Virsa: Engaging Children with Pakistani Culture through Interactive Play

National University of Science & Technology

School of Art Design & Architecture

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National University of Science & Technology

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Approved by the Guidance Committee

Advisor: Shahzaib Rao

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Virsa: Engaging Children with Pakistani Culture through Interactive Play

A Research Report

Zennab Shujah

A research report submitted for evaluation to the School of Art, Design and Architecture on 4th June 2024, in partial fulfillment of the requirement for the degree of B.ID.

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Abstract

This paper presents an overview of the research and design process conducted in the designing of *'Virsa'*, a tabletop game that aims to educate Pakistani children about the material cultural heritage of their country. The paper aims to cover the aspects of primary and secondary research, as well as ideation and prototyping of the game. It focuses on two main concepts, one that focuses on the material culture of Pakistan, and the other that aims to understand children's behavior towards educational material, child-centric design, and play-based education. It establishes the position of 'Virsa' being a successful medium to educate and expose young Pakistanis to their indigenous material culture.

Keywords: *Material culture, indigenous, child-centric design, play-based education*

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1. Introduction

Pakistan's cultural landscape is diverse and rich, with a unique blend of ethnic, linguistic, and religious traditions. With a population of over 220 million, the country encompasses a diverse range of ethnicities, resulting in a rich tapestry of cultural practices and artifacts that coexist throughout its vast territory.

Culture is primarily categorized as either material or non-material. Non-material culture includes the more abstract, intangible aspects of heritage, including values, history, language, and customs. Material culture refers to the physical objects and artifacts that a society acquires, produces, and uses (material culture, Oxford Dictionary). It consists of the tangible aspects of culture, including food, monuments, garments, tools, arts and crafts. 'Virsa' focuses on the material culture of Pakistan.

2. Secondary Research

2.1 Significance of Cultural Connection

Staying connected to one's native culture is of great significance on an individual level. It provides a sense of belonging, identity, and pride in one's heritage. It also helps to preserve the cultural heritage and traditions that have been passed down through generations. Research has shown that possessing a strong cultural identity can promote resilience, and enhance self-esteem (Ontario Ministry of Tourism, Culture and Sport, 2016). It can also provide a sense of purpose, social support, and self-worth (Altugan, 2015). Therefore, it is essential to stay connected to one's native culture to maintain a healthy psychological outlook.

Material culture is an essential aspect of cultural connection as it provides a tangible link to the past, present, and future. Material culture helps individuals to understand the social, economic, and political context of their society and how it has evolved over time. It also reflects the values,

beliefs, and aspirations of a community, which are essential for cultural identity and preservation. By understanding material culture, we can gain insights into the human experience, creativity, and innovation, which are crucial for personal and societal growth and development (Robb, Goldhill, Rublack, Thomas, 2017).

For young people, material cultural heritage serves as a source of inspiration, identity, and connection to their roots. It provides a lens through which they can appreciate their traditions, arts, and beliefs. By understanding and embracing their material cultural heritage, young individuals gain a broader perspective on the world and develop a sense of belonging, fostering a strong sense of cultural pride and resilience in an increasingly globalized society. It empowers them to navigate the complexities of today's world while nurturing a deep appreciation for diversity and inclusion (Altugan, 2015).

2.2 Effects of Cultural Disconnect

Cultural disconnect manifests in various factors that are detrimental at an individualistic level. Studies show that individuals who lack connection to their native roots lack self-esteem and self confidence, and also show reduced creativity and ability to innovate (Altugan, 2015). Moreover, such individuals have also shown a troubled sense of self-identity. Being disconnected from their roots also causes an endangered sense of community and belonging (Pahl, 2015).

This disconnect also manifests adverse effects at a grander scale. As individuals become increasingly disconnected to indigenous material culture across generations, this poses a decline in the demand for cultural products. This may occur at such a scale, that whole crafts have gone extinct in some parts of the world, while others remain endangered. As these tangible gateways to a nation’s essence disappear, it causes the greater cultural erosion of these nations, and

threatens its global identity (Heslop, 2017). Additionally, this may also impact the economy of a country, since locally crafted products would be removed from the economic scene.

2.3 Target Audience

The target audience for this game comprises of Pakistani children, from seven to twelve years of age. This age group has been established on the basis of Piaget's Theory of Cognitive Development, which proves that children at this age are the ideal demographic to introduce material concepts to. It further proves that this particular age demographic, also termed 'middle childhood', is when children tend to absorb and retain information best, and any concepts that are introduced at this age have a tendency to become permanent (Rabindran, 2020). Furthermore, this is also termed as the 'Concrete Operational Stage', that is, the stage where children mentally operate on concrete, objects and events. At this stage, children have begun to actively employ tactics such as logical reasoning, decision-making, and problem solving. (Thompson, 2019). This, combined with their newly developed ability to understand and apply the concepts of reversibility, seriation, conservation and classification, makes them particularly well-suited to play-based learning.

2.4 Play-based Learning

Play-based learning (PBL) is a child-centered approach that focuses on children's academic, social, and emotional development, and their interests and abilities through engaging and developmentally appropriate learning experiences. PBL unifies play and education, and is an effective way to integrate important academic standards into developmentally appropriate learning experiences for children. PBL shows more effective and deeper learning experiences for students than direct instruction. The essential purpose of PBL is for children to learn while playing. Incorporating PBL in children's lives has been proven to help them develop

problem-solving skills, build vocabulary, and gain background knowledge in many content areas. (Taylor, 2020).

Play holds special significance in a child's life on the following three levels (Lillemyr, 2009):

1. Psychological Significance: Children gain new experiences, learn, and develop through play.
2. Educational Significance: Play is a constant medium of education and exposure for the child.
3. Developmental Significance: Play that encourages physical activity allows children to test and expand their physical limits. Similarly, play also works as a medium to expand children's cognitive and language skills.

Therefore, play is an effective and valid approach to exposing a child to concepts that are desirable for them.

2.5 Child-centric Design

Child-centric design is a holistic approach that places the child's needs, interests, and abilities at the forefront. Research shows that children crave a sense of agency (Dadich, 2019), which would allow them to make decisions and influence outcomes, fostering a sense of ownership and independence.

Moreover, children have also been observed to crave challenge. Any activity or object that does not stimulate their mind, imagination, or physical ability is quickly seen as boring and tedious by them, which also gives rise for the need of child-centric products to be innovative, novel, and dynamic (Feder, 2019).

Collaborative engagement is another key consideration. Children learn effectively through social interaction. Therefore, designs should promote cooperation and shared experiences, encouraging children to work together towards common goals (Gilutz, 2019; Dadich, 2019)

To summarize, child-centric design is a delicate balance of providing agency, embracing the challenge of empathizing with children, and promoting collaborative engagement. It aims to create an environment that is not only functional and safe but also fun and engaging, fostering creativity, curiosity, and a love for learning (Dadich, 2019).

3. Primary Research

3.1 User Surveys

A rudimentary survey was conducted to assess the feasibility of the project concept and the trends amongst the target user group with respect to culture and behavior. A sample size of 53 participants of various demographics were targeted to obtain a wider range of feedback.

Questions in the survey were aimed at the parents and other caregivers of children between the ages of 7 and 12, and were set to gauge the current level of cultural knowledge the target user group possesses, as well as to assess their behavioral trends.

Results of the survey showed that a majority of caregivers believed that their children were undereducated as regards to their indigenous material culture, and that they responded better to play-based mediums of education. The full results of the survey are detailed in Figure 1.

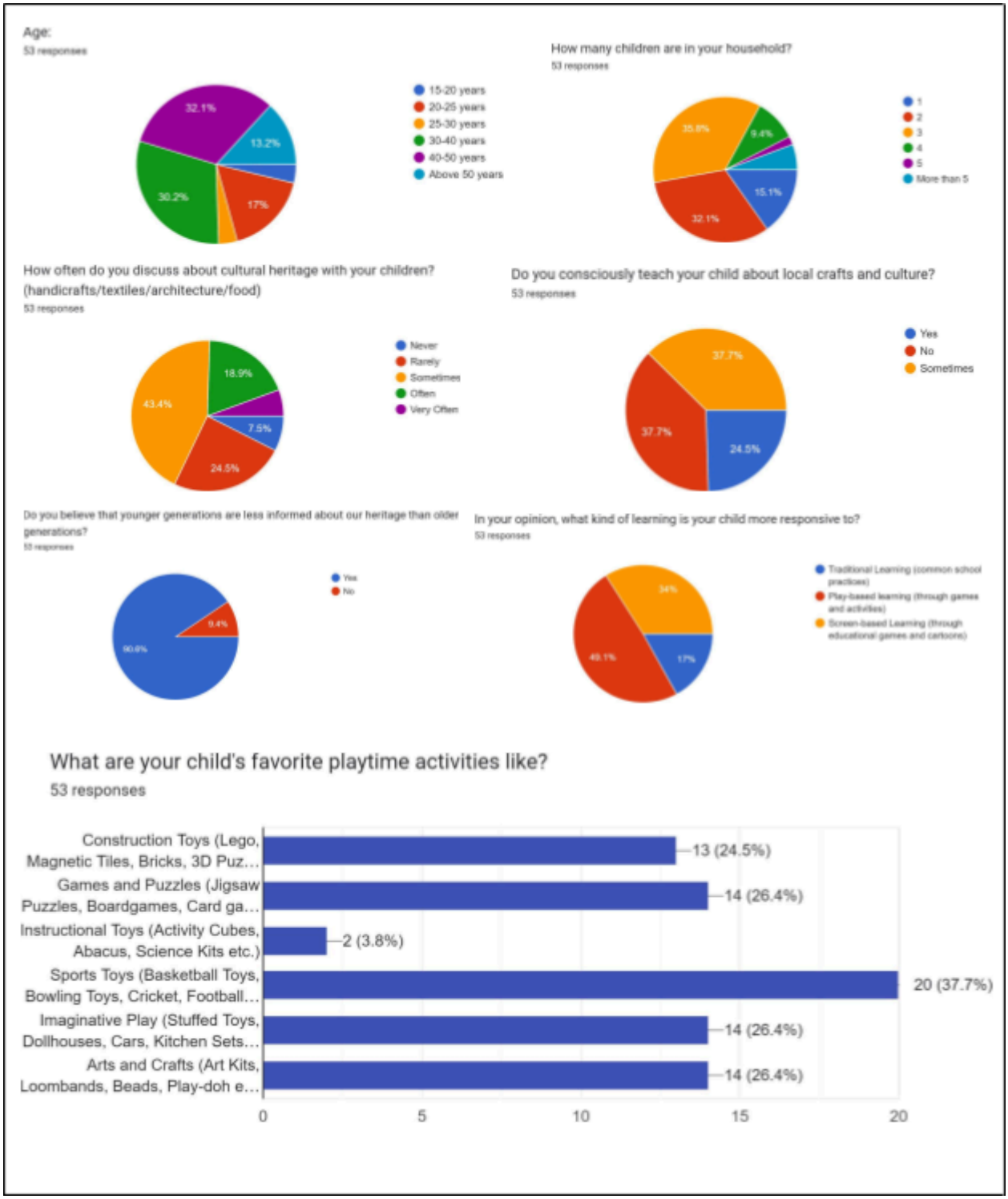


Figure 1: Results of the User Survey

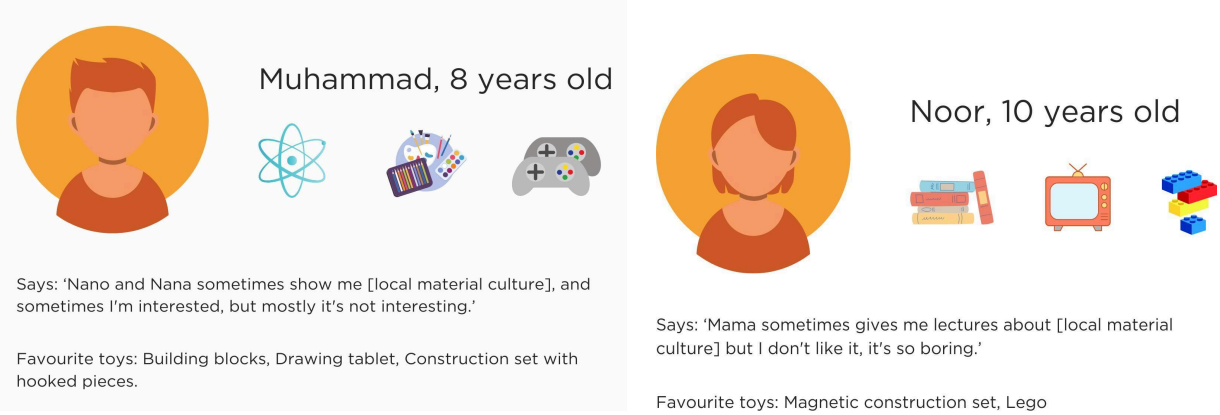
3.2 Field Study and Interviews

An observational field study and interviews were conducted with a sample size of 18 children. The study included a short quiz, where children were asked to identify and explain a selected group of cultural artifacts from Pakistan. 83% of these children scored 50% or less on this quiz. The less scored less than 65%. The study also included a survey of the children's toys, games, habits, and behavior. Some observations are as follows:

1. Any cultural knowledge taught in schools is through lengthy chapters in textbooks, which children perceive as dry and boring.
2. The screen media children are consuming is based solely on foreign cultures.
3. Any discussions that caregivers try to have with children about our indigenous culture are perceived as boring.
4. There is a notable lack of books, games, documentaries, or shows that are good-quality or child-centric about this subject.
5. Most children are intimidated by excessive use of Urdu in books and games.
6. The average user is more competitive than collaborative.
7. They appreciate challenge, but are intimidated by difficulty.
8. They enjoy and are interested in games that allow them to strategize.
9. They have short attention spans, and so demand more novelty from their experiences.

3.3 User Personas

The following user personas were generated based on the aforementioned research:



4. Related Works

4.1 Gridopolis

The dominant points of interest in this children's game is the dual aspect play of this design, which allows children to utilize both the concepts of construction and strategy simultaneously. The first aspect of the game is to utilize the modules to build the gameboard, and the second is to play the game itself.

Figure 2: Gridopolis

4.2 DropMix

DropMix uses sensors to bridge the tangible and electronic aspects of the game seamlessly and allows competitive and collaborative interaction between players.

Figure 3: DropMix

4.3 Sunday Bazaar

Sunday Bazaar is a card game designed for the Pakistani market. The game has an interesting use of the balance between Urdu and English languages to appeal to the audiences.

Figure 4: Sunday Bazaar

4.4 Ludo

Ludo is by far the most popular board game amongst Pakistani audiences. Its basic novelty lies in strategizing around chance, and in the simplicity of its gameplay.

Figure 5: Ludo

4.5 Beasts of Balance

Beasts of Balance consists of both digital and tangible elements, and uses RFID technology to bridge the gap between the two, and create a more dynamic interaction.

Figure 6: Beasts of Balance

5. Design Criteria and Objectives

5.1 Solution Statement

The solution aims to provide an innovative medium to educate and expose Pakistani children to their indigenous material culture, through semi-structured play, independent, and collaborative engagement.

5.2 Design Objectives

The criteria that the final proposed solution needs to meet are as follows:

1. Exposure to Pakistani Material Culture: The primary goal of the final solution is to educate young minds about the tangible aspects of Pakistani culture.
2. Aid in Information Retention: The design should incorporate elements that aid in the users retaining that exposure.
3. Novelty and Engagement: The solution should be novel enough for the users to want to interact with it intermittently.
4. Challenge and Agency: The game should involve a certain level of challenge, in order to create novelty, and should allow them to strategize at their own discretion.
5. Collaborative Engagement: The game should allow the users to create an environment where they can learn collaboratively.

6. Design Development

The initial ideation process started by exploring various options for the solution, some are portrayed as follows:

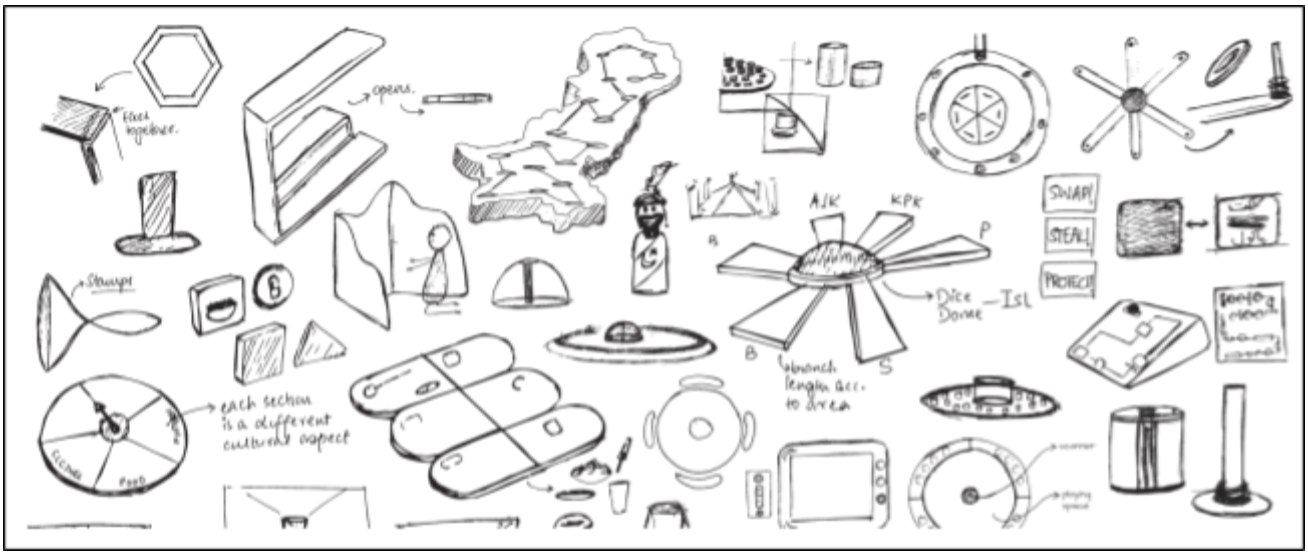


Figure 7: Design Development, Part 1

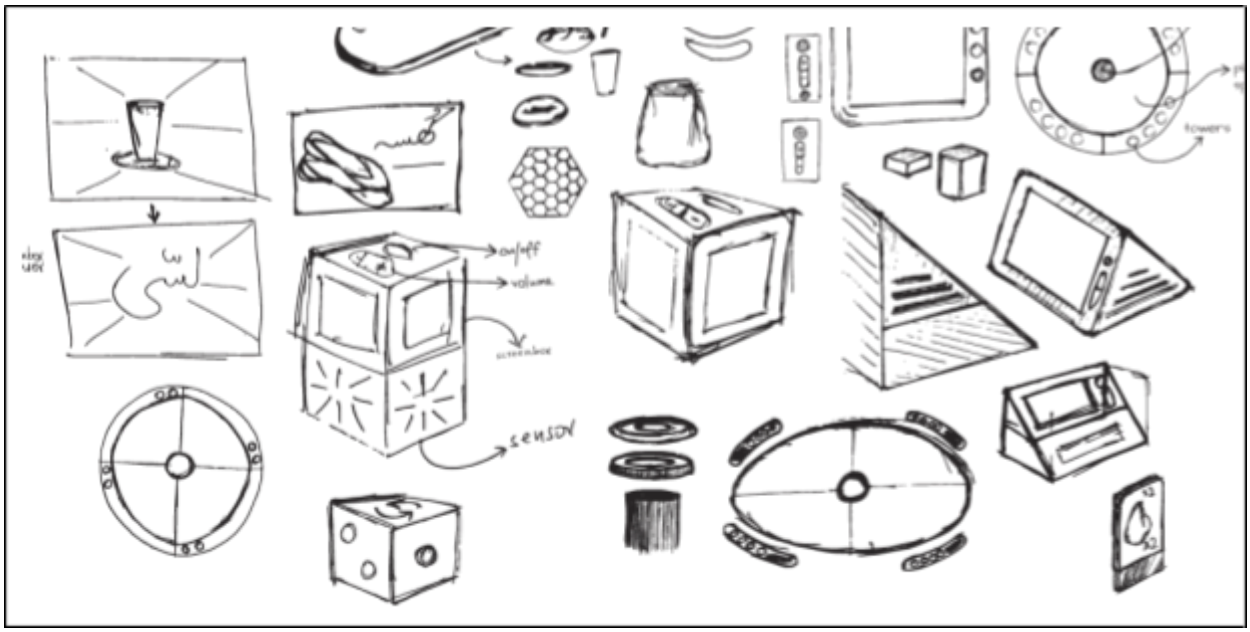


Figure 8: Design Development, Part 2

These options were narrowed down to the most effective and feasible solutions.

7. User Testing

7.1 Usability Goals

1. Educational Value: The game should expose the users to Pakistani material culture effectively.
2. Engagement: The game should be engaging enough for the user to return to it.
3. Agency: The game should present the element of agency to the users.
4. Game Mechanics: The game mechanics need to be tested and their effectiveness needs to be verified.

7.2 Testing Methodologies

1. Rapid Playtesting: A quick form of playtesting where the participants would test certain parts/aspects of the game only, rather than playing the whole game in its entirety. This would enable early identification of issues and adjustments, and provide efficient and immediate feedback.
2. Guided Playtesting: Observing the participants as they play the game, while giving them instructions on how to play/what to do. The participants would be provided explanations, clarifications and prompts during gameplay. This would help uncover areas where participants struggle, and allow real-time adjustments and insights into user behavior.
3. Independent Playtesting: Allowing the participants to play the game after giving them a quick rundown of the rules and objective. Not interfering during the play enables the observation of authentic user behavior.

7.3 Recruitment Criteria

The target user group is children between the ages of 7 to 12 years of age. This demographic was recruited for guided and independent playtesting. Rapid playtesting majorly included, but was not limited to, this target demographic.

7.4 Testing Environment

The testing was carried out in environments where such a product would normally be used, ie. in children’s bedrooms and living rooms.

7.5 Implementation

1. The first round of usability testing took place with the prototype of version 1 of the game. The participants tested the game through both guided playtesting as well as independent playtesting.

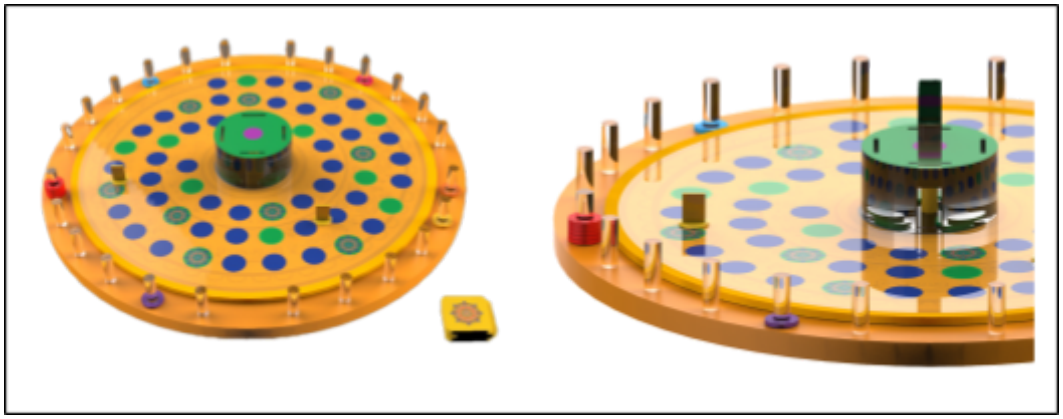


Figure 9: Version 1

2. The second round of testing took place in many smaller sessions. The users participated in rapid, guided, and independent playtesting. These sessions took place using low fidelity prototypes of the second version of the game.

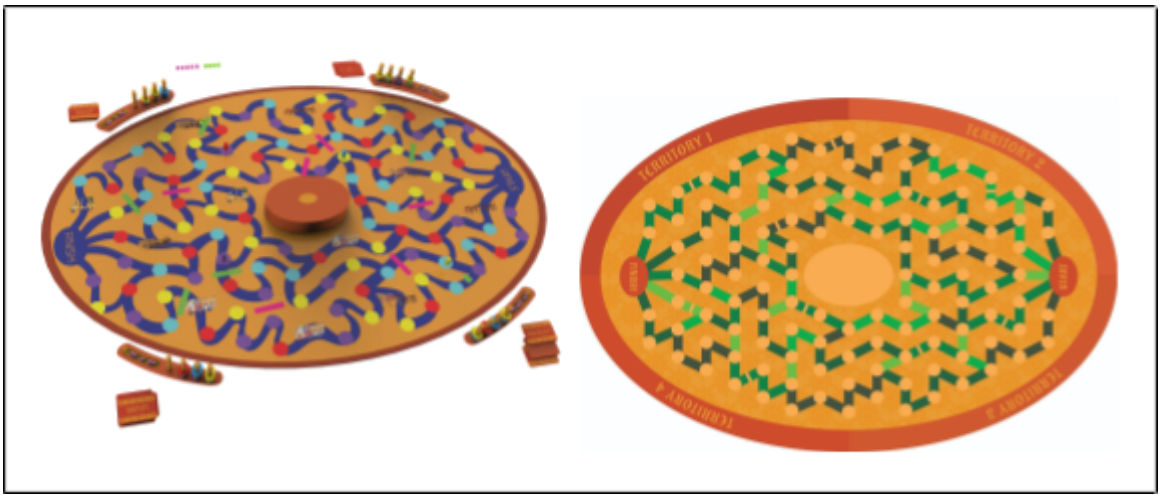


Figure 10: Version 2

7.6 Insights

Version 1.

1. Limited Engagement: The participants were not very engaged in the game, and were not very enthusiastic about playing it again.
2. Not enough challenge: The participants seemed to find the game mechanics too easy, which contributed to the low engagement.
3. Too dependent on chance: the mechanics of the game did not provide the players enough agency. They did not have enough opportunity to strategize or form their own method of playing to win, since most of the movements within the game were dependent on chance.
4. Resorting to guessing: This version required the players to collect tokens and sort them according to their category. This strategy was not successful as the players simply resorted to guessing if they did not know the answers, which hindered the purpose of the game.
5. Color/image association: It was observed that instead of associating the provided cultural artifacts with reality, the participants simply started building an association with color, or with the particular graphics that represented the artifacts in the game.
6. Limited Knowledge Base: The game had a set number of artifact tokens, that were not enough to build lasting interest for the players. After playing the game once or twice, the players would memorize the tokens and they would lose interest in playing.

Version 2.

1. Game Layout: The layout and graphics of the second version had to be tested and reiterated three times, according to user feedback. The earlier layouts were either too confusing, or did not provide players with proper navigation and a sense of direction.
2. Rock Salt Tokens: The incorporation of rock salt tokens as an added currency was done due to user feedback. The game was tested both with and without rock salt tokens on low-fidelity prototypes, and user feedback provided assurance that engagement increased with the introduction of these tokens.
3. Incorporation of Territories: User feedback indicated that the game should incorporate an added level of challenge, since some participants preferred to add some extra challenge to the play after a few rounds. Therefore, the idea of territories was added, as an optional layer of complexity.

7.7 Refining the Solution

1. Increased Engagement: The refined solution is much more engaging. Players were more enthusiastic about playing it again due to the refined game mechanics and complexity. The addition of the game premise and characters also added extensive engagement value.
2. Increased Challenge: The refined version includes many more layers of challenge and complexity, which involves strategic thinking on the users' part, and thus provides a greater opportunity for learning. This increased challenge is provided in terms of rock salt, action cards, territories, and multiple routes in the layout.
3. Increased Player Agency: The refined version of the game is much less dependent on chance, and allows the players to form winning strategies on their own, while managing their winning points.
4. Expanded Knowledge Base: The knowledge base in the refined version has been shifted to digital form rather than tangible form. This has allowed the random shuffling of artifacts, as well as a wider collection of artifacts to be efficiently represented.

8. Final Proposed Solution

8.1 Components

The final solution consists of the following components;

1. Playing Board: The flat, foldable board where most of the gameplay occurs.

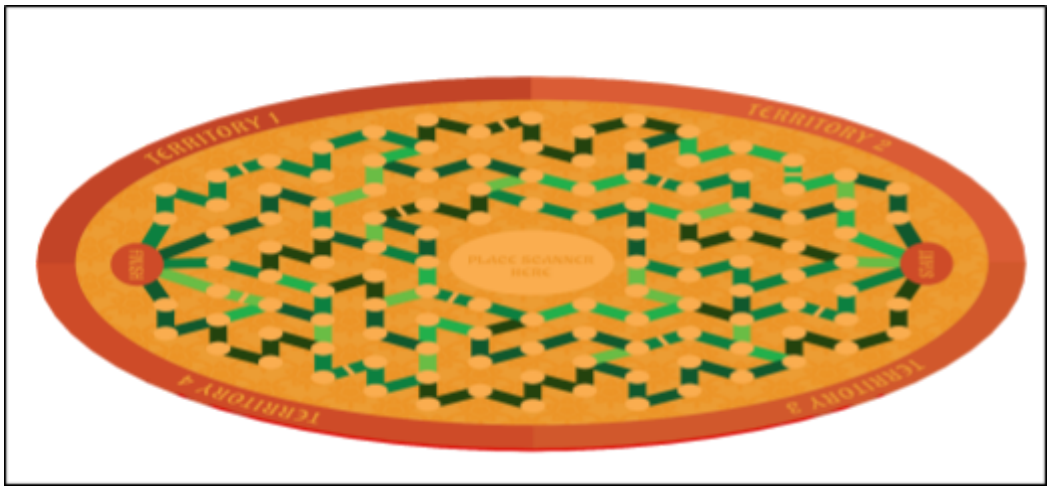


Figure 11: Playing Board

2. Scanner: The component that scans rings through RFID technology.

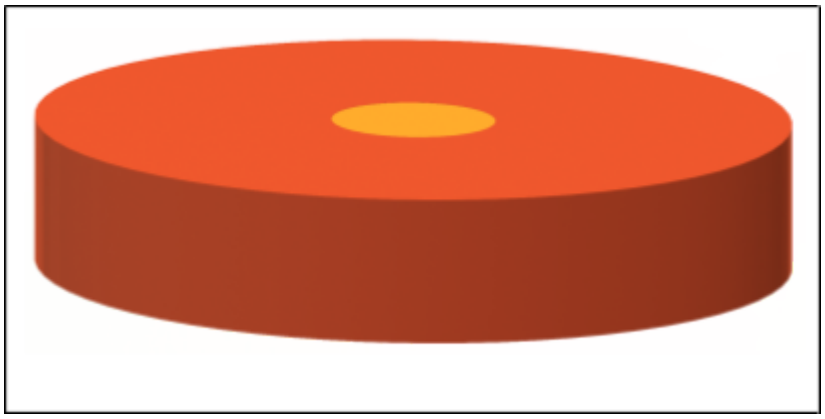


Figure 12: Scanner

3. Screen: The component that reveals what artifact is inside each token, and showcases information about each artifact.

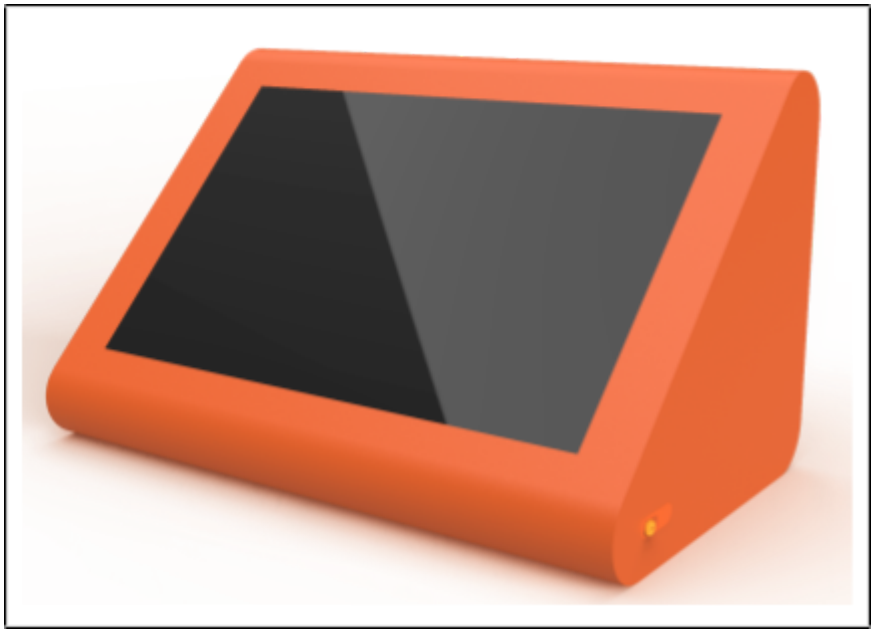


Figure 13: Screen

4. Ring Towers: The components where each player stacks their rings and keeps their rock salt tokens.

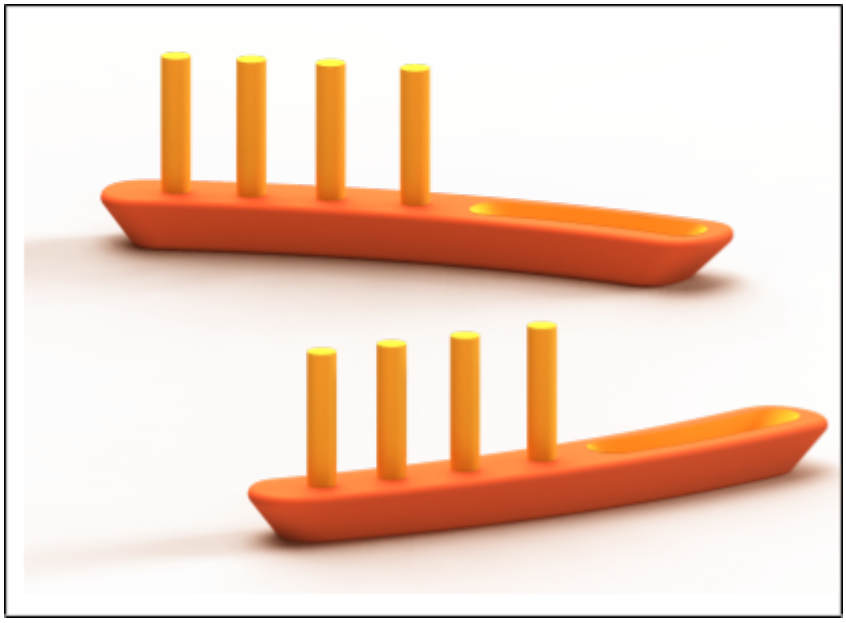


Figure 14: Ring Towers

5. Ring Steps: Four different colors of steps that are placed on the board as the game commences, and allow players to collect rings of their corresponding color.

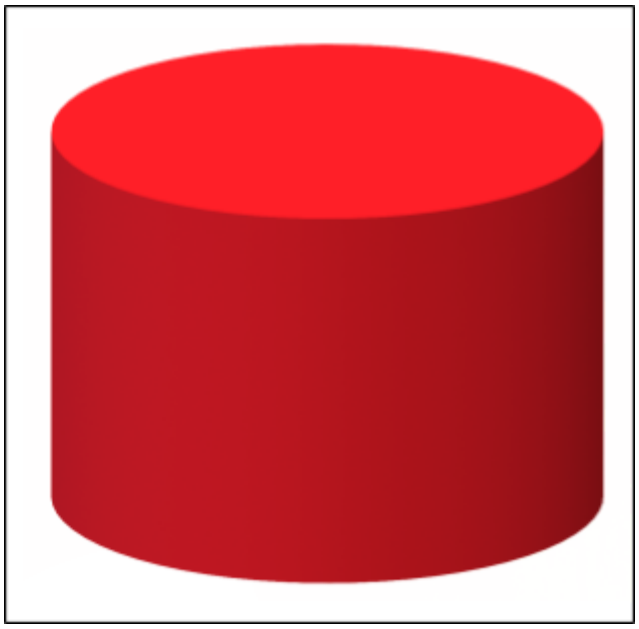


Figure 15: Ring Step

6. Transport Steps: Steps which signify various modes of traditional transportation, and transport the players to various points across the board.

Figure 16: Transport Step

7. Pink Steps: Steps which signify what amount of rock salt tokens should be given or taken in order to proceed with the game.

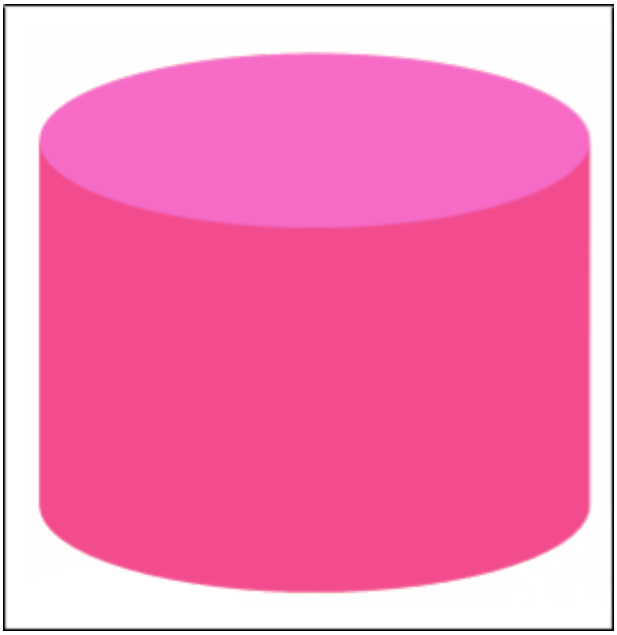


Figure 17: Pink Step

8. Rock Salt Tokens: Small tokens shaped like rock salt mineral, which are given and taken throughout the game to pass certain checkpoints.

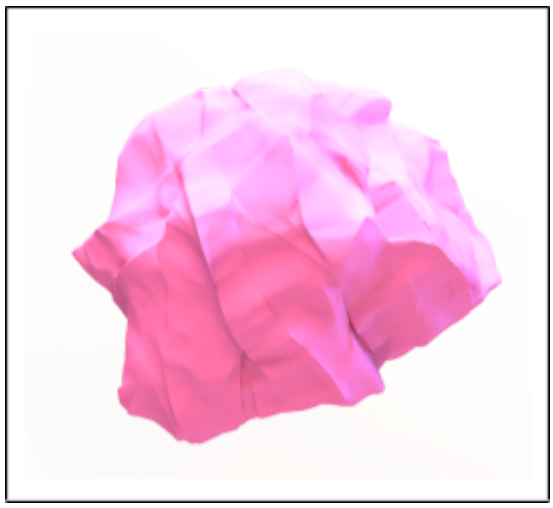


Figure 18: Rock Salt

9. Ring Tokens: Ring tokens categorized as four different colors, which are collected throughout the game to earn points and reveal artifacts.

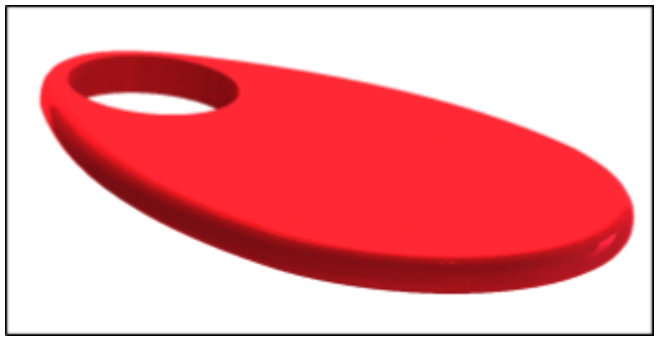


Figure 19: Ring Token

10. Character Cards: Cards that mention each player's character, along with their affinities.

Figure 20: Character Cards

11. Action Cards: Cards that allow the players to perform one of three actions on their turns: swap, steal, or protect.

Figure 21: Action Cards

12. Playing Tokens: The tokens that each player uses to move around the board.

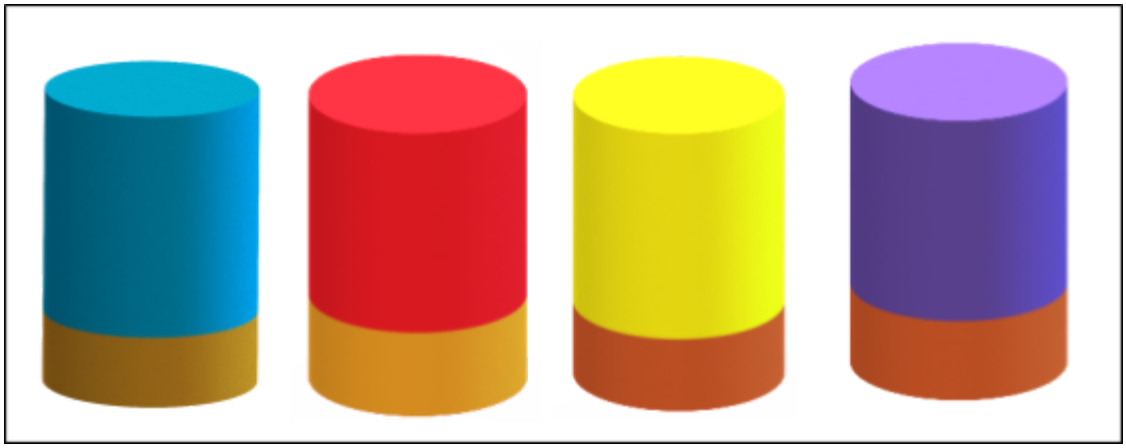


Figure 22: Playing Tokens

8.2 Layout

The layout of the game was finalized after multiple iterations and user testing. The final layout consists of an elliptical base, with a starting point on one end and an ending point on the other end. The players have to move from the start point to the end. The layout has marked spaces for the steps to be placed on it in random variations, and the paths are differently coloured in order to make it easier for players to navigate through them. The layout has also been divided into four territories to add another layer of challenge to the game. Moreover, there is a designated space for the scanner in the middle of the board.

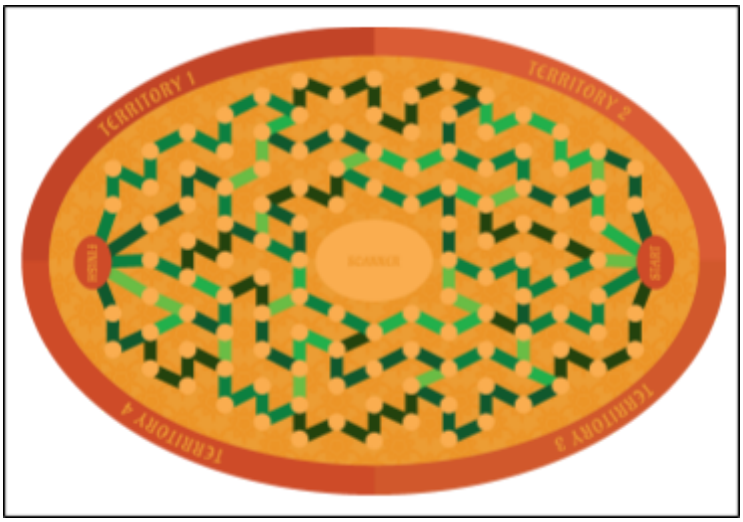


Figure 23: Playing Board Layout

8.3 Game Mechanics

The game employs the following major mechanics:

1. Set Collection: The players have to collect certain rings and tokens to win.
2. Victory Points: The rings and tokens are all worth points, and the player with the total number of highest points wins.
3. Race to the Finish: Whoever reaches the finish point first earns extra points, however, that does not guarantee his win.

8.4 Gameplay

The game is played through the following steps:

1. Set up the board.
2. Choose your characters.
3. Roll the dice.
4. Strategize your path and move your playing token according to the number on the dice.
5. If you land on a ring step, collect a ring of the corresponding color.
6. Scan the ring.
7. Witness the artifact revealed on the screen and learn about that artifact.
8. Stack your ring on the tower.
9. If you land on a pink step, give or take the number of rock salt tokens mentioned on it.
10. If you land on a transport step, move to the corresponding step on the board.

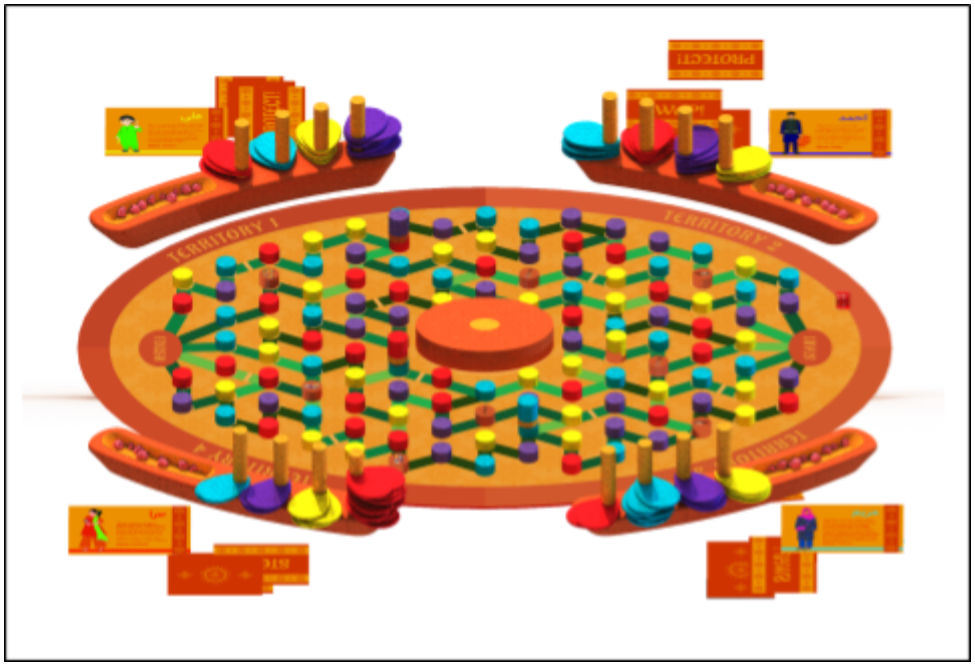


Figure 24: Perspective View of 'Virsa'

8.5 Point Values

The point values for the game are as follows:

1. Each Ring = 1 point
2. Affinity Point = +1 point
3. Rock Salt Token = 2 points
4. Ending the Game = 4 points

8.6 Technology

The game employs Radio Frequency Identification (RFID) technology, which allows the content in the ring tokens to be scanned by the scanner, and trigger a reaction on the screen. The ring tokens are embedded with RFID tags that store scannable information. The scanner component consists of an RFID scanner and an ESP device. The RFID scanner scans the information in the token, and the ESP module sends that information to the screen component. The screen component then reads this information and plays the corresponding graphics on the TFT screen.

9. Manufacturing Process

9.1 Materials

The main material used for all the manufacturing will be ABS (acrylonitrile butadiene styrene), which is durable, impact resistant, and versatile. It can be molded into thick and thin forms of various specifications. The board and the steps both will also incorporate magnetic material.

9.2 Process

All the components of the game, except for the cards, will be injection molded from ABS. The cards, and the layout of the game will be printed on high-quality materials. Lastly, all these components will be assembled and packaged.

10. Prototype

The prototype of the final proposed solution was constructed through a mixture of CNC machining and carving on MDF, as well as 3D printing through PLA.

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