the game into a mundane activity with the course of time	a)Rewards system needs to be improved. b) Motivation to play the game is very low. c) Currently, resembles more to an MCQ than a game	a) Need at most 4 players to proceed with the game. b) Needs four digital applications for the game.

Concept 4 and concept 5 were developed further and playtested.

Playtest

Total playtests: 3

Number of players:

Playtest 1: 2 players
Playtest 2: 4 players
Playtest 3: 4 players

Location: At playtesters' home(closed room)

Age group: 8-12 years

Problems identified	Problem mitigation
a)The game was first designed for two players playing against each other. Since the game involves some amount of guesswork, players found it harder in the first few rounds of play to understand the game. b) Players had trouble understanding the clues given in the back of each raw material cards in the initial part of the playtesting c) The board of dimension 5x7 squares was not entirely used d) Previously each turn in the game was 30 secs, where players were allowed to do any number of actions, Players were seen to be taking haphazard decisions, with 30 secs timer in mind	a)Instead of only two players competing against each other, players were grouped into teams of two. The player distinction into Captain and Apprentice made it easier for the player to communicate and assemble different resources. b) For subsequent playtesting, information cards were introduced. These had information about different raw materials printed separately. c) The board was reduced to a dimension of 5x5 squares. d) Each turn was converted into a set of 3 actions. Players were more confident about their actions after this change.

Figure: Paper prototype developed for testing

Proposed Evaluation Plan

Number of players: 4

Number of rounds: 3-5

Duration of each round: 15mins

Location: room(closed space)

Players will be given all the components of the game and will be asked to follow instructions from the application.

Natural Shadowing: Interactions made by all players, both in the application and the game board will be observed and recorded

After 2 rounds, players will be asked to leave. If the players insist on playing more of the same game, gameplay will be considered a success.

Analysis of Play sessions

All of the play sessions were video recorded and analyzed to further improve the game. Events and interactions that occurred and categorized as follows:

Most engaging mechanics of the game:

Dumb charades to assemble raw materials for musical instruments: Players found the use of dumb charades as a game mechanics, to communicate with their partners, very engaging. They used both the musical clues form the digital application and dumb charades to communicate with one another

Claiming the musical instrument: Players found the act of claiming the instruments after careful assembly very fulfilling. It provided them with a sense of achievement.

Blocking other players: Players were often observed to be planning their moves, both to progress ahead in their game and simultaneously block other players from constructing more musical instruments.

Mechanics created by the players, which were further added to the game:

Dumb charades to collect raw materials and special cards: Initially, dumb charades was only designed to be used to assemble raw materials in the assembly board. Players during the gameplay also used dumb charades while gathering raw materials and collecting special cards.

Time counter: When a team would take more time deciding their actions during their turn, the other team(opponents) would start counting to 10. We adopted the concept of the timer from the play testings.

References

[1]R. Baruah and C. Sarmah, Barluitor Barbhairav, Barbhairav production, 2012

[2] G. M. Ghazali, "In the minds of children: Understanding motivation to learn music", National Music Education Conference (MusEd'05), Universiti Pendidikan Sultan Idris, Tanjung Malim, Perak, November 28 – 30, 2005

[3] A. Arthur, "Royal Albert Hall chief warns classical instruments could face extinction", Press Association Entertainment Reporter, July 28 2018 10:07 PM[Online], Available: https://www.independent.ie/entertainment/music/royal-albert-hall-chief-warns- classical-instruments-could-face-extinction-37164245.html [Accessed: January 10, 2019]

[4]J. Schell, The Art of game Design, Carnegie Mellon University, 2008

[5] J. W. Davidson, M. J. A., Howe, D. G., Moore, & J. A. Sloboda, "The role of parental influences in the development of musical performances.", British Journal of Developmental Psychology, (1996), 14, 399-412.

[6] 6. J. W., Davidson, J. A., Sloboda, & M. J. A., Howe. "The role of parents and teachers in the success and failure of instrumental learners" , Bulletin of the Council for Research in Music, Education, (1996), 127, 40–44.

[7] S. S. Ranjit, "Symposium highlights extinction threat faced by India's famed classical instruments", India Today, August 5, 2002, ISSUE DATE: August 5, 2002 ,UPDATED: July 27, 2012 10:42 IST[Online], Available: https://www.indiatoday.in/magazine/society-the- arts/story/20020805-symposium-highlights-extinction-threat-faced-by-famed-classical-instruments-of-india-794645-2002-08-05 [Accessed: January 8, 2019]

[8]Game Design Conference, Youtube[Online], Available: https://www.youtube.com/playlist?list=PL2e4mYbwSTbbjN6TTMo6toJfByWpKvEDH

[9] Folk Games, Festivity and Subversive Game Design, Youtube[Online], Available: https://www.youtube.com/watch?v=CjVo0e9BE8k&list=PL2e4mYbwSTbbjN6TTMo6toJfByWpKvEDH&index=23&t=196s

[10]"Extinct Indian Musical Instruments", SiliconIndia, Friday, 09 March 2012, 23:29 IST, Available: https://www.siliconindia.com/news/general/Extinct-Indian-Musical-Instruments-nid- 108744-cid-1.html [Accessed: January 8, 2019]

[11] M. Austin, Music Video Games Performance, Politics, and Play: Introduction-taking notes of music games, Kindle edition, Bloomsbury, New York, NY, location: 326-345

[12] R. M. Abramson, Rhythm games for perception and cognition: Introduction, 1 vol, Alfred Publishing Co., Inc., 1997, pp: 4-8

[13] Brahmaputra Cultural Foundation,[Online] http://shilpikabordoloi.com/bcf/

[14] The sound test room, "SEAQUENCE Multi Voice Synthesizer - Tutorial & Demo for the iPad", Aug 18, 2017, Youtube, [Online]Available: https://www.youtube.com/watch?v=mQKhFl7P3_Y&t=645s [Accessed: January 15, 2019]

[15] Incredibox, [Online] Available: www.incredibox.com [Accessed: 15.03.2019]
[16] Sequence, App store preview, [Online] Available: https://itunes.apple.com/us/app/seaquence/id1106270489?mt=8 [Accessed: 15.03.2019]
[17] XCOM: the board game, Board Game Geek,[Online]Available: https://boardgamegeek.com/boardgame/163602/xcom-board-game [Accessed: 23.05.2019]
[18] Duelyst,Wikipedia, [Online] Available: https://en.wikipedia.org/wiki/Duelyst [Accessed: 23.05.2019]

Annexure 1: Concepts(1,2,3)

Concept 1:

Game overview:

Turn-based card game

A card based game where players compete against one another and assemble different raw materials to construct musical instruments. Players have to make strategic use of the raw materials available to them, simultaneously keeping in mind to affect the progress of the other player. The first player to construct all the instruments wins.

This game is two teams card-based game where players play against each other to complete a set of folk musical instruments either by constructing them or stealing from the opponent's assembly board. Teams with any number of players can interact, learn and use different musical powers to create new instruments, create challenges for the other team, or just race each other to completion of all the desired musical instruments.

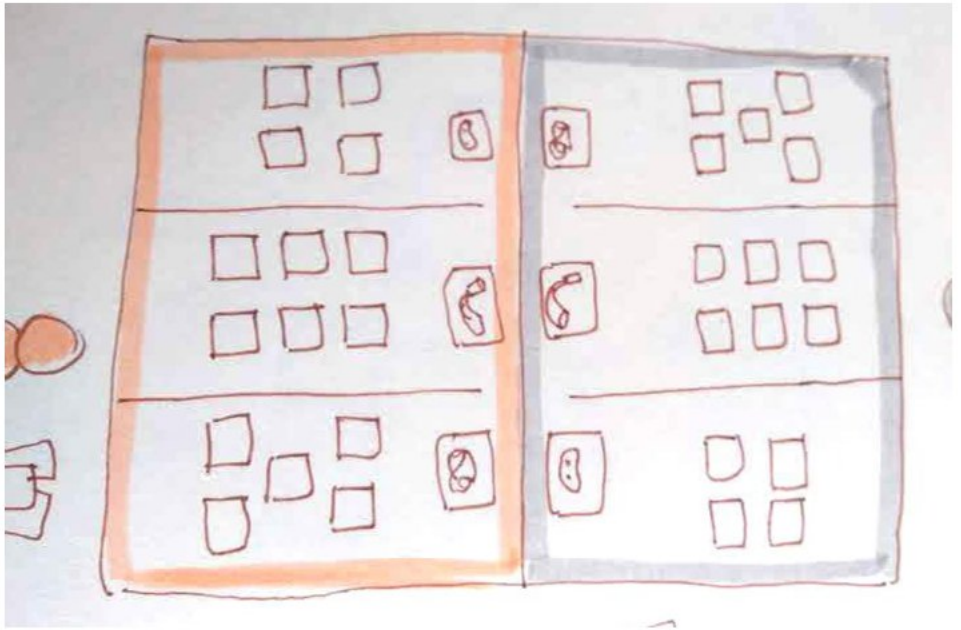


Figure A1: Concept 1

Game setup:

The objective of the game-play is to assemble raw materials required to construct folk musical instruments and recognizing the sounds of the instruments.

Players: Two teams can compete against one another. A team can contain one to three players.

Digital application: A digital application is incorporated in the game. The primary function of the application is to check the assembly of cards made by the players and analyze their correctness.

For every turn, each team gets two choices: They can either choose to assemble their own raw materials or affect the progress of the other team through special power cards.

Figure: Player screen of copcept 2

Concept 2:

Game overview:

Puzzle-based digital multiplayer game In the game, you and your friends(players) visit a village who happens to be preparing for their annual festival. However, they are running out of time and need your immediate help. They are willing to pay you anything, to anybody who can make all the instrument first and fast.
Players have to compete against one another and complete assembling all of the required instruments, before time runs out.

Game setup:

The game-play is set in a village. Players can visit different areas of the village different raw materials and assemble them together in their workshops.
The village is divided into different areas, a player can visit. These sectors mainly refer to different locations in the village, such as forest, river, paddy fields, vegetable gardens, ponds, blacksmith workshop, etc. Each of them is the sources from where the player can obtain their required raw materials.The game is deployed as a digital application. Players can join in on the same mission through the internet. All of the players will share the same game mission and compete and collaborate to achieve their tasks.There are three parts of the game:

Exploration:

Players visit different areas of the village and explore different raw materials available in thos sources.

Festivals or events:Players have the liberty to create their own missions. Before any mission, players are asked to choose a place or community and a time of the year for their visit. This selection of time will create a unique mission based on the festivals associated with the community and the time of the year.
This feature will enable the players to explore different communities, their festivals and musical instruments associated with it.

A music studio:

With the collected musical instruments, players can mix the sounds of their instrument and create their own soundtracks. Players can come together, have a jamming session, reward each other for their performances or compete against each other to a battle of bands.

This concept takes into consideration the construction of the musical instruments followed by the sound produced, the relationship between community, time of the year, and musical instruments. It also has the potential of informing the audience of the occasions, festivals or events specific instruments are used for.

Figure: Player inventory

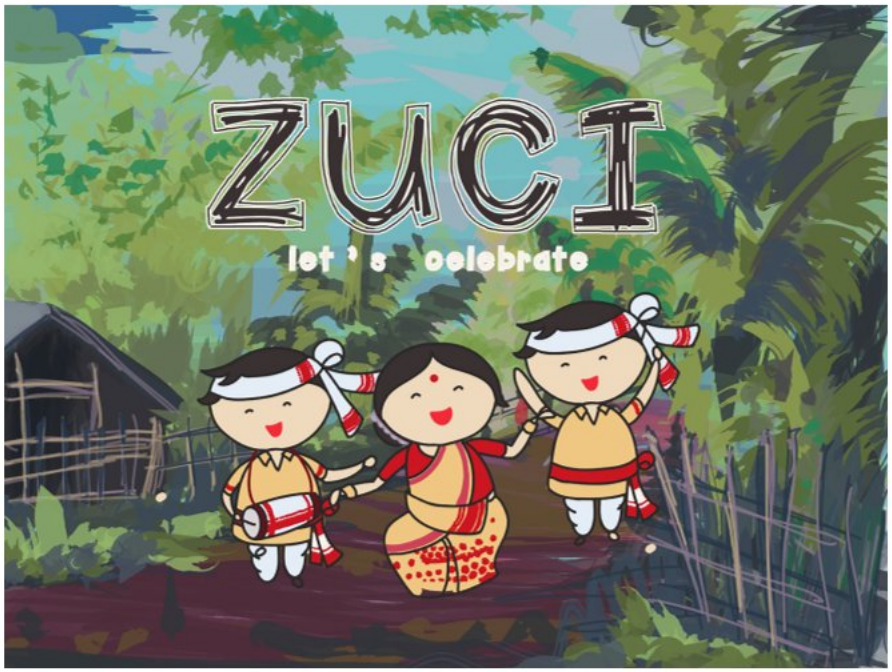


Figure: Player screen of copcept 3

Concept 3:

Game Overview:

Single player, arcade game.
You are an explorer and currently at a village meeting. Villagers need some extra help with the celebration of their festivals. With the time running out you(Player) are their last hope. You are tasked with making of different musical instruments and get it ready by the time for the festival. Explore the village, visit different areas of the village, collect different raw materials and assemble them.

Game Setup:

Application software deployed in a mobile device.
A yearly calendar: The player at the beginning of the game is asked to choose the community or the place of visit along with their time of visit. The calendar notifies the player about the time of the year(player can also adjust the calendar), and asks him/her to perform different challenges. The time of the calendar corresponds to the real world time and celebrations related to the community.

Concept 3.1:

Flow diagram of game mechanics: https://drive.google.com/file/d/15dljmHCLC3Rbh7XdMtv7U8x7X5esEtxj/view?usp=sharing

Game flow:The player is first asked to choose the areas of the village which he/she might think will be useful. The player is provided with some hints, for every

option.

After successful selection, the player has to look for clues in every raw material obtained from the chosen areas and find the correct raw material.
The wrong choice comes with penalty points.

Once chosen and correct, the player needs to enable the raw material by choosing the correct sound of the instrument, from a pile of audio tracks.

A correct choice will help the player win. Rewards obtained after successful completion will be based on the time taken to complete the challenge. The player can then either play again to increase his rewards or choose to progress to a new level.

New level: Each new level is an instrument construction level, with increased difficulty. Difficulties might come in terms of multiple choices of the sound, time limits, and more disturbance from external elements.

Figure: Selection of raw materials

Concept 3.2:

Flow diagram of game mechanics: https://drive.google.com/file/d/1TBcDIzzCjVLbIUBTIoITc-t4cYTWCqdr/view?usp=sharing

Game Flow: The player is first asked to choose the areas of the village which he/she might think will be useful. The player is provided with some hints, for every option.

After successful selection, the player has to look for

Figure: Raw maetrial collection

clues in every raw material obtained from the chosen areas and find the correct raw material.

The player tries to combine all possible raw materials needed for the instrument. He/she can try and check for the combination through hints(if available). If stated correct, submit!

Wildcard: When no the player loses all his/her strength, he/she is given an option to choose Wildcard. It's a luck based function, contains Coins, free lives, cuckoo, or no help!

Each level consists of different instruments for the player to construct. A level is completed when he/she is able to construct his/her instrument. Rewards for the same is awarded based on the time taken—less time taken, more rewards.

Appendix A: Concepts 4

Table of content

Game overview:

Game concept:

A worm mother has four small worm kids. There are a set of sounds being played near their swamp. Worm mother wants her kids to learn them, for they have a big test coming along about musical instruments, the next day! Help the worm kids by choosing the correct instruments in the game.

Players can do so by matching the background sounds with their respective instruments. Failure to identify the soundtracks will make the worms angry also reduce a player's life. Correct selection will help players to upgrade their level, collect rewards and unlock achievement levels.

Game feature set:

1. Digital single player game
2. Player has to identify the musical instrument for the sound of the musical instrument being played.
3. Player has to differentiate between a set of sounds which sounds similar but are or can be of different instruments.

Genre: digital, Single player, arcade game
Target audience: 8+ years

Game flow summary: The player is tasked with selecting the correct musical instrument with the sounds being played in the background. Each sound will be played for a duration of 10secs, and the player will be given options(musical instruments) to choose from. The correct combinations of sound and the musical

instrument will increase the player s chances of receiving more rewards while wrong combinations will make the worms angry.
The aim of the play is to keep the worms happy by replying correctly as long as possible.

Look and feel: The game environment is situated in a swamp with a muddy set-up.

Game mechanics

Task/mission:

The mother worm wants her kids to learn about musical instruments and their sounds. She doesn t know how to. You are being hired by the mother worm to help her kids learn about the musical instruments. Choose the musical instrument for each sound being played in the background and earn rewards from the mother worm.

Player Interaction:

The player listens to each of the sounds coming up(max duration: 10secs) and chooses the respective instrument. This will make each baby worm happy. The player can either match the sound to any of the given instruments or press the X button to skip that sound.

Selecting the correct combination of sound and musical instrument:

Each correct combination will give the player an immunity period for next 2 combinations. Any mismatch made within this period won t affect the player.

Incorrect combination of sound and musical instrument chosen:

Failure to match the correct sound to the instruments(When the player doesn t have immunity) will make baby-worms angry, one at a time. They will cry and make loud noises. It will interfere with the new subsequent sounds of the instrument.

Casualties:

When the baby-worms cry, their voices will interfere with the sounds of instruments. With every incorrect

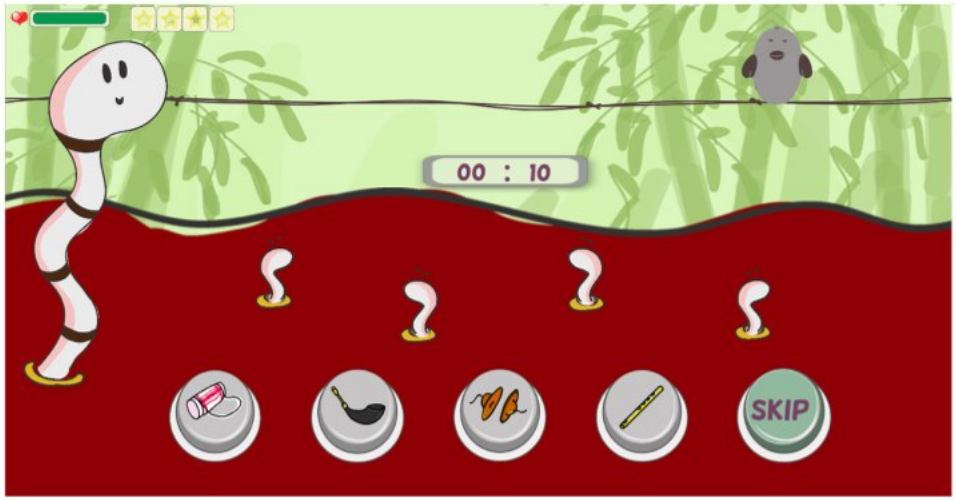


Figure: Screenshot of the application devdeloped

combination made(When the player doesn t have immunity), one more baby-worm will start crying and more interference will be produced.

Immunity:

After every correct combination made, the player will receive immunity. Immunity is a state where the player can make any incorrect combinations for the next 20 secs, and these errors will not be recorded.

Cuckoo bird:

A luck based factor. The player can take help from the cuckoo bird placed in the top right corner of the screen of the game. The bird appears in the game every 20secs. The cuckoo bird has two cases in which it operates:

1. It will help: The cuckoo bird can decide to help the player when there are worms crying. Players have to ask for help by poking the bird. When it helps, it will sing a song for the worms and they will be happy again. Any consecutive mistakes made will be removed, however, the score for total mistakes made so far remains.
2. Just move away: The bird can decide to not help the player and just move away to the right of the screen.

Mistakes:

When any wrong combination is made, it is recorded in two types of mistakes, as follows:

Total mistakes: Players are allowed to make a total of 7 incorrect combinations in the entire game. If the number exceeds 7 the game gets over.

Consecutive mistakes: When the player makes mistakes consecutively, it is both recorded under total and con-

secutive mistakes. Maximum numbers of consecutive mistakes one player can make are 4. If the number exceeds, the game gets over. If the player is able to make a correct choice before the total number of consecutive mistakes reaches 5, the play gets refreshed. All of the worms stop crying, and the consecutive mistake variable is set to zero. The total mistake variable, however, remains the same.

When does the game get over:

If the player makes 4 consecutive wrong combinations of sound and instrument, all of the baby-worms starts crying. On 5th consecutive wrong combination all the baby-worms wake up, Mother worm gets angry and the game gets over.

After 10sounds of instruments are played(or more) the game gets over.

Reward system:

0 wrong combinations: 1 raw material(that can be found near sand/mud/clay/earth/land), 1 instrument(which can be constructed from clay/hutuli), 1 miscellaneous instrument, 100 coins

1-2 wrong combinations: 1 raw material(that can be found near sand/mud/clay/earth/land), 1 instrument(which can be constructed from clay/hutuli), 50 coins

3-4 wrong combinations: 1 raw material(that can be found near sand/mud/clay/earth/land), 25 coins

5-above wrong combinations: 10coins

Story narrative:

A worm mother has four small worm kids. There are a set of sounds being played near their swamp. Worm mother wants her kids to learn them, for they have a big test coming along about musical instruments, the next day! Help the worm kids by choosing the correct instruments in the game.

Appendix B: Concepts 5

Table of content

Game overview

Game concept:

You and your friends visit a village or community during your school trip. The village is busy with the celebration of their yearly festival and needs some help. You and your friends are asked to help the villagers with the construction of some musical instrumentsthat they will need for the festival. This is a multiplayer board game where players play in teams of two to construct different musical instruments from the available raw materials. The game incorporates a digital application as a part of the gameplay. The application is used to create different tasks for the player, keep information about the instruments to be constructed, time, special powers players posses and help players(in the team) to coordinate and communicate between them

Game feature set:

1. Phy-gital game: Presence of a physical game board and a digital application to facilitate dynamic challenges, offers real-time player interaction in the same space and better engagement.

2. Players within a team communicate play the role of captain and apprentice. Within a team, the captain act as a guide. He/she has the knowledge about all the musical instruments and is tasked with coordinating the apprentice into the successful completion of all the musical instruments.

3. Apprentice, if you are one, you explore different areas of the village to collect the necessary raw materials, assemble and make your musical instruments.

4. Both the captain and the apprentice work together as a team, however, the only form of communication is through charades, gestures or enactment. You lose if you speak!

5. Check and affect the progress of the other competing teams with special power cards.

6. You can play your own music when the festival comes, download and share it with friends or create your own studio and create mixes of sound-tracks.

Genre:

Multiplayer Phy-gital turn-based strategy game

Target Audience: age 8years+

Number of Players: Players play in teams. Two teams are required for the gameplay. A team must contain 2 players(only).

Players required: 4 or 6 players

Game flow summary:

This is a turn-based strategy game where the players in groups of two help each other construct a set of folk musical instruments. Each team consists of a Captain and an Apprentice. Their primary goal is to communicate within themselves and collect the required materials, assemble them together to form musical instruments while simultaneously checking the progress of their opponent.

Look and feel:

Traditional village environment.
Characters/Actors made to be inside the village environment should be in their traditional clothes.
Player avatars can have any casual clothing.

Figure: Background

Game set-up

Genre: Multiplayer game phy-gital game.

The number of players: Players play in teams. Two teams are required for the gameplay. A team must contain 2 players(only).

Players required: 4 or 6 players

Physical components:

Assembly board: is placed in the center of the four(or more) players.

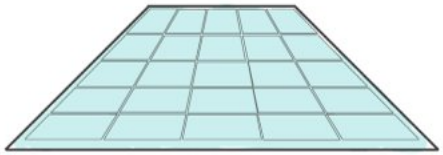


Figure: Assembly board

Raw materials card: Depending on the source of any raw material, raw material cards are placed in the village board. For example, Bamboo card will be placed in the forest area of the village board. This arrangement will be made by the players with help from the application(through a guided tutorial)

The number of cards required for each game-play will be decided by the application.

The algorithm will follow a simple procedure:
Calculate the total numbers of raw materials needed for all the instruments to be constructed. Select any one raw material from every instrument. Reduce the quantity of the raw materials selected by one.
For example: for three instruments, Dhol, bahi and Taal the total number of required raw materials are as follows:

Figure: raw material card

Village board: Depending on the village to visit, players are required to set up their village board. The application will guide players to set the village board(Please refer to village board setup section).

Players: This is a partnership game where one player, called Captain sits opposite to the other, called Apprentice.

Digital components: A digital application is incorporated into the gameplay. This application has two parts aimed at the two players in the team. They are:

Captain application: After a player decides to be the captain he/she will be given this application. It contains all the information about the instruments that need to be constructed. It helps players to coordinate and communicate with one another within and outside the team.

Apprentice application:

The apprentice of the team after gathering the raw materials can choose to look into more information about the same in the application. Apprentice application contains information about all the raw materials collected by him/her.

Village board set up:

Players at the beginning of the game are asked to choose the location they wish to visit and the time of the visit. Based on this information, the village board is generated. The game comes with a set of village boards. Based on the village chosen in the application, players have to take the village board out for play. The board is placed near the assembly board. Players

source	materials	numbers required for each team to construct two instruments	numbers used in game
blacksmith	bell metal	2	2
	knife	2	1
	chisel	2	4
	fire	1	1
	hammer	1	2
fields	cow skin	1	2
	leather	1	1
	buffalo horn	1	1
	cow dung	1	1
forest	jackfruit	1	2
	Bamboo	5	4
	mango wood	1	1
	gamble wood	1	1
	coconut	1	1
swamp	water	1	2
	clay	1	2
	water hyacinth	1	1
	frog skin	1	1
	lily	1	1

Fig: Raw material cards can be arranged in this manner for Dhul, Taal na d Bahi

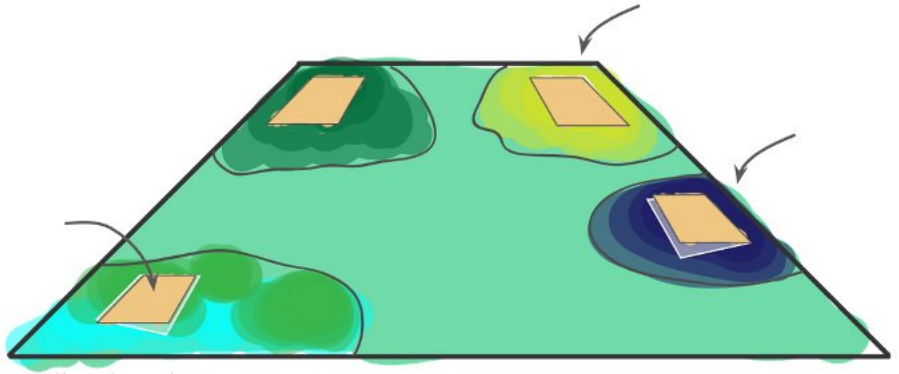


figure: Village board

are then asked to arrange the raw material cards into the village board. Raw material cards will be arranged into the village broad based on their sources. For example, the bamboo card will be placed in the forest area of the village, whereas Fire will go to the black-smith. The application will help users.

figure: Tutorial of raw material arrangement

figure: Tutorial of raw material arrangement

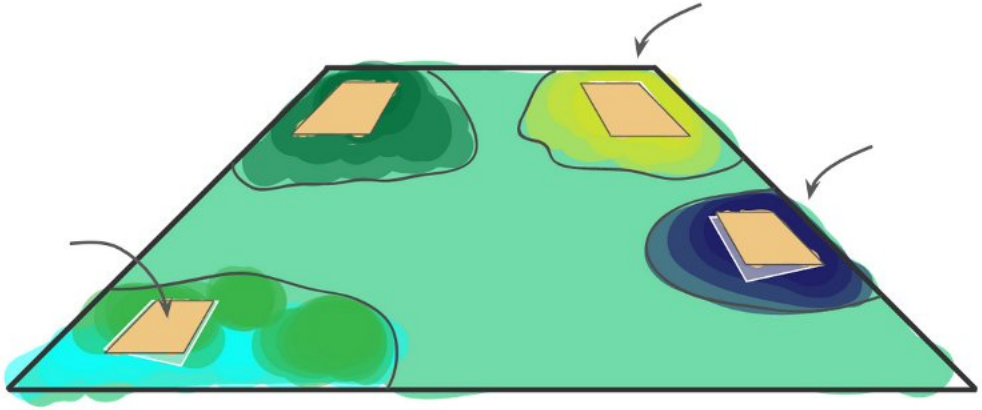


figure: Arrangement in physical board

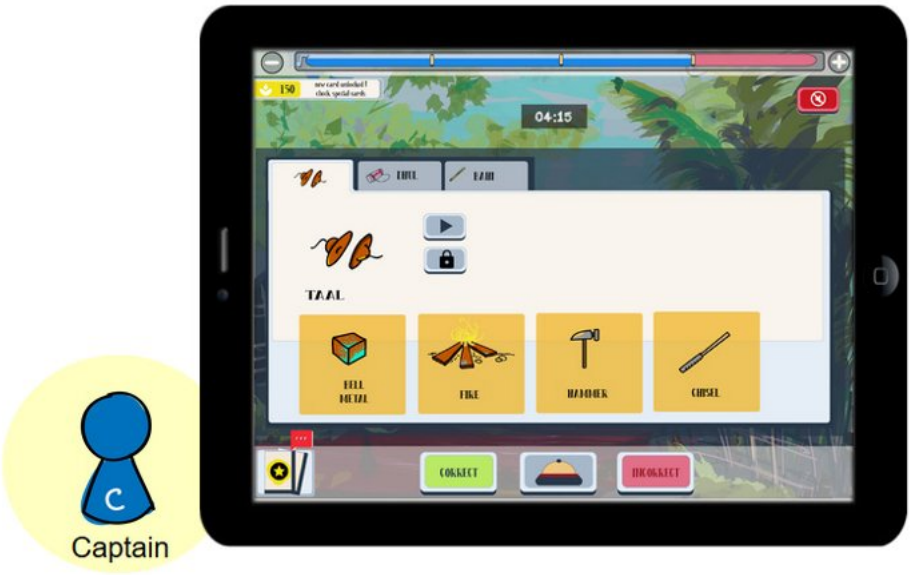


figure: Captain application

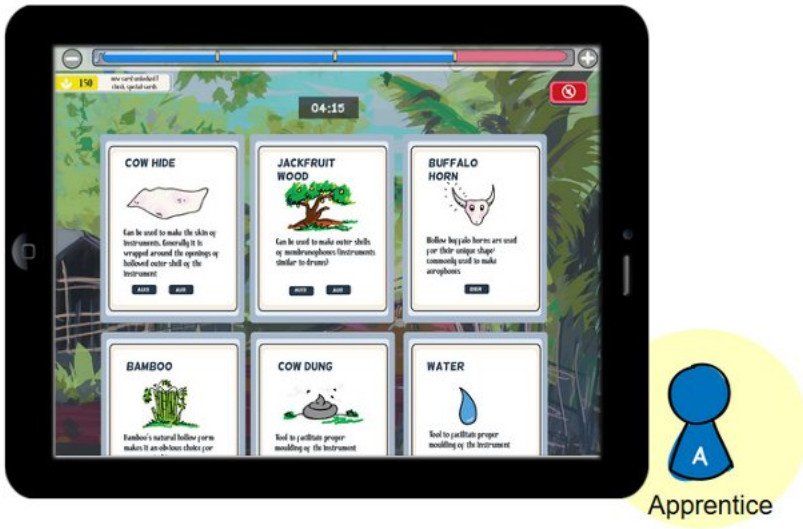


figure: Captain application

Gameplay:

Mission creation:

Before the game starts, players are asked to choose the village or the community they want to explore. They are also asked to choose the time of the year. Based on the given information, a mission is generated for the players, via the digital application.

Areas of the village:

The village to be visited, shown in the application(Captain) and printed into a physical board. The village is divided into different areas. These areas such as forest, paddy field, river, blacksmith, etc resonate a real-life village. Players explore these areas to look for different raw materials to construct different musical instruments.

Team: The game should have a minimum of two teams. Each team will consist of two players. These plays will have two roles to pick from.

1. Captain
2. Apprentice

Captain: Captain is the guide in the team. He/she has the knowledge of all the musical instruments. The main task of the captain is to communicate this knowledge to the Apprentice, who is in charge of the construction of the instruments. The captain can't shout or use any form of vocal feedback to communicate. The only way of communication is through charades, gestures or enactment.

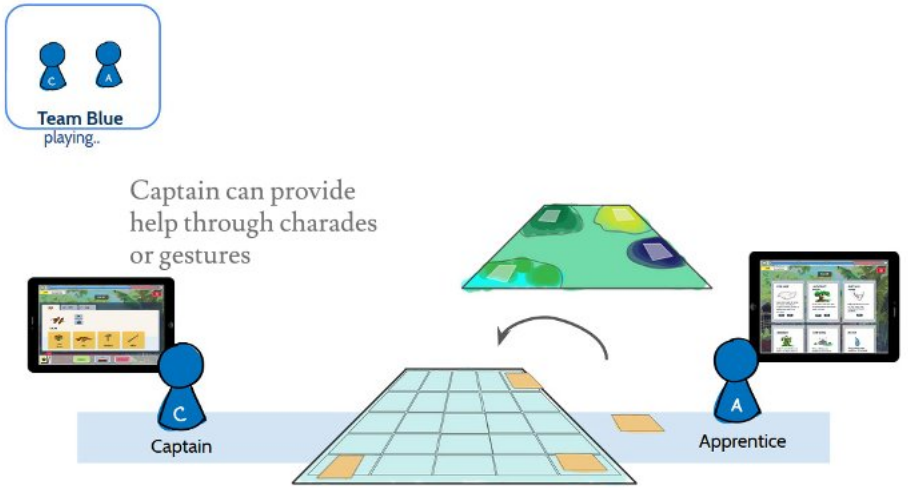


Figure: Apprentice arranging cards

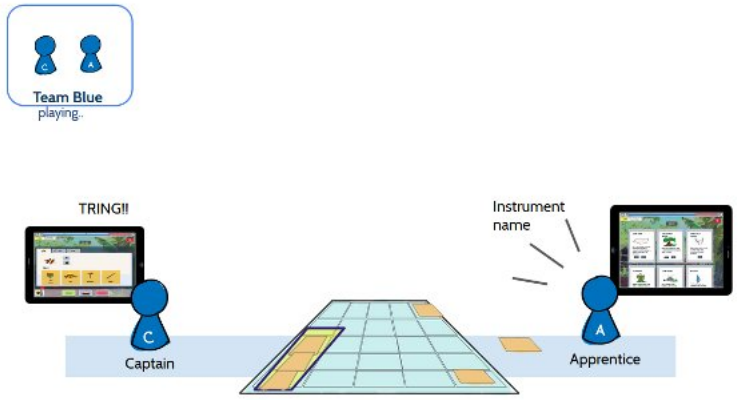


Figure: Instruemnt collection challenge

Apprentice: Apprentice is tasked with retrieving and assembling raw materials for construction of the instruments. He/she can take help from their captain, or be continue the task on their own. The gameplay changes with every move made by the apprentice in the assembly board.

Digital application:

Gameplay includes a digital application. The primary goal of the digital application is to assist the teams in assembling their musical instruments. The application also helps create new missions, establish player interactions, within and outside of the teams, keep track of time and increase difficulties of the game-play.

There are two versions of the application.

Captain application: The team captains is equipped with an application which contains all the information about the musical instruments that need to be constructed. It will give them a hint of all the necessary raw materials needed for construction, sounds of the instruments and help him/her communicate with their apprentice. To increase the difficulty of the game and collect higher rewards, players can choose to eliminate all the hints and play on their own as well

Apprentice application: The apprentice collects raw materials from the village board before the start of every turn. Information about the collected raw materials will be displayed in the Apprentice application. It also contains clues of what can be constructed using those raw materials.

Assembling raw materials: After a team collects all of the required raw material he/she
can start assembling the same in the physical assembly board(dimension 5x5). Each turn given
to every team consists of three(3) actions. These actions can be any of the following options:

1. Place a new raw material card in the assembly board.

2. Move any raw material 2 squares in a straight line

3. Replace an existing raw material in the board with a new one

Affecting the opponent's progress:

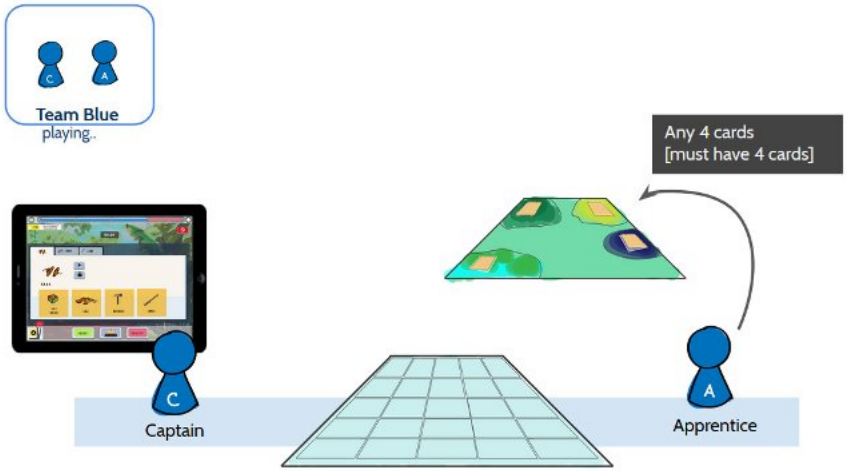
Players in a team can affect the other team by either strategically placing their raw material cards or using their special cards. Special cards are stored in Captain's application. Teams can use these cards either to affect other's progress or increase their own chances of winning.

Game mechanics: construction of Musical instruments

Task/mission:

The primary task in the gameplay is to construct the given number of musical instruments. Players in the team coordinate between one another and construct the instruments. Along with the construction of instruments, each team have to keep track of the time-limit, experience points and progress of the other opponent teams.

Sub-task: unlock different achievement levels and obtain special cards



Game start:

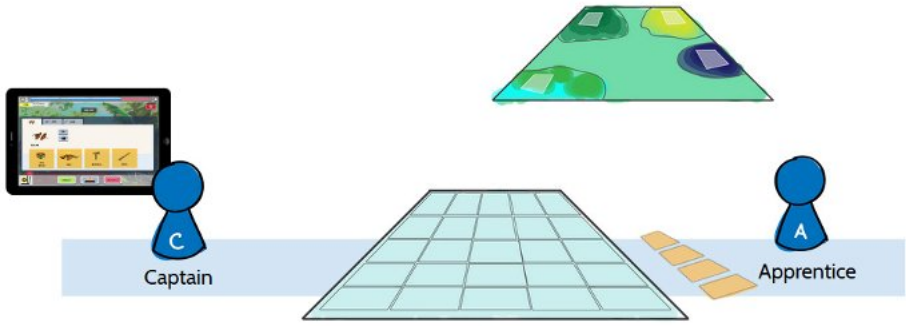
All of the teams are asked to collect a maximum of any four cards from the village board. Before beginning each turn each team must posses a maximum of four raw material cards.

For one round of play, each team gets one turn.

Once the raw material cards are collected , teams can decide who will go first, and let the game begin!

Turns:

Players can decide the first team to play. Players are to have a total 4 raw material cards and 2 special cards all the time.



When a team is playing their turn, they will be allowed three actions. These actions can be any of the following options:

1. place any raw material card on the assembly board
2. move any raw material on the board by a maximum of two squares in a straight line.
3. replace any existing raw material card on the board with new one form their own collection.

Only the Apprentice will be allowed to move the cards on the assembly board. The captain can help the apprentice with feedback buttons from the application or through techniques of dumb charades, but not vocal feedback.

Player interactions:

Players are to form teams of two. Players in the same team will sit opposite to one another with the assembly board in between.

A team comprises of a captain and an apprentice.

Apprentice will check the information about each cards he/she has in the application, listen to the soundtracks that can be constructed with each material,<insert images> and using these clues, try and assemble the correct combination of cards. If the assembly is wrong, or apprentice needs help he/she can communicate with the captain through charades, gestures or enactment.

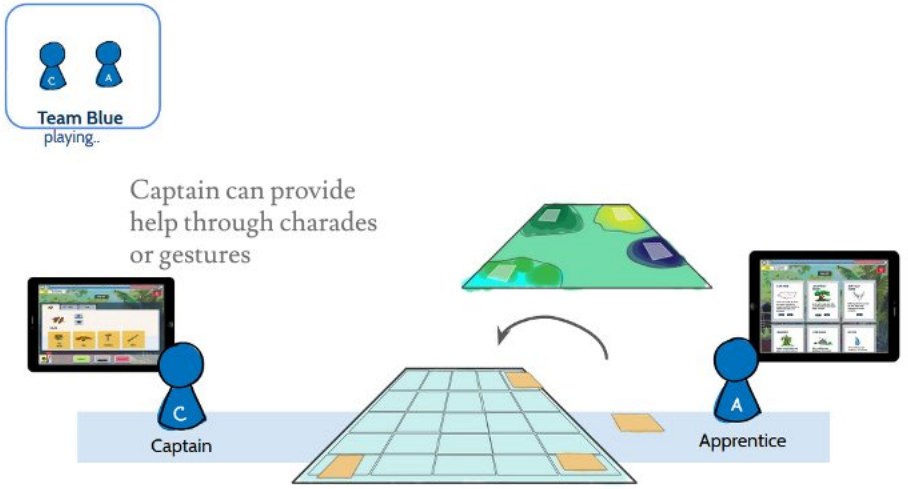


Figure: Apprentice arranging cards

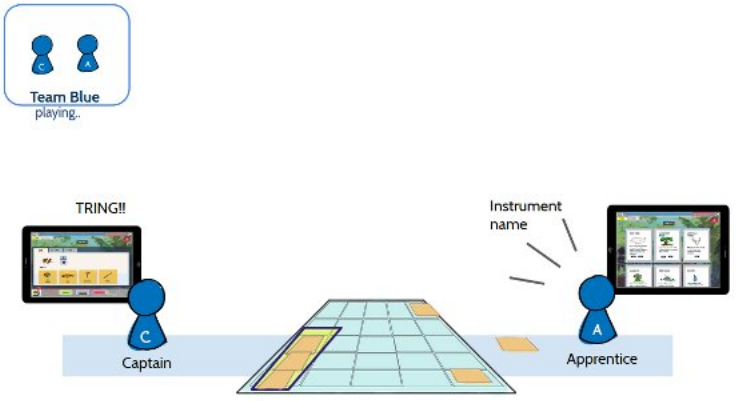


Figure: Instruemnt collection challenge

Correct assembly:

After every correct assembly, captain of the team will press the "TRING" button. Apprentice in the team needs to shout out the name of the instrument once the "TRING" sound is heard. If the name is correct, the team is given the instrument card. Every instrument card comes encoded with a code. Captain will scan the card and the instrument will be unlocked for the respective team. It shows an animation of the instrument being made(Refer to rewards section), and score update(Refer to rewards section).

Affect the progress of opponents:

When TRING button is pressed, apprentices from other teams can also shout out the name of the instrument. If the name is correct and they were the first to say it, they will get the instrument card.

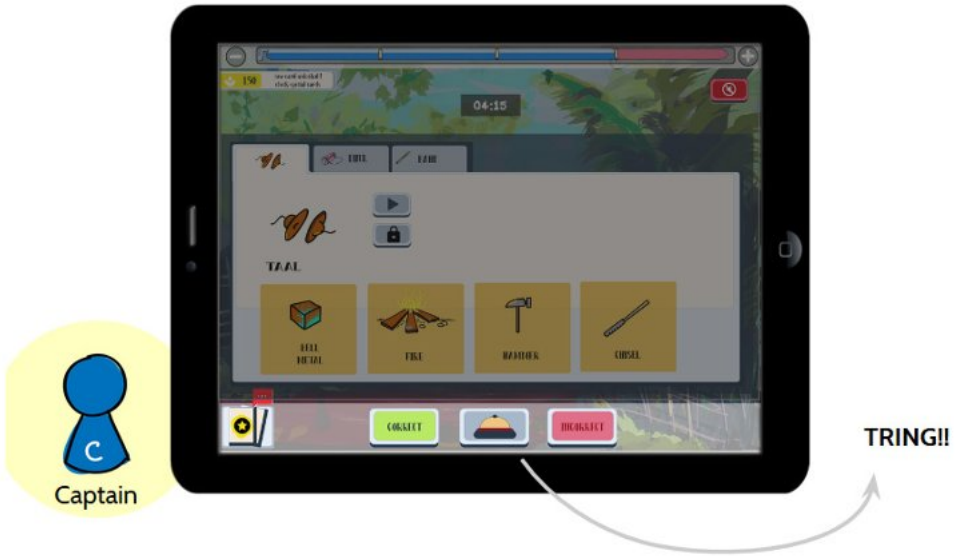
Special cards are present with the captains of each teams. They can sue these powers at any point during the gameplay. At any instant of time 4 of the special cards are activated, and the team can use those cards to either help themselves or affect the progress of other teams.

Winner:

The group with maximum number of instruments win!

If the time-limit runs out, the group with most instruments wins

If they have same numbers of instruments, group with highest achievement levels wins!



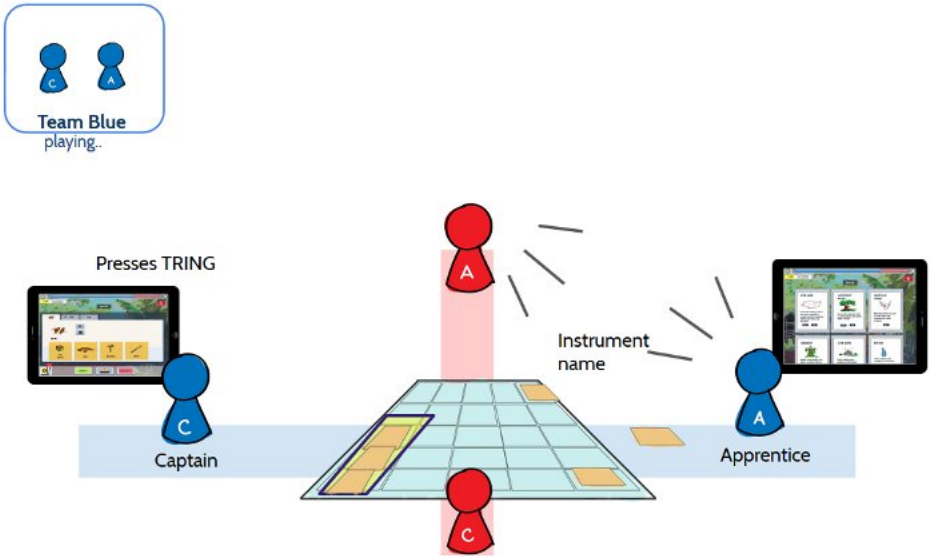


Figure: Both teh teams can claim the instrument if they know thw name

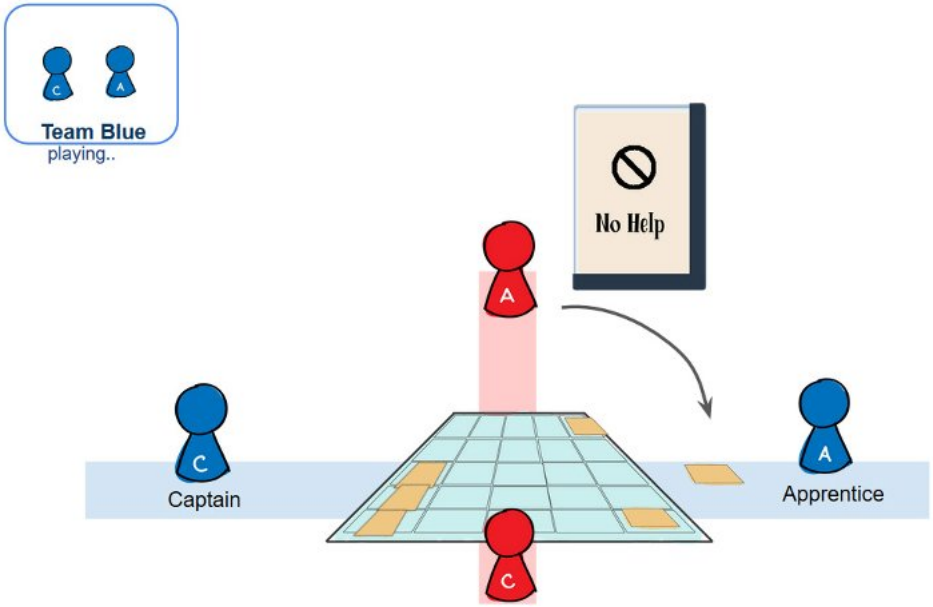


Figure: Teams attacking another

Screen Flow

Digital feature set:

Volume points(VP): Volume points in the bar states the volume in which the sounds of each instruments from the information cards will be played(refer to screen description). The volume bar has a maximum of 20 volume points. Volume bar is divided into 4 parts:

Part 1(VP between 20-15): Sound tracks from the information cards[B](Application 2) will be played at the highest volume. No noise interference

Part 2(VP between 14-10): Volume of soundtracks(of information cards[B] in Application 2) will decrease to 10 and noise(soundtrack) will be introduced volume 5

Part 3(VP between 9-5): Volume of soundtracks(of information cards[B] in Application 2) will decrease to 5and noise(soundtrack) will be introduced volume 10

Part 4(VP between 4-0): Volume of soundtracks(of information cards[B] in Application 2) will decrease to 15 and noise(soundtrack) will be introduced volume 1. Players cannot use their special power card, except for restore volume points card.

Information cards: Information cards are divided into two types:

Information card for Captain: Contains the name, image, sound and all the raw materials required to

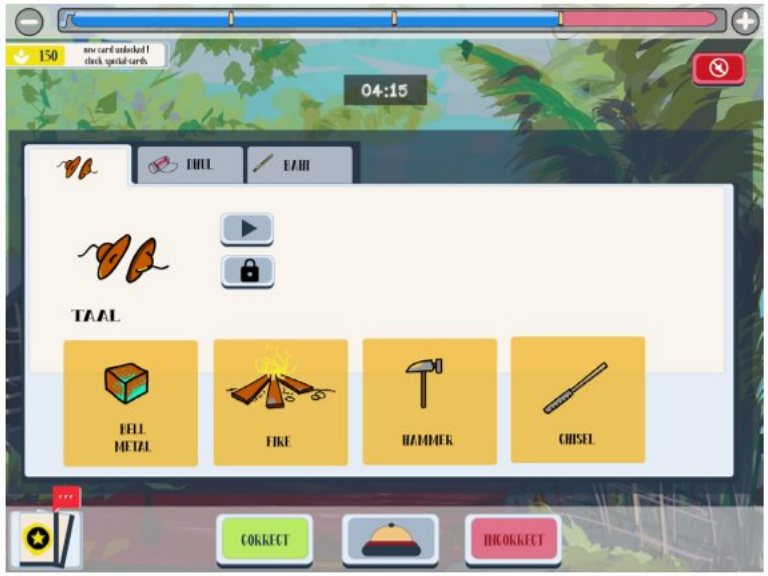


Figure: captain application

Figure: apprentice application

construct the given instrument.

Information card for Apprentice: contains name, image and sound-tracks of all the instruments that can be constructed from the raw materials collected by player B(in the game so far).

Special-power cards: At any instant of time only 4 special cards are enabled in the device of Player A. He/she can use those cards to affect other groups of players. To use these cards, players have to pay some amount of their volume points. If their volume points are below 4(in part 4) they won't be allowed to use any special cards, except for the one that restores volume points, if it is present among those four cards.

Players can replace one of their special cards, one at each turn only.

Types of cards:

• Exchange: Exchange any one of your card with your opponent [volume points required: 3]

• Worm: Infect your opponent's already constructed instrument with worms, they have to return their instrument if they don't have worm repellent.[volume points required: 5]

• Worm repellent: Kill the worms with worm repellent spray.[volume points required: 5]

• Send back to source: Send any of the opponent's raw material back to their source.[volume points required: 3]

• Choose your raw material: Choose any one raw material of your choice[volume points required: 5]

• Stop Player A from any group from helping Player A: Stop player A from helping player B[volume points required: 7]

• No Sound: Your opponent can't use any audio clues[volume points required: 5]

• Decrease volume points by 7: Decrease opponent s volume by 7.[volume points required: 3]

• Increase volume points by 5: Increase your volume by 5

• Increase volume points to 15: Increase your volume to 15 if you have less

• Hints: player B can verbally ask player A about one raw material of any instrument

• Teleport to other location: move any raw material on the board to any location[volume points required: 4]

• Help: Help opponent to choose one raw material for one instrument[volume points required: 0]

• Share volume points: Share volume points with opponent. Subtract the number of points from your volume point and your opponent can increase volume points.[volume points required: 0]

• Construct instrument for opponent: Construct one entire instrument for your opponent.[volume points required: 0]

Time limit: To increase difficulty level, time limit to complete the game can be used. Each game will incorporate a timer. The group which is able to complete the task within the time-limit wins, otherwise the one

with maximum number of instrument(aftre time runs out) wins the game. If there is a tie it can be broken with experience points. Group with the most experience points wins.

Number of instruments	Time-limit
3	15
4	15
6	20
7	20

If any instrument contains more than 7 raw materials to construct, add 5 more minutes to the time-limit.

Time-limit can also be set by the players if they want(next-future versions of the game)

For increased difficulty level, time-limit can be decreased.

Rewards based on time limit:

Time-taken	Experience points
½ * timelimit	10
1/3 * timelimit	30
1/6 * timelimit	50

Rewards after completion:

1. After completion of each instrument, the volume bar is restored to 15 points, if it was less before.

2. Animation: combine all the raw material morph instrument[play sound track]

3. Based on hints and time show experience points obtained achievement levels obtained(if any)

Hints: Information cards in both the applications contains data about the raw material- properties of the material and the sounds of the instruments that can be constructed. After a duration of time period these hints will get locked. Players can manually lock the hints as well. Players to assemble all instruments without any hints will obtain more experience points. (Refer to experience points section)

Time	Hints to disable
¼ th of time-limit	1
½ th of time-limit	2
¾ th of time-limit	3

Conditions apply: at least one of the raw materials should stay enabled till the end of the game, unless locked by the players themselves

Experience points: Depending on the use of data given on the information cards, and time taken to assemble an instrument players are given experience points.

Players can either choose to use the information on the cards or disable them. Depending on the usage of the information cards, players are given experience points.

5-Points are added for each locked or disabled raw material(which the player can't see) in each of the information card.

(5-points)*(number of raw materials in the information card, if the player choose to disable the information about the entire instrument.

Achievement levels: Players with different experient points will be awarded with different badges as follows:

Experience points

Experience points	**Badges**
50	Level 1 Player
100	Level 2 Player
170	Level 3 Player
200	Level 4 Player

Replaying and Levels

Players at any point of time can choose their desired village or the location, set the time of the year and begin their new explorations.

Achievement levels in the form of different badges will open up(Refer to Experience Points Section) with the increase in Experience Points of the players.

Difficulty levels can be further increased or de-creased(according to player). This can be done so by changing the time constraint and clues provided in both the applications.

Game mechanics: music mixing studio

Task/Mission:

Create soundtracks by mixing sounds of all the available instruments within a limited time period. Each team has to come up with their own mixes and judge each other s performances.

Start:

Players are taken to a studio, and introduced to different musical instruments. All team members are asked to experiment with different instruments, play and record their mixes.

Player interactions:

After the time limit gets over, each team has to submit their creation. The jury formed by the other team(s) can grade them. Grades can be:

4/10 points or 3 star/5 star: You can do better!

8/10 or 4/5 stars points: woooow nice!

10/10 /5 stars: Maestro!

Soundtracks:

the sound tracks created can be played, downloaded, shared by the players.