

Designing a purposeful game for gender sensitization for children



Project 3

Guide: Prof. Girish Dalvi

Shikha Verma

M. Des Interaction Design (2017-19)

IDC School of Design,

Indian Institute of Technology, Bombay.

Approval Sheet

The Interaction Design Project 3 titled “Designing a purposeful game for gender sensitization for children” by Shikha Verma (Roll Number 176330005) is approved for partial fulfillment of the requirement for the degree of ‘Masters in Design’ in Interaction Design at the Industrial Design Centre, Indian Institute of Technology, Bombay.

Guide:

Chairperson:

Internal Examiner:

External Examiner:

Declaration

I declare that this written document represents my ideas in my own words and where others ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea, data, fact or source in my submission. I understand that any violation of the above will be cause for disciplinary action by the institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.



Shikha Verma
176330005
Interaction Design

IDC School of Design,
Indian Institute of Technology, Bombay.

Acknowledgment

I'm thankful for Prof. Girish for his eternal patience, expert guidance and constant motivation. Thank you for helping me navigate the right path and for introducing me to the knowledge I never knew I absolutely needed. I thank all the Interaction Design faculty — Prof. Venkatesh Rajamanickam, Prof. Ravi Poovaiah, Prof. Jayesh Pillai, Prof. Vivek Kant for their helpful feedback and suggestions throughout the project.

I would like to thank all the children who helped me during this project, for letting me borrow their precious play time, and for teaching me so much more through their words, thoughts and idiosyncrasies. Thank you to all the school teachers, experts I met with for the project. Every piece of advice, experience and story you've shared with me has found its concrete place into the game. I would like to express my gratitude to my friends and family for lending me their time and support for those (hopefully fun) playtesting and brainstorming sessions.

This project has extensively contributed to my personal and academic learning. It has shaped my understanding of gender and feminism, and helped me to analyze and challenge my own biases. It has introduced me to the works of some prolific individuals whose ideas and thoughts have been epiphanic to me. As a designer, it taught me to better empathize with the people I am designing for. I'm grateful for having the opportunity to initiate and work on such a project.



Anurag
4-6-19

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Moreover, in a hundred years, I thought, reaching my own doorstep, women will have ceased to be the protected sex ... The nursemaid will heave coal. The shop-woman will drive an engine ... expose them to the same exertions and activities, make them soldiers and sailors and engine-drivers and dock labourers, and will not women die off so much younger, so much quicker... Anything may happen when womanhood has ceased to be a protected occupation, I thought, opening the door.

— Virginia Woolf, *A Room of One's Own*

Abstract

Gender socialisation starts at an early age whereby individuals internalize gender norms by their family, social networks and other social institutions. These internalized gender roles and norms reinforce themselves in many ways and can have larger implications on an individual's choice of career & opportunities, attitudes and behaviours and can even lead to violence. In India, the Right to education act 2009, Sarva Sikhshan Abhiyaan has emphasized on a gender-sensitive curriculum and making children aware of gender issues. However, despite such recommendations, gender sensitization remains to be made compulsory in the school curriculums. Present design interventions in this space have a high saturation of activities and toolkits. Serious games that intrinsically motivating and provide a complexity that allows for learning opportunities. Hence serious games can be a promising medium over existing tools and activities to communicate complex subjects within gender sensitisation. An analysis of existing design interventions also presents an opportunity to design content in local languages relevant to the Indian context, which can be more accessible and inclusive for children from lower socio-economic backgrounds. The school setting provides a safe and gender equitable setting for these children to learn about concepts of gender sensitization. Hence in this project, we propose a serious game design intervention for gender sensitization for children to be used in a classroom setting.

1. Introduction

1.1. Gender sensitization

Gender is a socially constructed concept used to attribute differences associated with being female or male. Gender socialisation starts at an early age whereby individuals internalize gender norms by their family, social networks and other social institutions, and become gendered at an individual level. Gender sensitization is about identifying these gender norms, and “changing behaviour and instilling empathy into the views that we hold about our own and the other genders” [1]. Internalized gender roles and norms reinforce themselves in many ways when individuals grow up. They can have larger implications on an individual’s choice of career & opportunities, attitudes and behaviours and can even lead to violence. For instance, STEM-based toys designed and marketed towards young boys could deter girls from pursuing a career in STEM [2].

1.2. Gender sensitization in India

India ranked 114 out of 142 countries as per the World Economic Forum 2014 Global Gender Gap Index which measures the performance of women against men, with respect to their economic participation and opportunities, educational attainment and health and survival [3]. There are several gender issues that grapple India such as division of labour, gender-based violence, dowry, child marriages, amongst others. The labour participation in India is only at 28%. Out of this, 66% of the work women do remain unpaid, this includes work done on household chores, caring for family members, shopping and travel related to the household [4]. India also reports the highest total number of dowry deaths with the number standing at 8,391 in 2010 [5]. A survey by the UN Population Fund and the ICRW also found out that six out of ten Indian men admitted violence against their partners [6]. These gender issues can be attributed to harmful gender norms and behaviour that exists, such as boys being tough and girls being soft and docile.

The aftermath of some of the most serious cases of gender-based violence in the country has been followed by suggestions by the Indian judiciary to make gender equality compulsory in the curriculum and make children more gender sensitised [7]. This makes gender sensitization a pressing issue to be addressed in India.

1.3. Starting Early

Gender role socialization and internalization starts at an early age, right from when children are born. By adolescence gender attitudes and behaviour settle in and the negative outcome of gender norms begin to reflect [8]. Hence there is a need to start gender sensitisation early on before adolescence.

1.4. The school setting

Households may themselves not provide gender-equitable conditions for children. In this case, the classroom setting can become a safe space for the child to learn about gender sensitisation and practise it in the outside world. The school teachers can further provide an atmosphere of trust where children can 'share experiences, where conflict can be acknowledged and constructively questioned' [9].

1.5. Current Status

Right to education act 2009, Sarva Sikhshan Abhiyaan emphasized on a gender-sensitive curriculum and making children aware of gender issues. However, despite such recommendations, gender sensitization remains to be made compulsory in the school curriculum in India. Some government interventions in this space include analysis of NCERT school textbooks to free them from gender biases, and the creation of training material for teacher educators on gender equality and empowerment.

1.6. A serious game intervention

Games based interventions are used to deliver learning content, this is because games are said to foster better engagement and better engagement can lead to better learning. Serious games are intentionally designed to have a purposeful impact on the players' lives beyond the self-contained aim of the game itself. There is also meta-analysis which confirms that serious games

overall are more effective than conventional instruction methods[10]. An advantage of serious games over other instructional media is that they are intrinsically motivating and the player is actively involved in making decisions. The game environment is responsive and can have a complexity that allows for learning opportunities. This makes it a promising medium to communicate complex subjects within gender sensitisation that require users to reflect and think critically on subjects of gender issues. Hence considering the saturation of activities, toolkits, manuals and other instructional content for gender sensitization, and the benefits of serious games over traditional methods of learning, a serious game intervention is proposed.

2. Scope

As discussed previously, due to the huge saturation of activities and toolkits, we decided to choose a serious game intervention. Repeated play of such games can also allow the users to repeatedly engage with the content without requiring constant expert supervision while being able to maintain the user's interest each time. We decided to base this intervention in a school classroom setting due to the safe and gender-equitable condition that it can provide for children to be gender sensitized. As most of the activity/games interventions analyzed were in English language, we further decided to make the game in Hindi language and hence target children from lower socio-economic backgrounds. Hindi language was also chosen as it is commonly spoken and taught in all types of schools (Hindi, Marathi and English mediums), and due to my own familiarity and comfort with it. Considering the user group, we also decided to create a tangible game, as they would be more accessible, require less infrastructure to support it and also require less pre-knowledge or skills to play the game. Through such considerations, we aimed to create a more contextualized, and inclusive intervention.

3. Objective

The objective of the project is to be able to design a tangible game for gender sensitization to be used in a classroom setting for children ages 8-10 in Hindi language.

4. Goals

The goals of the project are, with respect to gender issues as follows:

- To make children aware of gender issues
- Enable children to identify instances of the same
- Respond positively to negative instances

5. Research

The primary research question that the project aimed to answer is — Can a game be designed to bring about gender sensitization for children? A breakdown of the research questions for this project are as follows:

- Which elements from the user's environment could be used to form elements of the game world?
How: Expert interviews
- Which elements from the user's environment could be used to form elements of the game world?
How: Expert interviews
- How do social interactions within games affect the player experience?
How: Comparative analysis, observation during play

The detailed description of the methods used to answer the research questions are as follows:

5.1. Secondary Research

5.1.2. Analysis of existing interventions

Existing interventions that facilitate participatory learning for gender sensitization were found. These included games, activities, toolkits and guidelines including those used and built locally. These were then sampled on the basis of those that are meant for children aged 8-10, can be used in a classroom setting and can be accessed for analysis. The instruments of analysis used looked at the ecosystem in which it would be used, the content in it and whether the content was relevant to the Indian context.

The analysis showed a large number of interventions as being toolkits and manuals. The primary content was gender biases, stereotypes and, gender and career. There were few (only 3) guidelines that included content relevant to the Indian context.

5.1.3. Content curation

In order to curate content, first, content from existing feminist literature was identified. This included primary content, as well as peripheral content which would help to better the understanding of primary content. To choose the final content some parameters were identified to curate and prioritize content based on the problem area. This included listing whether the content would be relevant to their age, Indian context, and it's coverage in existing interventions. In order to age-relevant content, the Lifecycle approach (lists the vulnerabilities girls face throughout the lifecycle) and gender development framework were referenced. Further, a life skills psychologist was consulted in order to evaluate whether the content would be developmentally and age-appropriate. The UNWomen Rapporteur's report and Plan International Vulnerability Index report were referenced to list Indian content relevant content.

Sr No.	Name	Ecosystem	Content/Information	Contextualized content
1	Hypatia	Hosting with a stem professional	Gender and sex, gender stereotypes and skill, gender and science	-
2	Unnati foundation	Instructor led	gender stereotypes, women's subordination, socialisation, patriarchy, violence, gender and disability, history, single women	Yes
3	PINK AND BLUE WORLD, Gender Stereotypes and Their Consequences	Classroom	Gender representation in textbooks, advertising, gender and career, gender socialisation, male figure, gender and sex	-
4	Institute for human education activities	Instructor led	Gender roles, gender stereotyping, gender and career	-
5	NCERT book	Classroom	Sex and Gender, Indicators of Gender Equality and Empowerment, Gender Budgeting, Gender representations, Gender and Violence, Gender & Science and Technology	Yes
6	Gender & Science	Exhibition booklet	gender and sex, gender and science/technology, historical background, women scientists	Yes
7	Playing for gender equality workbook	Instructor led	gender discrimination, equality, roles, violence	-
8	Breaking the Mould	Instructor led	gender representations, stereotypes	-
9	MediaSmarts, exposing gender stereotypes	Instructor led	gender stereotypes, dating violence	-
10	LIKE, Gender equality, the game	self + instructor	gender representations, stereotypes	-
11	Global Impact Games	outdoor, instructor led	rights and inequalities	-
12	Gender Bias Bingo	Game	gender bias	-
13	UNESCO Gender sensitivity training manual	manual		-

Figure1. Analysis of gender sensitivity based games and activities

		Referred to the lifecycle approach and gender development	Referred to UNWomen Rappoteur's report, Plan Internations Vulnerability Index	in existing 12 toolkits/activities, games		
Topic	Type of content	Age and developmentally appropriate/ Relevance to age	Relevance to Indian context	Coverage	Content	Relevant sources
Gender and sex	Primary	Yes	-	High	Difference between the two	
Gender representations	Primary	Yes		High		
Gender stereotypes	Primary	Yes	High	High		
Gender socialization	Primary	Yes	High	High	norms, restriction on play	
Gender bias	Primary	Yes	High	High	discrimination in parental care	
Gender & career	Primary	Yes		High		
Historical Background	Primary	Yes		low		
Gendered violence	Primary	Yes	High	low	abuse by known, unknown person	
Division of labour		Yes	High	high	unpaid, unrecognized work	
Patriarchy		Yes	High	high		
Intersectionality	Related	Yes	High	low		
Hyperfeminization		Yes	Med	low		
Commodification	Related	Yes	High	-		
Agency	Related	Yes	High	-	lack of voice in home or society	
Peer Interactions	Related	Yes		-		
Power equations	Related	Yes	High	med		
Women's empowerment	Related	Yes	High	high	Positive discrimination	
Rights & laws	Related	Yes	High	low	Positive discrimination	
Customary tradition & practises	Related	Yes	Med	low		
Dowry	Related	-	High	low		
Honour killing	Related	-	High	low		
Domestic Violence	Related	Yes	High	low		
Female foeticide	Related	-	High	low		
Child marriage	Related	-	High	low		

Figure2. Content curation

5.2. Primary Research

5.2.1. Expert Interviews

An in-depth interview with experts was conducted to gain a better understanding of the user group and domain. This included 2 professionals who conduct workshops on gender sensitization in schools and an engineering college, 2 primary school teachers for a Hindi medium school, and a life skills psychologist. Overall, these interviews provided some approaches, resources that can be used to communicate gender sensitization to children, and anecdotes from conducting workshops on the field.

The cumulative findings from these interviews are listed below:

- The teachers emphasized the lack of infrastructure such as computers and laptops, as well as access to mobile phones, for the play of digital games amongst children.
- A possibility of the inclusion of using existing myths and assumptions in the community in the game content.
- Some theories such as gender analysis and cognitive behaviour modification being used to conduct activities and workshops.
- Include content that would make children aware of and be able to exercise their agency.
- Peer interactions with the opposite being one of the key issues for graduate college students.
- Anecdotes which illustrated existing beliefs by people in the community such as 'girls never being able to win in math Olympiad as they are dumb', 'gender based behaviour being embedded in our genes'

5.2.2. Playtesting educational board games with children

Games for social play are heavily influenced by factors such as player composition, game mechanics and characteristics of the game environment [11]. Social interactions themselves can be internally or externally derived. Internally derived interactions are caused due to 'game rules and design patterns' and externally derived interactions 'emerge from the players and the social playing context outside the game, which includes aspects like the relationship between players and their current mood' [12]. These varying factors need to be considered while analyzing social interactions within games.

We used a 2x2 Latin Square for playtesting with 8 children (4 males and 4 females) in groups of 2. Thus we could compare player interactions between the games, to account for any variation between them. The number of games and participants chosen for the experiment was kept limited in order to accommodate for participant dropouts.

Choosing participants

We had to ensure that the participants possessed uniform knowledge and skills to play the games, hence we chose school children as our participants. All the participants were 8 years of age and studied in the same class in a Hindi medium school. The games were tested in their school setting during free school hours, this provided a controlled set up for playtesting.

Choosing games

We decided to opt for educational games over entertainment games, in the hope that the children also benefit from being a part of the study. We identified ten off the shelf multiplayer educational board games designed for ages 8 and above. We then thoroughly played the games and shortlisted some games on the basis of the level of difficulty and time taken to play them. From these shortlisted games, we finally chose two games which used distinct game mechanics. The two chosen games were; Foxed, a strategy based multiplication game that uses cards and tokens and Discovery of India (DOI), a geography-based game where players learn about the location of cities within India.

Foxed

The Foxed game contains number cards and number tiles with parts of Fox's face on it. During the player's turn, they have to multiply any two cards and place their token on the answer on any Foxed tile. Once they place their token on all the numbers on a fox tile, they can collect the tile. The player to first collect all the parts of the fox's face wins the game. In the game, the players also have an option to block other players by placing their token on the fox tile that is being filled by another player. To unblock, the players must use the 'Unblock' card.

Discovery of India (DOI)

In the DOI game, the players choose from a pack of shuffled site cards, which mentions the latitude and longitude of that particular location. The players have to place their peg on the correct location of that site on a map of India. The players can also choose to earn a bonus site worth Rs. 500 by guessing any one site that falls on the same latitude or longitude as the site card they are holding. There is an information wheel which gives clues to the player in the bonus turn by indicating the number of sites located on the same latitude and longitude as the site card that they are holding. If the player is able to place the peg in the correct square on the map, she earns a bonus of Rs. 500 from the bank. If the player is incorrect, then distance in squares from the correct location is measured, and the player has to pay a penalty of Rs.150 per square to the bank. The game is over when the player finished all their pegs or when all the sites have been marked. The player with the maximum money at the end of the game wins.

Method

The playtesting began with a quick individual survey. This survey assessed the children's gaming experience. Based on this, mix gendered groups of 2 F and 2 M were created with one member from each group having more gaming experience than the other. Playtesting sessions were videotaped and then analysed. Initial 5-10 minutes were spent in explaining the game rules to them. This was followed by a one-turn demo play by each player. Participants were then asked if they had doubts or questions. Play sessions started once the participants were ready. After the play sessions, the children were individually asked some qualitative questions on their play experience. Post that, 10 minutes were spent in switching over to the next set of participants.



Figure 3. Children playing the Foxed game



Figure 4. Children playing the Discovery of India game

Instruments of analysis

There are several means, such as questionnaires and surveys that are used to capture player interactions and experiences. These methods rely heavily on the user's ability to articulate their experience, and cannot be used during game play [13]. In order to measure social interactions, we had to investigate how they can be recorded and analyzed during gameplay. Observations is one of the means to do so. Some researchers have created observation schemes to capture social interactions in the specific context of their studies. Bromley et al. [14] made a tool to capture social interactions during game play which includes metrics such as shared awareness, requesting information, shared history, shared success, shared failure, team optimization, trash talk, and self-indulgence. Seif El-Nasr et al. [15] came up with cooperative performance metrics which includes parameters such as laughter or excitement together, worked out strategies, helping, global strategies, waited for each other, and got in each other's way. Further, [11] combined some observation metrics proposed by [16] and [17], and added new ones such as , to analyze social interactions in co-located multiplayer games. The metrics used by [14], [15] and [16] in their studies were referenced to create initial set of observation metrics contextual to multiplayer board games. We then watched the recorded play sessions to examine if the metrics fit the context of our study. Upon examination, we added new categories such as rivalry, anxiousness, asking to hurry, distracted and doubting/complaining.

Category	Description	Type
Enjoying	Laughing, expressing fun or pleasure, showing enjoyment due to game events	previous
Shared awareness	Exchanging information about the game's state, current game events, or the presently performed action	previous
Helping	Prompting moves, offering help, asking for help	revised
Rival	Expressing show signs of competition	new
Planning next moves	Looking into their own cards, memorizing	new
Mocking	Teasing, insulting another player	new
Anxious	If the player looks like their user pressure while performing actions in the game	new
Asking to hurry	Verbally asking the player to hurry for their moves	new
Doubting/complaining	Verbally complaining about player/players to other players/the moderator or to oneself.	new
Distracted	Looking elsewhere, fidgeting	new

Figure 5. Observation metrics along with their description.

Observations and Findings

We created an analysis sheet with the observation categories in a single column and player turns (TA,TB,TC,TD) in consecutive rows. The player turns were also annotated with game events. Whenever we observed an instance of interaction between players, we marked the players (A,B,C,D) in the cell corresponding to the interaction category and player turn. These interactions were listed sequentially. An example of the following is shown as follows.

Enjoying										D		A,C									A,B		C,D,A
shared awareness	DC										DC		DC			A,D				CA			
helping		A	DC					A	B				DC					D					
rival																							
planning next moves						D									A,B							B	
Mocking																							
anxious																							
asking to hurry/waiting							A										D						
doubting/complaining				A,C																			
distracted						C																	
5 turns	TA	TB	TC	TD	TA	TB	TC				TD	TA	TB	TC					TD	TA	TB	TC	
Actions/Events		Card			Card							Block				Announcing her moves A							UB

Figure 6. Analysis sheet

I also transcribed user responses to qualitative questions on gaming experience for the two games. The user responses helped to corroborate our observations for validation. I compared the sequence of interactions between both the games, and player groups. We also looked at the overall social interactions that occurred for specific game events in all the play sessions. We have listed our key observations below from our study:

Shared awareness and enjoyment

While analysing the sequence of interactions between players, we found recurring observations of shared awareness and enjoyment being followed by each other. In shared awareness, the players discussed the state of the game or a recently performed player action. In addition to this, the players also discussed their own moves. In one of the play sessions, which had the highest instances of player enjoyment, the players reflected on the moves

that were causing other players to win or lose the game. We can hypothesize through this, that either shared awareness lead to player enjoyment or player enjoyment led to shared awareness for the player groups. We suggest that this can be probed further.

Help in both games

The players were observed helping each other in both the games. The same interaction of helping another player was received differently by the players in the same group for both the games. Players helped each other in two cases; first, in the Foxed game, to decide which number cards to multiply and place the token on. Second, in bonus turn of the DOI game to guess the latitude and longitude of a location site. The outcome of helping another player in both the games was different. In the Foxed game, helping a fellow player reduced the overall waiting time. In the DOI game, helping a player in the bonus round saved them from paying a hefty penalty. In the Foxed game, participants from the same group helped each other frequently. They also showed signs that they enjoyed the game following the same. However, in the DOI game, helping another player led to doubting and complaining by fellow players. The interaction of helping another player was received differently in both the games as it led to different outcomes i.e reducing the waiting time in one versus possibly saving another player from losing in another. Hence the difference in social interactions can be attributed to the respective game mechanisms.

Player involvement in each other's turns

Players in the DOI game had more involvement in each other's turn than they did in the Foxed game. In the Foxed game, the players held the multiplication cards with them at all times. Hence the players were observed memorizing tables, looking at their cards and number tiles, to plan their next move. There were also instances where players announced their moves beforehand, during another player's turn. In the DOI game, the players could only plan their move, after they picked a site card during their turn. Hence the players were observed plotting the location of the site card.

Other findings

- Both groups attempted to manipulate games, some successfully did
- Player decisions seemed to be influenced by each other
- Some players were more authoritative; asking for players to show their cards etc. Some were submissive; asking to check their moves.

6. Ideation and Playtesting

In order to ideate, first, the game world and narrative was decided upon. I did so by drawing analogies and taking inspiration from children's books and movies. This led to the generation of some preliminary game concepts. Next, game mechanics or game content was decided upon based on the learning content. Post this, low fidelity paper prototypes of the game were made. These paper prototypes were then tested with the users. I also referenced an early version of the Educational Game Design conceptualization framework and related game design frameworks for the same.

Following are the game design concepts generated.

6.1. Concepts

6.1.1. Space-equate

Based on: Alternate futuristic game world with egalitarian conditions

Core content: Division of labour

Description: Earthlings have landed on a new planet where they must earn star medals to be citizens of the new planet. To do this, players travel through different regions on the game board like the food lab, travel station, toy lab and fitness station and solve tasks using their skill cards. The team to have solved an equal number of tasks in a region wins the star medal for that region. The first team to win all the medals wins the game.

Players: 4 players in teams of 2

Time: 30-40 mins

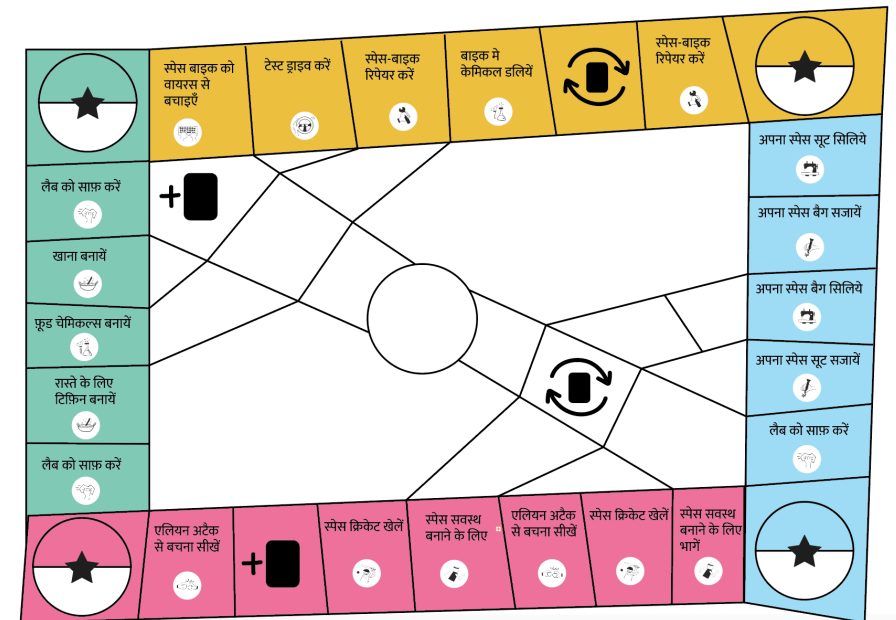


Figure 7. Space Equate

6.1.2. Jungle City

Based on: Drawing analogies to the animal world

Core content: Gender stereotypes

Description: Jungle city is a world where animals can walk and talk and pretty much live like human beings. While most animals have adopted a modern way of living, some still continue to follow primitive practices from their old jungle days. Help the female horse, gorilla and fox to go out food gathering and be the head of their tribes just like their male friends. Join forces with the animals and use combat cards with the right examples, and true facts to solve challenge cards. The first player to solve all their challenge cards wins the game.

Players: 2-4 players

Time: 15-20 mins



Figure 8. Jungle City

6.1.3 Society

Based on: Alternate futuristic game world with egalitarian conditions

Core content: Division of labour

Description: Earthlings have landed on a new planet where they must earn star medals to be citizens of the new planet. To do this, players travel through different regions on the game board like the food lab, travel station, toy lab and fitness station and solve tasks using their skill cards. The team to have solved an equal number of tasks in a region wins the star medal for that region. The first team to win all the medals wins the game.

Players: 4 players in teams of 2

Time: 30-40 mins



Figure 9. Society

6.2. Playtesting

The playtesting was conducted using low fidelity paper prototypes with children ages 7-11 from both Hindi and English medium schools. Each game was playtested with minimum of 4 children. Before playtesting, the participants were first explained the rules of the game, followed by a demo play session. User response to the game was collected in the form of observations and user comments made during play. Post play, users were also asked questions for further corroboration. Low fidelity paper prototypes were playtested on the parameters of learning, fun and engagement, and usability. They are detailed below:

Learning

- What did they think was the game about?
- What did they learn from the game?

Fun and engagement

- Do they want to play the game again?
- Observations of laughter, discussions, comments made during gameplay

Usability

- Was the game easy to understand? (Did they understand the game rules at once or required many explanations)
- Doubts, questions asked during the game play.
- Were they able to use all the game features

The results of the playtesting sessions are discussed as follows:

6.2.1. Space-equate

Fun and engagement:

The participants completed playing the game but did not seem to show a lot of eagerness or excitement to play the game. This can be concluded from the lack of laughter or commotion during play. One of the reasons for the same was the long time taken for the players to reach their desired position on the game board, as one of the players was quoted saying, "I've to move too far". Another player was quoted saying "This is too boring".

Usability:

The players were able to play the game as per the rules but were observed to be confused with the colour coding of the 'boy' and 'girl' play pieces. They were also unable to strategize effectively missing out on some instances where they could have captured areas.

Learning:

Upon asking what the game was about and whether they learnt anything from the game, the participants seemed clueless ("I don't know what the game was about, I just played by the rules"). It is hypothesized that the children did not understand the purpose of the game as the learning content was mapped onto the mechanic of the game, and not stated explicitly in the game content.

As the game idea failed to show potential in terms of the fun and engagement as well as learning, no further versions of the game were ideated upon.

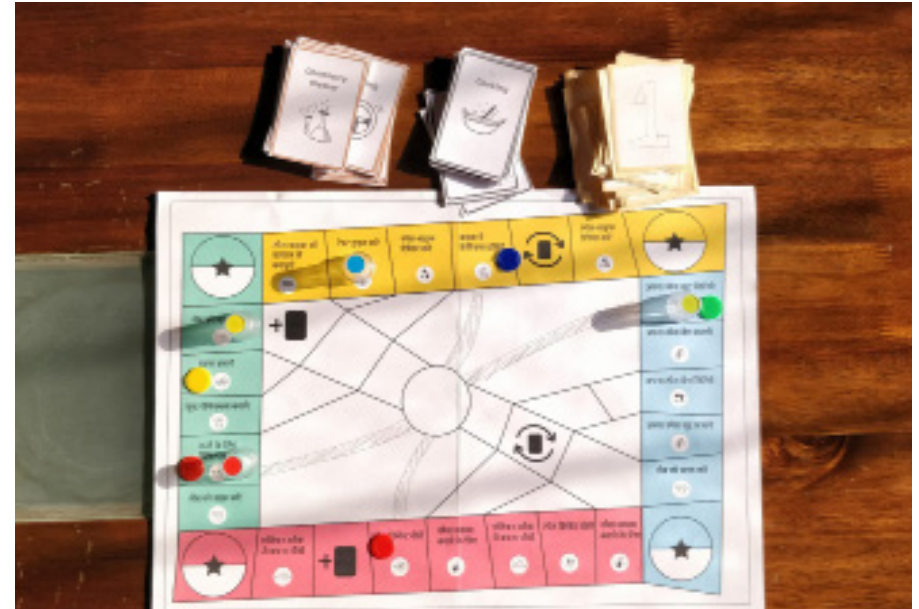


Figure 10. Paper prototype of Space-equate game



Figure 11. Playtesting Space-equate game

6.2.2. Jungle City

Fun and engagement

The game was fun and engaging for the participants, they insisted on playing the game again. It was observed that the participants felt a sense of accomplishment upon being able to solve the challenge cards. They also enjoyed passing the challenge cards to each other.

Usability

The game was easy for players to understand. They were able to strategize and use all the game features. One of the mechanics to pass on the challenge cards was difficult for them to follow and was hence dropped. One of the drawbacks of the card design was that the children were matching cards based on the top heading of the card and did not read the card description, which described the main purpose of the card. This, in turn, affected their learning from the game.

Learning

The game was able to trigger some conversation among the participants. One of the participants were observed drawing analogies to his own mother while playing the game. He said, "My mother used to work at a shop but doesn't go there anymore as she has to look after me".



Figure 12. Paper prototype of Jungle city game



Figure 13. Playtesting Jungle city game

Revised game

As the game was fun and showed learning potential we decided to further make a revised prototype of the game, called 'Same- Same'. This game follows a similar mechanic as it's the previous version, the major change being the design of the game cards. All the text in the playing cards were replaced by visuals. Players now had to solve challenge cards showing gender stereotypical activities, with solve cards showing gender challenging activities. Cards showing equal brain power and physical power were used as wild cards.

The paper prototype was the playtested with the participants. We found that the children seemed to enjoy the game as much as the previous version. They now paid attention to the card contents as well. When asked what if they learned anything from the game, one of the participants was quoted saying "Women can do all the things that men can do". The game was also easy to understand for the participants and they used all the game features. Hence the game proved to be effective in fulfilling its purpose in terms of learning, fun and usability. However the content coverage in the game was limited, it did not cover the deeper issues behind certain gender stereotypes and how they can be challenged. Hence the game was not taken forward due to these reasons.



Figure 15. Playtesting revised version of Jungle City game

6.2.3. Society

Fun and engagement

The participants found the game engaging and wished to play it again. There was also relative seriousness while in the participants while reading some of the cards out for the first time. The challenge level in the game however needed to be increased. There was also a need to increase user control in the game and make it less luck based in order to reduce any player fatigue.

Usability

The participants easily understood the game and used all features. It was also observed that they waited patiently for their turns to play. One of the drawbacks was the arrangement and shuffling of cards which caused some player fatigue as they received the same card multiple times. The players were also observed reading all the card contents.

Learning

The players were observed making logical arguments against the card content as they discussed it amongst each other, and thought aloud while reading the cards. During play two of the boys were observed teasing the female players about how girls cannot play cricket as they cannot hit sixes, to this a female player replied 'Girls can play cricket hence we have the Indian women's cricket team', which was precisely written in one of the solve cards. We also observed the boys discussing amongst themselves, 'Yes boys can also cry, it is not a girl thing'. Hence it can be said that the game facilitated positive introspection and discussion amongst the participants. This was also because the game content and narrative was relatable to them.



Figure 16. Paper prototype of Society game



Figure 17. Playtesting Society game

Revised version

A revised version of the game was created wherein each category had multiple challenge cards. The solve cards were revised such that they could be used in any category. This would help make the game more open ended and also make the game more challenging. A scoreboard was also added for each character where players would each earn a point upon solving the challenge cards. This also added another winning condition to the game wherein the first player to earn 20 points would win the game. This would help to not extend the game and encourage them to use solve cards rather than '-2' action cards to get rid of the challenge cards.

Conclusion

Hence Society game was chosen to be taken forward as the game was fun and engaging, easy to understand and provided the most learning out of all the game concepts as it was the most relatable and contextual game for the participants.

A new part

Another part that focuses on gender socialization was added to the game. Herein players have to build a character by forming decks of different categories. These categories include physical appearance, self interests, and roles and responsibilities. The cards that will help them to form these decks include instances of gender socialisation caused by socialisation agents such as family, media, peers etc. The formation of the character towards the end of the game is completely luck based. At the end of the game, players read out their characters and are explained about the concept of gender socialisation. Based on the characters formed, the players are then assigned older characters in the second game.

A paper prototype of the game was created and tested. The participants found the game fun and engaging. The learning had to be facilitated with an explanation. The transition from the first to the second part of the game needs to be playtested and iterated upon to have a smoother flow.

7. Final Game

Description:

The players start by building their own characters by forming their appearance, interests and roles and responsibilities based on the instances encountered with their family, friends and media. Based on this, the players are then assigned older characters. Players then play as these relatable characters in society and help them achieve their goal. Each character has its own character board and story deck with their unique situations. To achieve their goals players need to resolve situations in the characters home, school and TV/news. Players compete with each other to be the first player to resolve their challenges and complete their goal.

Players:

4 players in teams of two, preferable mix gendered teams

Total time: 30-40 mins for both the games

Type of play: Repeated play

Pre-knowledge or skills required: Reading

7.1. Content Coverage

A detailed breakdown of content coverage in the game is presented here.

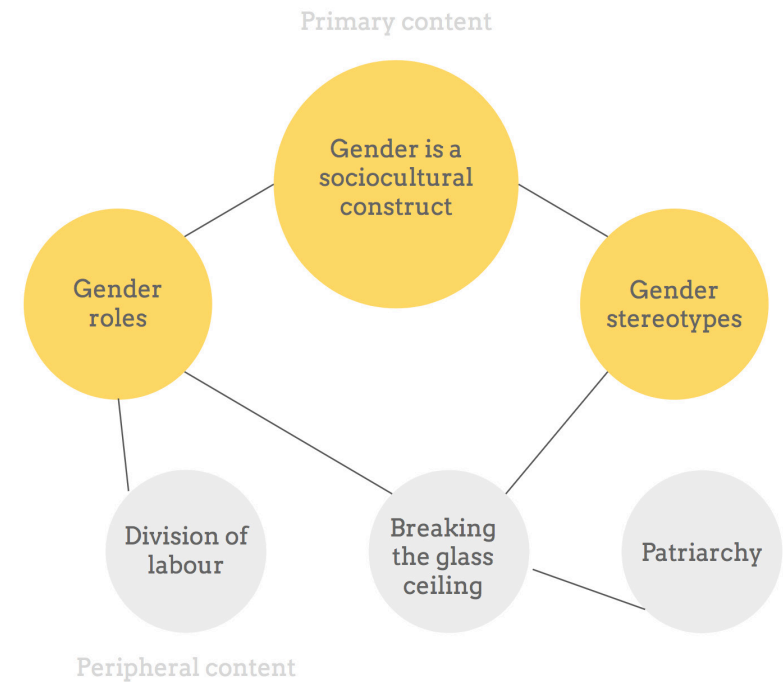


Figure 18. Broad Content Categories

Content Mapping



Figure 19. Content Mapping

7.2. Hi fidelity game components

The game consists of

- 2 character boards printed on both sides (Rani, Sheru, 2 start boards)
- 3 card decks
- 1 set of tokens

Below are the hi fidelity versions of the same.

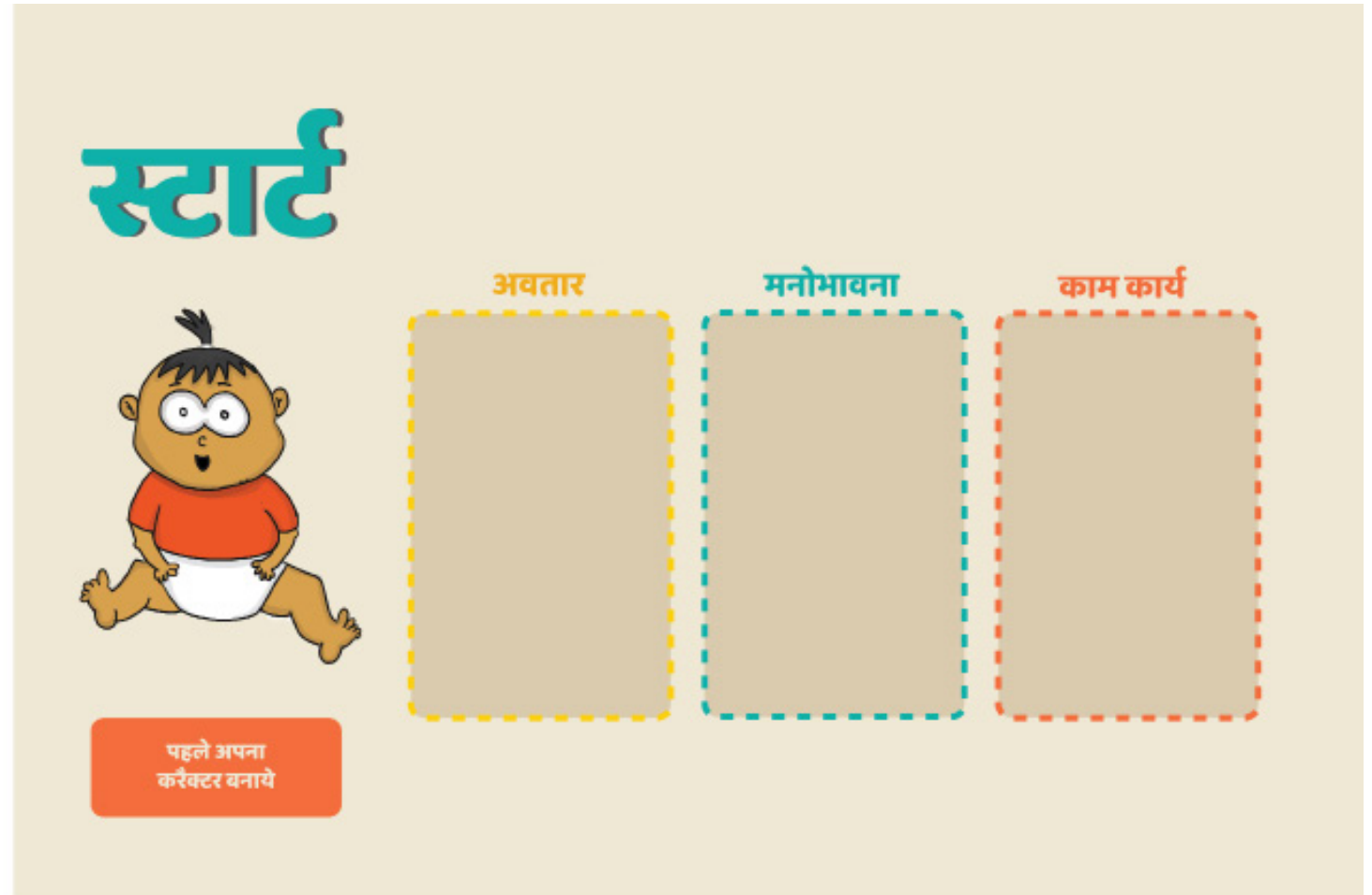



Figure 20. Card deck and character board for first game



रानी



मुझे क्रिकेटर बनना है

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

घर


स्कूल

टीवी न्यूज़

Figure 21. Card deck and character board for Rani



शेरू



मैं भरतनाट्यम सीखना चाहता हूँ

12345678910
11121314151617181920

घर

स्कूल

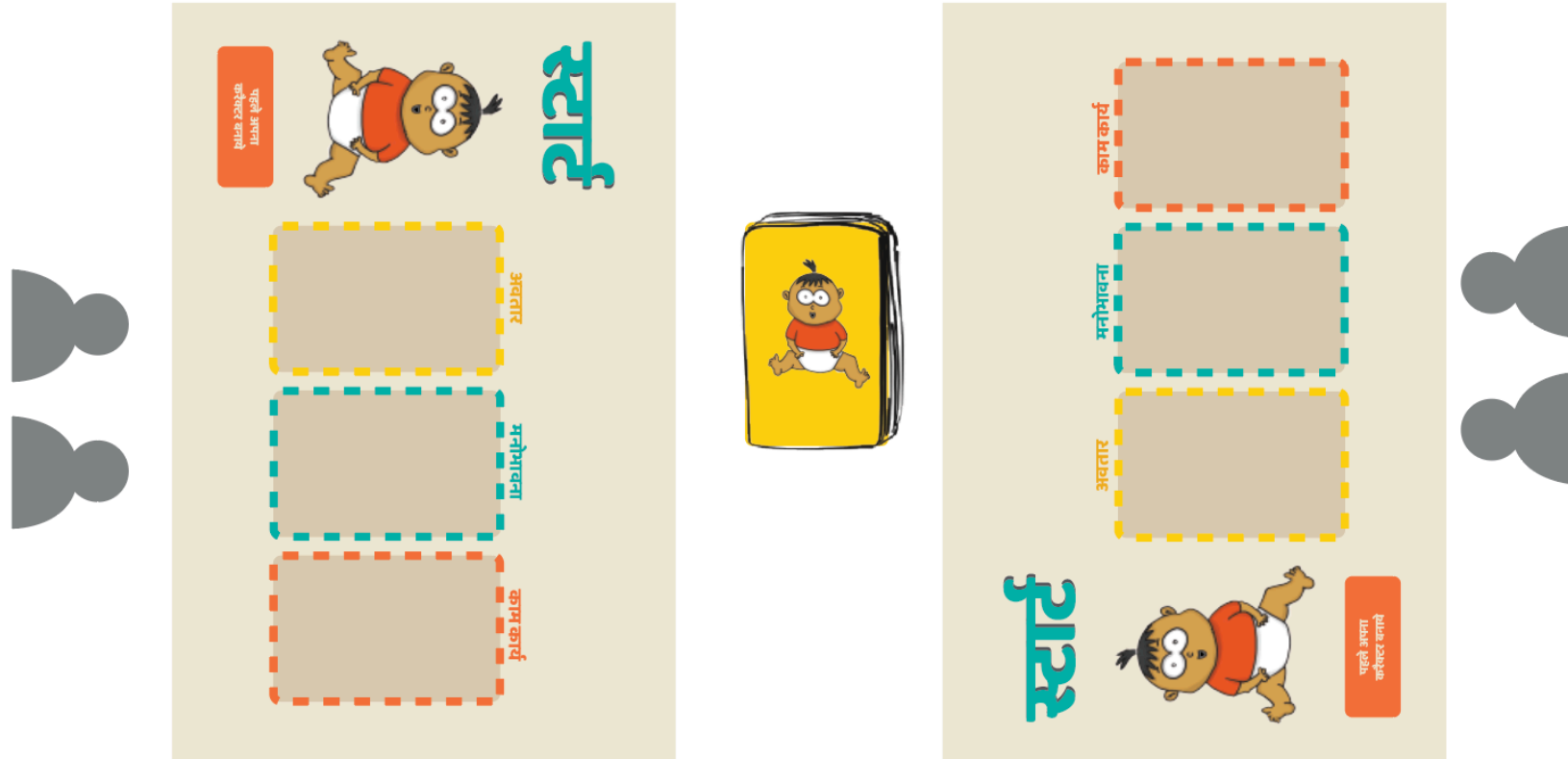
टीवी न्यूज़

Figure 22. Card deck and character board for Sheru

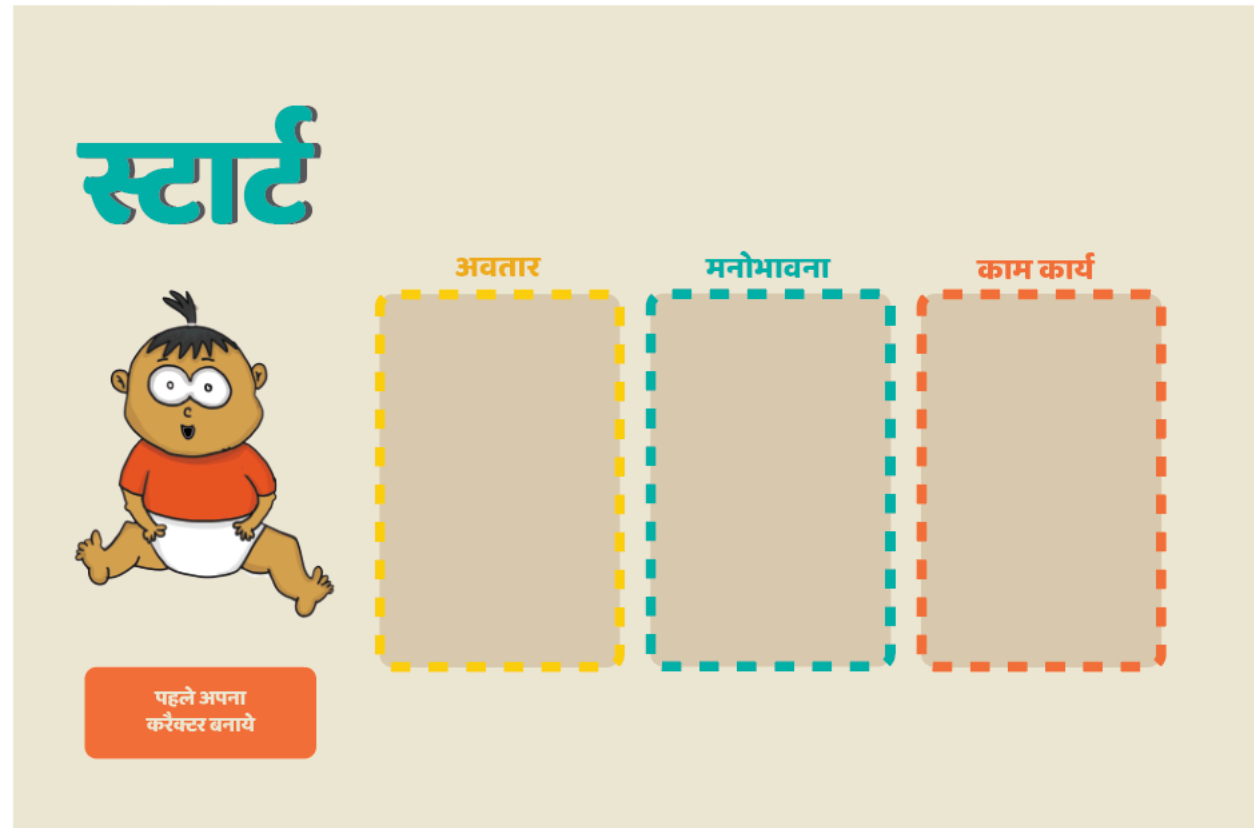
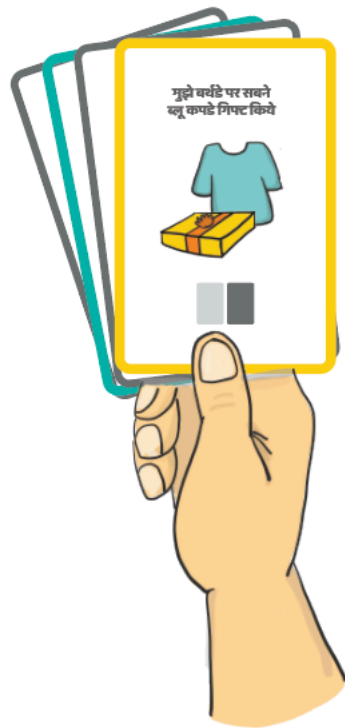
7.3. How to Play

7.3.1. First Game

Players play in teams of two, to set up the game, each player is given a character board, the draw pile is placed in the centre



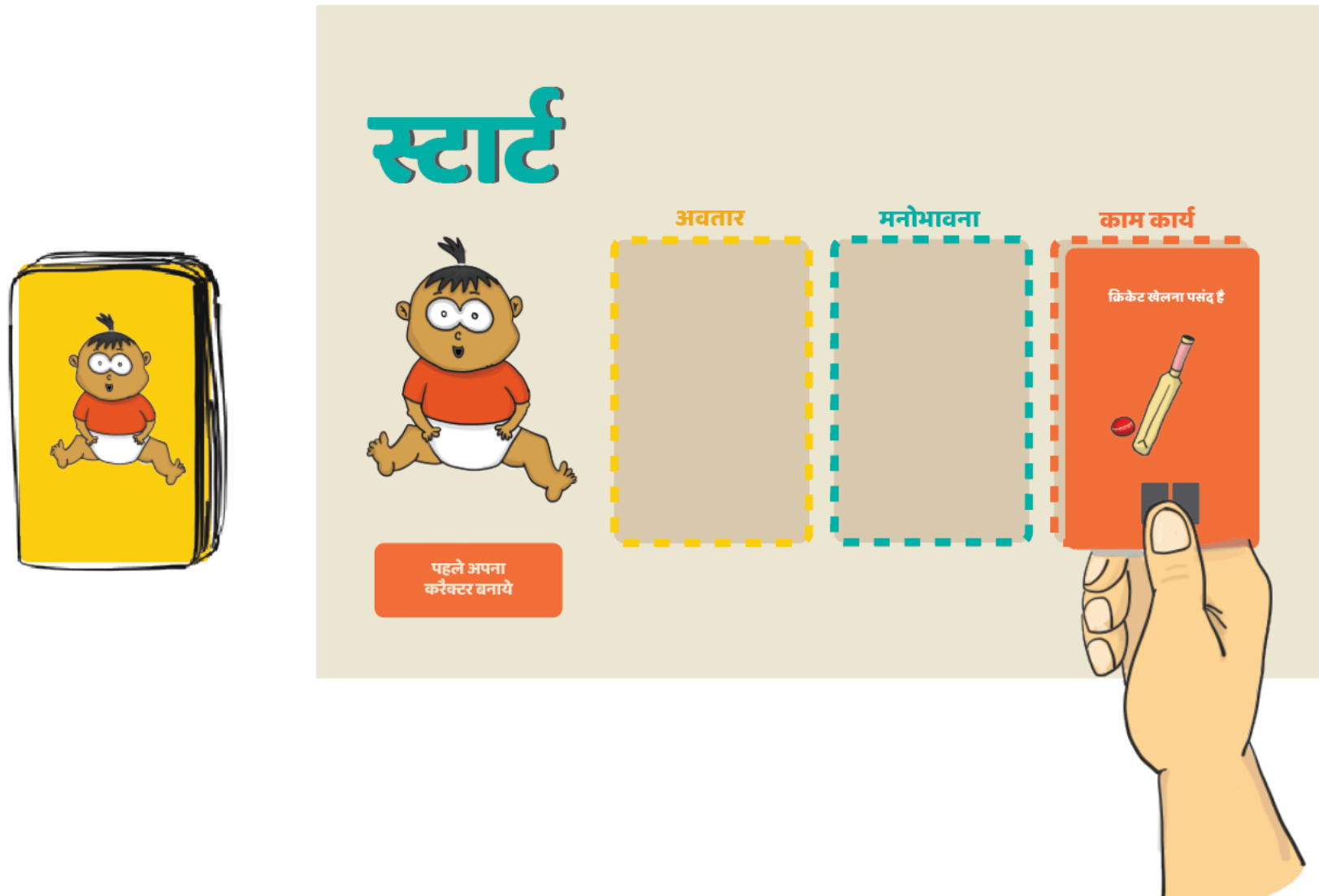
At a given time, each player can hold 4 cards in their hand



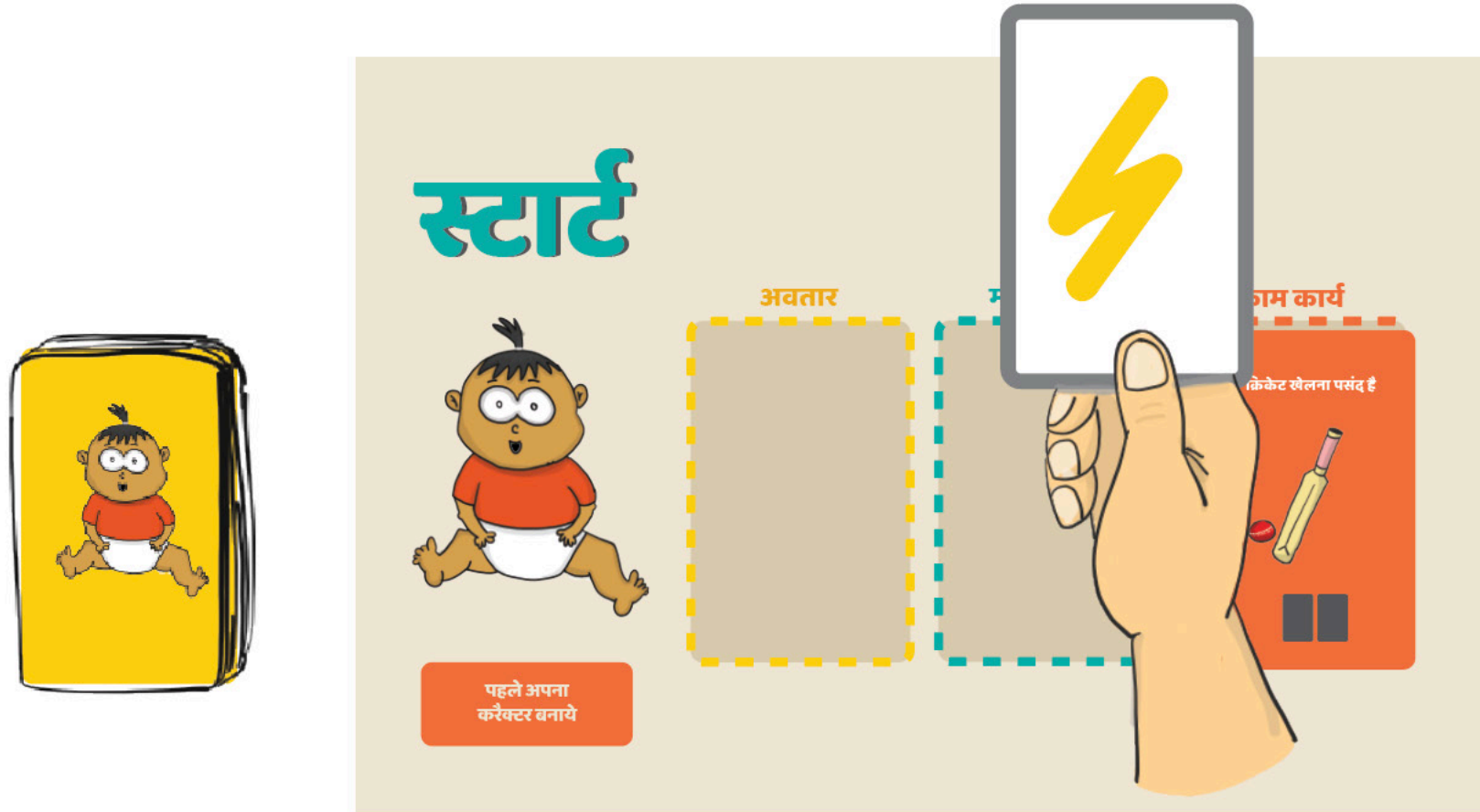
The first player to complete a deck of cards in all the categories wins the game. The total number of cards required to complete a deck is shown on the cards.



During each player's turn, they can perform 2 actions, which include
1. Either placing or picking a card from the board



2. Or playing an action card



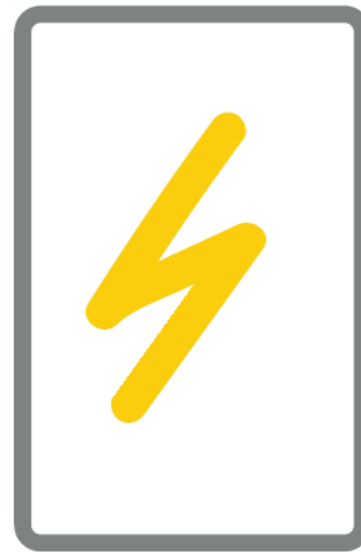
There are three types of action cards in the game



Wild card



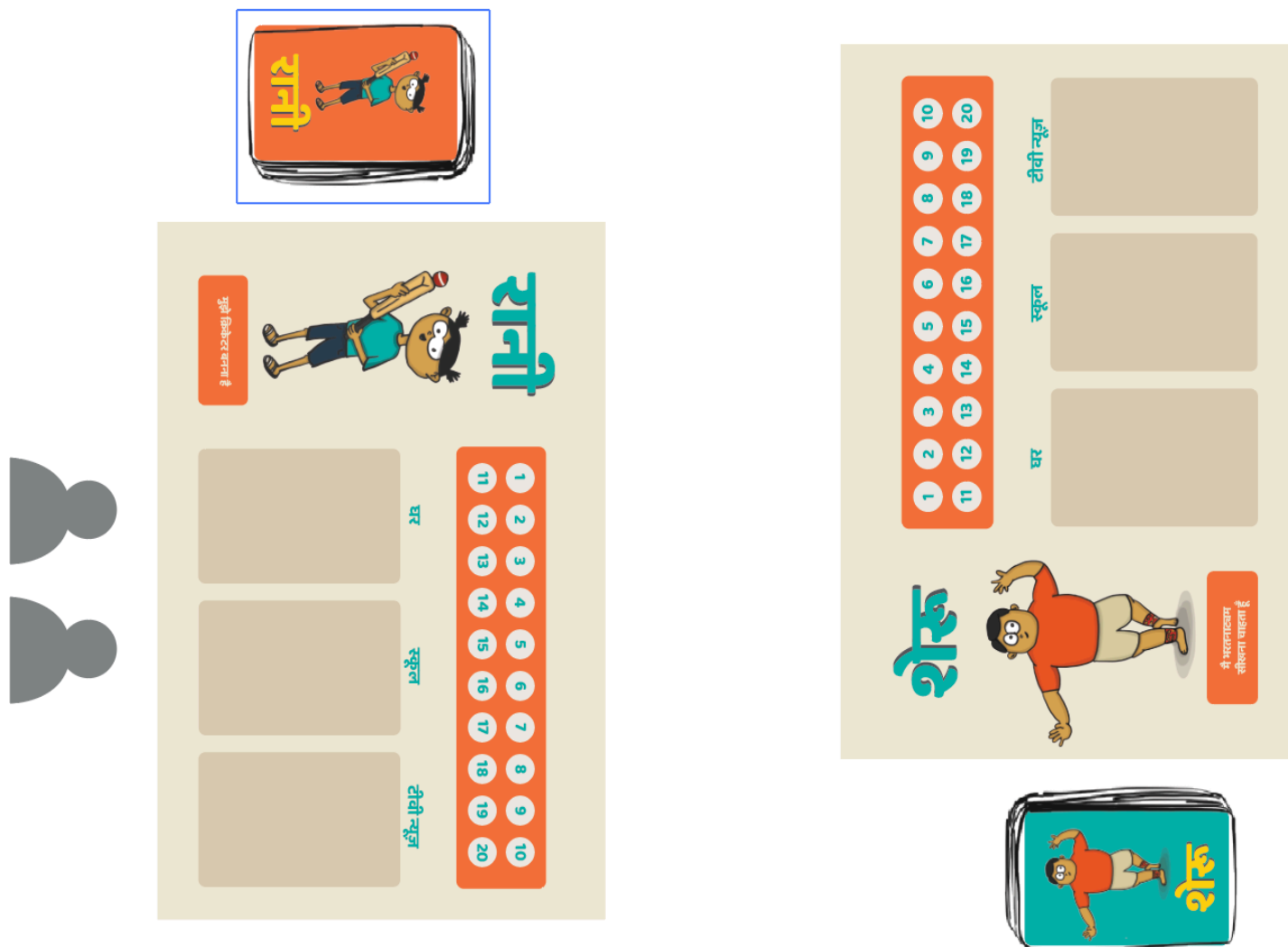
Exchange cards with the
opponenet player



Steal any one of the
opponent players deck

7.3.2. Second Game

Players play in teams of two, to set up the game, each player is given their own character board, and draw pile or story deck



Any three types of challenge cards are kept in their category section on the board



रानी



मुझे क्रिकेटर बनना है

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

घर

घर



यह लो डॉल्स के साथ खेलो

स्कूल

स्कूल



लड़कियाँ क्रिकेट नहीं खेलती

टीवी न्यूज़

टीवी न्यूज़



मुझे बर्थडे पर सबने ब्लू कपड़े गिफ्ट किये

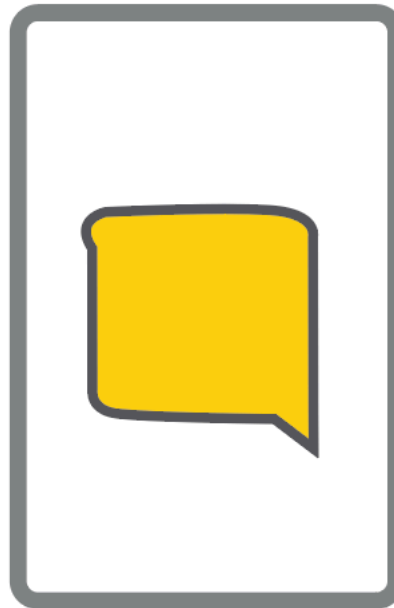
The draw pile contains three types of cards, challenge cards (orange), solve cards (green) and action card. The players have to match the challenge cards with the appropriate solve card



There are three types of action cards in the game



Number cards which contain
+2,-2,+1,-1



Wild speech cards



Lock cards

The first player to either have 3 solve cards in each category or complete 20 points wins the game



रानी



मुझे क्रिकेटर बनना है

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

घर



बैट बॉल के
साथ खेलो

स्कूल



बैट बॉल के
साथ खेलो

टीवी न्यूज़



बैट बॉल के
साथ खेलो

During each player's turn, they draw a card from the deck. The card can either be a solve card which has to be used to solve a challenge card or be kept for later use. Once a player solves a card, they may discard the challenge card. Upon discarding a challenge card, the player earns a point.



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मुझे क्रिकेटर बनना है



घर



बैट बॉल के साथ खेलो

स्कूल

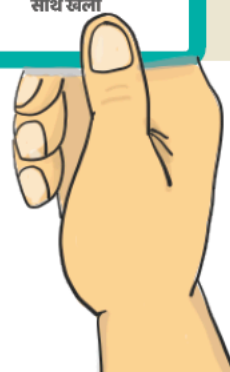


लड़कियाँ क्रिकेट नहीं खेलती

टीवी न्यूज़




मुझे बर्थडे पर सबने ब्लू कपड़े गिफ्ट किये



To use the speech bubble wild card, the player has to speak of an instance which can solve a challenge card




रानी



मुझे क्रिकेटर बनना है


●	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

घर




बैट बॉल के साथ खेलो


स्कूल



लड़कियाँ क्रिकेट नहीं खेलती

टीवी न्यूज़





The players can either use the action cards +2/-2/+1/-1 for their own characters or force another player to get rid of their solve cards or add more cards



रानी



मुझे क्रिकेटर बनना है

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

घर



बैट बॉल के साथ खेलो

स्कूल

स्कूल



लड़कियाँ क्रिकेट नहीं खेलती

टीवी न्यूज़

टीवी न्यूज़



मुझे बर्थडे पर सबने ब्लू कपड़े गिफ्ट किये



Each deck contains one lock which can be strategically used by the player to avoid any card entering or being removed from a category.



रानी



मुझे क्रिकेटर बनना है



घर



स्कूल

स्कूल



लड़कियाँ क्रिकेट
नहीं खेलती

टीवी न्यूज़

टीवी न्यूज़



मुझे बरफ़ें पर सबने
ब्लू कपड़े गिपट किये

8. Ecosystem Design

8.1. Stakeholders and surrounding

The proposed game will be played by children in a school setting under the moderation of a class teacher. The game can be played during free class hours or can be conducted as a 1-day activity

8.2. Procuring the game

A web page will be created for the game which will enlist the game rules, a video showing how the game will be played. The page will enable users to purchase the physical copy of the game or download a DIY pdf of the game. The school can purchase the game through this or download DIY pdf of the same. The teachers and students can collectively take printouts and assemble the game themselves with the downloadable pdf.

8.3. First time play and repeated play

FIRST TIME PLAY			
		REPEATED PLAY	
Procuring the game	Understanding the game	Playing the game	
Teachers	Teachers, facilitators (student leaders, NGO volunteers)	Teachers, facilitators (student leaders, NGO volunteers), students	
<ul style="list-style-type: none"> • Purchase the game (10 games for 1 class of approx 40 students) • Make DIY game from online PDF 	<ul style="list-style-type: none"> • Learn how the game is played using rulebook, online tutorial, volunteer 	<ul style="list-style-type: none"> • Teacher's supervise play session 	<ul style="list-style-type: none"> • Facilitators conduct the play session in groups (for ex; 1 facilitator for a group of 10)

Figure 23. Journey for first time and repeated play

9. Evaluation Plan

9.1. Expert Evaluation

Three expert evaluations will be conducted for the game; game design expert evaluation, content expert evaluation and stakeholder analysis. For all the said evaluations, the following method will be used:

Method:

- Present game prototypes (game pieces, rule book, supplementary content) to the experts
- Explain how the game is played
- Describe the game ecosystem.
- Post this the experts will be asked to rate the game on specific parameters based on Likert scale.

9.2. User Evaluation

Play testing sessions were conducted with children on the parameters of learning, engagement and fun and usability. A detailed description of the evaluation is given below

Number of Participants: 8; 2 groups of 4 children

Time:

- Day 1 - Pilot Testing
- Day 2, 1.5 hours — 1 play session with first group
- Day 3, 1.5 hours — 1 play session with second group

Method:

- Explain game context and rules
- Demo play
- Play session
- Video record play session
- Fill analysis sheet
- Individual survey with participants

9.2.1. Learning

In order to evaluate learning, qualitative analysis will be conducted during play session. The play session will be video recorded. Post this, participant discussions and observations will be transcribed and encoded. The questions asked will be — What was the game about, what did they take away from it, whether they draw relations with themselves or their surroundings and if they learn something they didn't know before

9.2.2. Usability

For measuring usability, observations were made during the play session on whether they used all the game features, if the game rules were easy to understand. Any doubts asked, confusion, mistakes which deals with the

design of the game contents or game rules were noted down.

9.2.3. Engagement and Fun

For measuring fun and engagement, player observations of laughter and discussion were noted. Apart from this we used the again-again table. We also asked the participants to rate game features with a smileyometer.

Figure 24. Data recording sheet

10. Results and Discussion

10.1. Expert Evaluation

10.1.1. Game Design Expert

Feedback recieved:

The feedback recieved from the game design expert included increasing the complexity of the game and player interactions. It was also suggested to make a digital equivalent of the game

Changes made:

Post the game design expert feedback, changes in the game mechanics were incorporated which include: using speech cards to solve opponent's challenges, using lock and key cards, getting approval for solution by the opponent team to increase player interactions. Penalty and rewards in the game were also added.

10.1.2. Stakeholder Analysis

For the stakeholder analysis primary BMC school teacher was spoken to, the feedback received from her are as follows:

Content:

The teacher was noted saying that since the game based on 'instances in their routine life, they will understand things that happen in their surroundings

and compare them. The examples provided in the game, about existing personalities in the field, will also interest them to learn more.

Fitting in the curriculum:

She said that the game can be made a part of the 'Beti Padhao, Beti badhao' scheme. It can be used to teach other content as well . She proposed her own idea saying that students can also create their own characters and build onto the game

Appropriateness:

The teacher said the game was appropriate for 5th std onwards, as they will be able to read well too

10.2. User Evaluation

The results of the playtesting session are discussed below:

10.2.1. Usability

Game Design:

Overall they were able to understand and follow the game rules. Some players (2) were confusing the challenge and solve cards with each other. Children were also observed tampering with the scoreboards as it was kept on their board. Points for speech cards was hard to remember

Content:

They could logically deduce which cards go together. They had some difficulty reading some words. For ex; Dolls, Bharatnatyam, Padma. Some cards were too verbose, which also made them difficult to read.

10.2.2. Engagement and Fun

Showed interest and enjoyed:

All the players wanted to play the game again. Voluntarily made a list of those who wanted copies of the game.

Overall children rated game features well:

Matching the cards rated highest. It was also observed most fun while getting bonus points, using speech cards

The game generated healthy peer interactions:

Players were being co-operative amongst themselves in their teams. Older players were also involving younger players. Because both had to approve each other's cards, they had made a settlement with each other to be fair during play

Features that can be improved:

Getting challenge cards rated low amongst other mechanics. Locking another person's card set was hindering them from playing ahead. Hence this mechanic was later modified.

Age	School	Group	Gender	Matching cards	Rewards	Action cards	Speech cards	Penalty	Lock and key	Getting challenges	Want to play again
10	Campus	1	M	5	5	4	5	4	5	5	Yes
10	KVIT	1	M	4	5	5	4	5	4	3	Yes
9	Campus	1	F	5	4	5	5	5	5	5	Yes
8-9	Campus	1	F	5	4	4	4	5	5	5	Yes
12	KVIT	2	F	4	4	4	5	5	4	5	Yes
12	Campus	2	F	5	5	5	4	3	3	2	Yes
11	KVIT	2	F	5	5	5	5	3	4	2	Yes
9	KVIT	2	M	5	5	5	4	5	4	5	Yes
				38	37	37	36	35	34	32	

Figure 25. Rating of the game mechanics with 5 being the highest and 1 being the lowest

10.2.3. Learning

Overall, the participants seemed to understand the primary message of the game, when asked what game was about or their learning from it.

Participation in discussions:

Discussions were evident while approving solutions or using speech bubble cards. While using the speech cards, they were noted making statements such as “Maine serial mai dekha tha ladke Bharatnatyam karte hue”, “Ranveer Singh bhi nachta gaata hai”, “Ladke bhi gaate hain, jaise Tony Kakkar”. Some of these where were they shared their personal views; which sometimes conflicted with others too.

Reflect and relate:

During post game survey, upon asking whether they know similar characters or have been in similar questions, many examples of their family and friends. Most of these were associated with playing cricket. Some of the statements by female participants include them saying, “I like football, my friend told me don’t play it, it’s for boys. Boys don’t let me play carrom with them, they say it’s a boy’s game”, “I used to tease my friend for playing cricket, now I know that they can also play cricket. Now she will laugh back at me”. Some statements by the boys included, “When we ask girls to play cricket with us, they tell us they will become like boys if they play with us”, “I also wanted to learn classical dance”

Others:

2 players also said that the game was a reading exercise for them and that if they would learn how to read better, it will help them in playing games like these.



Figure 26. Play testing session

10. Conclusion

In this project, we aimed to create a serious game design intervention for gender sensitization for children ages 8-10 from lower socioeconomic settings. We conducted thorough secondary research where we identified gaps in existing design interventions for gender sensitization. This was followed by primary research which included expert interviews and playtesting existing educational board games with children. This helped us in curating game content and provided useful insights on contextualizing the game for our users.

Several distinct game design concepts were created based on analogies and inspirations drawn from children's movies and books. Multiple iterations of low fidelity paper prototypes of these game concepts were then playtested with children. These games were evaluated on the parameters of learnability, fun and engagement, and usability. One game idea was chosen and its learning content and game mechanics were further refined. An ecosystem design of when, how, where and by whom will the games be played has also been discussed in the report. High fidelity prototypes of the game have

References

1. "Gender sensitization - Wikipedia." https://en.wikipedia.org/wiki/Gender_sensitization. Accessed 12 Mar. 2019.
2. "Gendered toys could deter girls from career in engineering, report says." 7 Dec. 2016, <https://www.theguardian.com/lifeandstyle/2016/dec/08/gendered-toys-deter-girls-from-career-engineering-technology>. Accessed 12 Mar. 2019.
3. "Global Gender Gap Report 2014 - Reports - World Economic Forum." 25 Oct. 2014, <http://reports.weforum.org/global-gender-gap-report-2014/>. Accessed 12 Mar. 2019.
4. "A woman-shaped gap in the Indian workforce - The Hindu." 9 Jan. 2013, <https://www.thehindu.com/opinion/op-ed/a-womanshaped-gap-in-the-indian-workforce/article4287620.ece>. Accessed 12 Mar. 2019.
5. "Dowry Deaths Make Significant Share Of Female Killings In India: Report." 27 Nov. 2018, <https://www.ndtv.com/india-news/dowry-deaths-make-significant-share-of-female-killings-in-india-report-1954056>. Accessed 12 Mar. 2019.
6. "International Center for Research on Women helps create classes for" 25 Sep. 2015, <https://www.pri.org/stories/2015-09-25/confronting-gender-disparity-start-chores-these-indian-teens-say>. Accessed 12 Mar. 2019.
7. "Court: Kids must be taught gender equality in school - DNA India." 6 May. 2017, <https://www.dnaindia.com/delhi/report-court-kids-must-be-taught-gender-equality-in-school-2429155>. Accessed 12 Mar. 2019.
8. "What is gender socialization and why does it matter? - Evidence for" 18 Aug. 2017, <https://blogs.unicef.org/evidence-for-action/what-is-gender-socialization-and-why-does-it-matter/>. Accessed 12 Mar. 2019.
9. "Democratic Values and Democratic Approach in Teaching: A" <http://pubs.sciepub.com/education/2/12A/6/index.html>. Accessed 12 Mar. 2019.
10. "Journal of Educational Psychology A Meta-Analysis of the Cognitive" 4 Feb. 2013, http://ocw.metu.edu.tr/pluginfile.php/11786/mod_resource/content/1/A%20Meta-Analysis%20of%20the%20Cognitive%20and%20Motivational%20Effects%20of%20Serious%20Games.pdf. Accessed 12 Mar. 2019.
11. Emmerich K, Masuch M. The Impact of Game Patterns on Player Experience and Social Interaction in Co-Located Multiplayer Games. In *Proceedings of the Annual Symposium on Computer-Human Interaction in Play* 2017 Oct 15 (pp. 411-422). ACM.
12. Salen K, Tekinbağ KS, Zimmerman E. Rules of play: Game design fundamentals. MIT press; 2004.
13. Zagal JP, Mateas M. Temporal Frames: A Unifying Framework for the Analysis of Game Temporality. In *DiGRA Conference* 2007 Sep.
14. Bromley S, Mirza-Babaei P, McAllister G, Napier J. Playing to win? Measuring the Correlation Between Biometric Responses and Social Interaction in Co-Located Social Gaming. *Routledge studies in European communication research and education*. 2014;3:172-82.
15. Seif El-Nasr M, Aghabeigi B, Milam D, Erfani M, Lameman B, Maygoli H, Mah S. Understanding and evaluating cooperative games. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* 2010 Apr 10 (pp. 253-262). ACM.
16. De Kort YA, Ijsselstein WA. People, places, and play: player experience in a socio-spatial context. *Computers in Entertainment (CIE)*. 2008 Jul 1;6(2):18.
17. Reuter C, Wendel V, Göbel S, Steinmetz R. Game Design Patterns for Collaborative Player Interactions. In *DiGRA* 2014 Aug.