M.Des Project 3

Riveting Ganga:
Unfolding India's Sacred River

Project by:

Shivani Verma
Roll No. 22M2255
IDC School of Design, IIT Bombay

Guided by:

Prof. Ravi Poovaiah

Declaration

I, Shivani Verma, hereby declare that this project report, titled "Riveting Ganga: Unfolding India's Sacred River" is entirely my own work, 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.

Shivani Verma
22M2255
Industrial Design Centre,
Indian Institute of Technology, Bombay
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Approval Sheet

Interaction Design Project 3 titled "Riveting Ganga: Unfolding India's Sacred River" (by Shivani Verma, roll number 22M2255) is approved for partial fulfillment of the requirement for the degree of 'Masters in Design' in Interaction Design at IDC School of Design, Indian Institute of Technology, Bombay.

Guide:

Chairperson:

Internal Examiner:

Digital Signature
Jayesh S. Pillai (i15316)
30-Jul-24 09:20:44

External Examiner:

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Abstract

The River Ganga, flowing through the heart of India, is more than just a river; it's a symbol of life, culture, and spiritual sanctity. Our book, crafted with the aim of sharing the magnificent story of the Ganga, unfolds this sacred river's journey in an engaging, interactive format that's as innovative as it is educational. Through the unique design of an accordion book, readers will traverse the length of the Ganga, from its icy origins at the Gangotri Glacier to its majestic merge with the ocean, exploring the vibrant life along its banks.

This book is a portal to discovering the Ganga's influence on the culture, economy, and spirituality of India. Each fold reveals a new aspect of the river's story—the sacred origins, the diverse flora and fauna nurtured by its waters, the vital crops that flourish in its fertile plains, and the bustling cities that have grown along its banks. The Ganga is not just a river; it's the lifeline of millions, a source of sustenance, spirituality, and sanctuary.

To bring this narrative to life, our book incorporates augmented reality (AR), allowing readers to immerse themselves in the sights and sounds of the Ganga. By simply scanning the images, one can witness the dynamic flow of the river, hear the stories of the cities it nourishes, and marvel at the wildlife it supports. This feature transforms the reading experience into an interactive journey, making the rich tapestry of the Ganga's story accessible to all ages.

In addition, our project includes a game element within the accordion book, designed to engage and educate children. Through interactive puzzles, quizzes, and activities, kids can learn about the Ganga's importance while having fun. This combination of storytelling and gameplay aims to inspire a deeper respect and appreciation for one of the world's most significant cultural treasures. Join us on this captivating journey along the Ganga, as we explore its enduring legacy and the countless lives intertwined with its sacred waters.

Contents

1. Introduction

Culture is not just a facet of our lives; it is the tapestry that weaves together the essence of who we are, influencing our beliefs, practices, and interactions with the world around us. It manifests in both the tangible and intangible aspects of our existence, from the food we savor to the stories we cherish and pass on to the next generation. Among the myriad elements that shape our cultural heritage, natural landmarks hold a place of reverence and awe, bridging the gap between the physical and the spiritual, the past and the present. In the heart of Northern India flows the Ganga River, a testament to the enduring bond between nature and culture. This project, centered around the story of the Ganga, seeks to unfold the layers of cultural significance embedded in its waters.

The Ganga is not just a river, it is a lifeline, a source of sustenance, spirituality, and sanctity for millions. Its journey from the icy cradles of the Himalayas to the vast embrace of the Bay of Bengal is a narrative of nourishment, nurturing not only the lands it traverses but also the souls it touches. The river's significance transcends the physical, embedding itself in the spiritual fabric of the communities that flourish along its banks. From the ancient rituals and festivals that celebrate its purity to the daily lives of those who depend on its waters, the Ganga is a symbol of life, heritage, and eternal flow.

Through this project, we aim to introduce readers to the profound cultural importance of the Ganga. We will explore its origins, the diverse ecosystems it supports, the civilizations it has witnessed, and the collective conscience it shapes. By unfolding the story of the Ganga, we invite children and adults alike to a journey of discovery, encouraging a deeper appreciation for this magnificent river and the myriad ways it continues to bless Northern India. This is not just a tale of a river but a narrative of India's heart and soul, a call to recognize and preserve the natural and cultural heritage that defines us.

2. Aim

Our goal is to foster a deeper understanding and appreciation among young readers for the significance of the Ganga River in culture, nature, and spirituality. Through captivating narratives, vivid visuals, interactive games, and informative facts, we aim to facilitate an engaging learning experience centered around the Ganga's importance.

2.1 Objective:

- Cultural Insight: Illustrate the Ganga River's role in stories, traditions, and daily life, fostering a sense of cultural pride among children.
- Environmental Awareness: Educate about the diverse flora and fauna along the Ganga, emphasizing the importance of environmental stewardship.
- Enjoyable Learning: Utilize innovative book designs and immersive AR technology to make learning about the Ganga an enjoyable and intriguing experience, ensuring children enthusiastically explore its rich narrative.

2.2 Personnel Motivation:

As a native of Uttar Pradesh, I recognize the imperative to actively involve children in the vibrant cultures and histories of every region, ensuring the preservation and appreciation of our precious heritage by future generations. I am eager to delve into the realms of data visualization, user studies, tangible interactions, game design, augmented reality, and related domains to achieve a fun and educational outcome.

3. Approach

First, we'll research and pick a great story. Then, I'll decide what's most important for our project. We'll come up with different ideas, using existing ones to make ours better. Next, we'll make small models step by step, improving them each time. These models will guide us to our final design. In the end, we'll use this final design to create our actual project.

4. Secondary research

4.1. Culture

- Culture is a complex and multifaceted concept that includes the collective beliefs, behaviors,
- practices, norms, values, and knowledge that characterize a social group, community, or society.
- It is not static but evolves over time, influenced by historical, geographical, social, and political
- factors. Culture is often expressed through language, art, music, cuisine, clothing, rituals, and
- traditions. It shapes individuals' identities, influences their perceptions of the world, and governs
- the way they interact with their environment and with each other.

Culture is integral to the human experience. It influences how individuals view themselves and others, and it plays a crucial role in binding communities together, providing a sense of belonging and identity. It is also dynamic, changing in response to internal developments and external influences, making it a vibrant and vital aspect of human societies.

Key aspects of culture include:
- Beliefs and Values: These are the fundamental ideas that people hold true within a society. They guide behavior and decision-making and are often rooted in religion, philosophy, or moral codes.
- Social Norms and Customs: These are the established rules of behavior or customs that are considered acceptable in a group or society. They govern interactions and social conduct.
- Language and Communication: Language is a crucial component of culture as it is the primary means of communication. It conveys knowledge, ideas, and customs from one generation to the next.
- Art and Literature: These reflect the aesthetic and creative expressions of a society. Through various forms of art and literature, culture expresses its tales, emotions, beliefs, and values.
- Music and Dance: These are important cultural expressions and often play a role in rituals, celebrations, etc.

- Traditions and Rituals: These are the practices and ceremonies that have symbolic meaning in a society. They are often linked to historical events, religious beliefs, or life cycle events.
- Institutions: These include the structures and systems within a society that govern behavior and support its functioning, such as legal, educational, and political institutions.
- Cuisine and Food Practices: The foods people eat and the practices around cooking and eating are deeply ingrained in cultural identities.
- Clothing and Fashion: The way people dress can be a reflection of their cultural heritage, social status, and personal identity.

4.2. Components of culture

Culture is composed of both tangible and intangible components that collectively define the experiences, practices, and values of a society.

4.2.1. Tangible Components of Culture

These are the physical or material aspects of culture that you can see, touch, and interact with. They include:

- Artifacts
- Architecture and Built Environment
- Works of Art
- Clothing and Fashion
- Culinary Items
- Literature and Written Documents
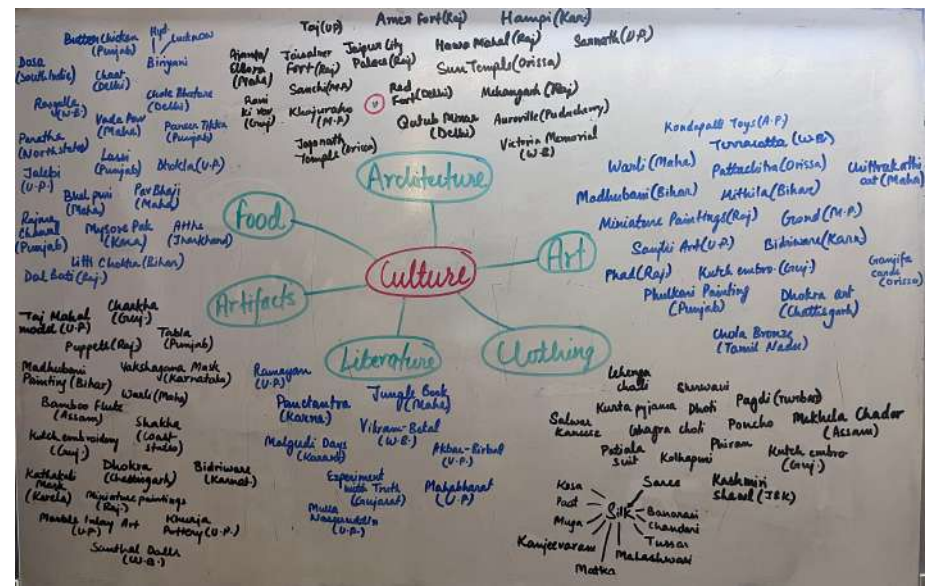- Technological Artifacts (UNESCO, 2011)

Fig. Brainstorming

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4.2.2. Intangible Components of Culture (Non-Material Culture)

These are the aspects of culture that cannot be touched but are just as important. They include:

- Language and Dialects
- Beliefs and Values
- Religious Practices
- Customs and Traditions
- Music and Dance
- Oral Histories and Storytelling
- Social Norms and Etiquette
- Educational Systems and Knowledge
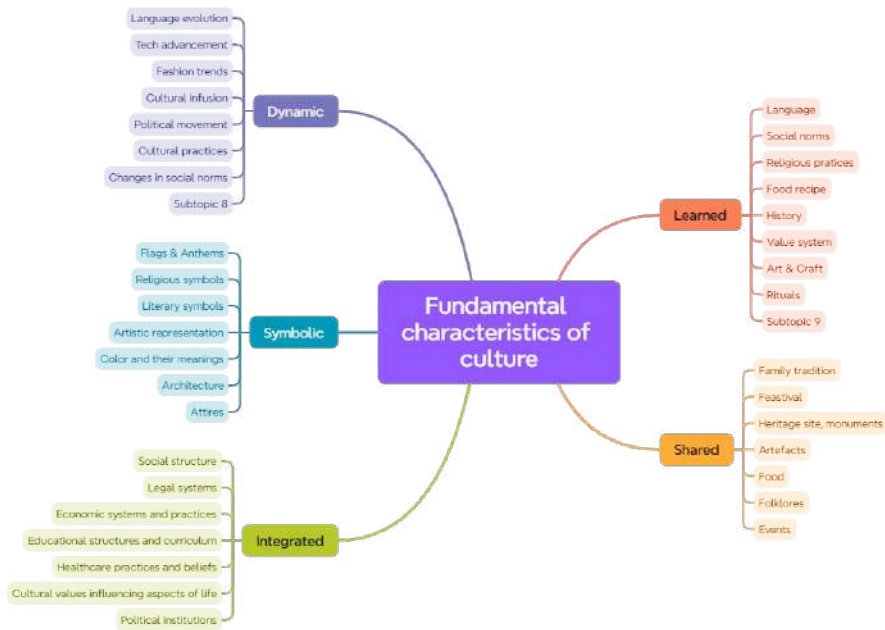- Laws and Legal Systems
- Philosophical and Ideological Perspectives

4.3. Fundamental characteristic of culture

Every culture exhibits the following characteristics:

Culture is learned: Culture is not a biological trait passed down genetically; it is acquired through learning. Much of this learning happens subconsciously, influenced by our environment. E.g, language acquisition, children are not born with the ability to speak a specific language. They learn the language spoken in their environment as they grow. This is not genetically inherited but is a result of immersion in their cultural setting.

- Culture is shared: As culture is communicated among members of a group, it allows for appropriate social behavior and the ability to anticipate others' actions. However, the fact that culture is shared doesn't imply its uniform across all members. For example, holiday celebrations. Consider how Christmas is celebrated in many parts of the world. The basic idea of the holiday is shared across cultures - it's a time for family, giving, and joy.
- Culture is symbolic: Cultures use symbols, whose meanings can vary and are often arbitrary. These symbols, such as language, money, and art, hold significance only when their meanings are commonly understood within the culture. For example, a national flag, every country's flag is a cultural symbol. The colors and designs on these flags have specific meanings that are recognized and understood by the people of that culture.
- Culture is integrated: All elements of a culture are interconnected, forming a cohesive whole.
- Culture is dynamic: Cultures are not static; they evolve through interactions with other cultures, exchanging ideas and symbols, and adapting to new influences. (Good Organizational Culture, 2024)

The rich tapestry of its culture is evident in its vibrant music, and dance forms like Kathak. Propagating the culture of Uttar Pradesh is crucial, not wealth of knowledge, art, and history with the world. (Culture of Uttar Pradesh)

4.3. Fundamental characteristic of culture

4.4. Culture of Uttar Pradesh

Uttar Pradesh often referred to as the heartland of India, boasts a culture steeped in history, diversity, and tradition. This state, with its myriad of customs, flavors, and practices, plays a pivotal role in defining India's cultural landscape. Uttar Pradesh is significance, as its home to many ancient cities, including Varanasi, one of the world's oldest inhabited cities, and Agra, the city of the majestic Taj Mahal.

4.5. River Ganga

4.5.1. Folklores

- Descent of the Ganga: One of the most well-known legends is the story of the descent of the Ganga from the heavens to Earth. According to Hindu mythology, King Bhagiratha performed rigorous penance to bring the Ganga down to purify the ashes of his ancestors. Lord Shiva agreed to break the force of Ganga's descent with his hair, thus preventing the flood from inundating the Earth.
- Ganga and Lord Shiva: In another myth, the Ganga is believed to have originated from Lord Shiva's locks. The story goes that Kin well-known legends is the story of the from the heavens to Earth. According to Hindu mythology, to bring the Ganga down to purify the ancestors. Lord Shiva agreed to break the force of Ganga's descent with King Bhagiratha prayed to Lord Shiva to release the Ganga from his matted hair to purify the souls of his ancestors. Lord Shiva obliged, allowing the Ganga to flow down to Earth.
- Ganga Dussehra: The festival of Ganga Dussehra is celebrated to mark the descent of the Ganga to Earth. It is believed that taking a dip in the Ganga on this auspicious day can wash away sins and bring salvation.

4.5.2. Geographic structure

- Origin: The Ganga River originates in the Himalayas at the Gangotri Glacier in Uttarakhand, India. It is one of the longest rivers in India, stretching over 2,500 kilometers (1,553 miles).
- Alluvial Plain: The Gangetic Plain, also known as the Indo-Gangetic Plain, is a vast alluvial plain formed by sediment deposited by the Ganga and its tributaries over millions of years. It is one of the most fertile agricultural regions in the world.
- Floodplains: The Ganga River is prone to seasonal flooding, especially during the monsoon season. These floods replenish the soil fertility of the floodplains and support agriculture, but they can also cause widespread damage to property and infrastructure.
- Delta: The Ganga-Brahmaputra Delta, also known as the Sundarbans Delta, is the largest delta in the world. It is characterized by a network of mangrove forests, tidal creeks, and estuaries, providing habitat for diverse wildlife including Bengal tigers and Irrawaddy dolphins.

4.5.3. Historical significance

- Taj Mahal: Located in Agra, Uttar Pradesh, the Taj Mahal is one of the most iconic monuments in the world. Built by Mughal Emperor Shah Jahan in memory of his wife Mumtaz Mahal, it sits on the banks of the Yamuna River, a tributary of the Ganga.
- Ramnagar Fort: Situated in Varanasi, Uttar Pradesh, the Ramnagar Fort was built in the 18th century by the kings of Varanasi. It is located on the eastern bank of the Ganga River and houses a museum showcasing royal artifacts and manuscripts.
- Vishwanath Temple: Also known as the Kashi Vishwanath Temple, it is one of the most sacred Hindu temples dedicated to Lord Shiva. Located in Varanasi, Uttar Pradesh, it is situated near the banks of the Ganga River and is visited by millions of devotees every year.
- Nalanda University: Although not directly on the banks of the Ganga, Nalanda University, located in Bihar, was a renowned center of learning during ancient times. It was established in the 5th century CE and attracted scholars from all over the world.

4.5.4. Agriculture

- Rice, wheat, barley, and sugarcane are major cereal crops grown in the Ganga basin.
- Pulses like lentils, chickpeas, and pigeon peas are cultivated for protein-rich food and soil fertility.
- Oilseeds such as mustard, sesame, and soybeans are grown for oil extraction.
- Fruits like mangoes, guavas, and bananas, along with vegetables such as tomatoes and potatoes, are cultivated for both domestic consumption and commercial purposes.
- Jute is grown in the Ganga delta region, primarily in West Bengal and Bihar, for making ropes, sacks, and coarse fabrics.

4.6. Storytelling

A story shows the ways and reasons life can change. (Fryer, 2003) Storytelling is about sharing ideas, beliefs, experiences, and lessons through stories. These stories can be about someone's personal life or imaginary events. They are told in a way that makes people feel strong emotions and think deeply about the message or lesson of the story. And to really inspire or motivate someone, reaching their heart is the key. (Serrat, 2008)

This project's goal is to teach kids about the culture of Uttar Pradesh in an enjoyable way. It's designed to show them how people live there, what they do every day, and their daily routines, all presented in a way that's fun and easy for children to understand.

4.6.1. Storytelling to children

Storytelling is a multifaceted tool that supports the overall development of children, from cognitive and linguistic growth to emotional and social learning. It is crucial for children because it aids in their development in several ways:

- Enhances Imagination: Stories spark children's imaginations, encouraging them to visualize characters and settings, and imagine new worlds.
- Language Skills: Listening to stories helps children develop language skills, including vocabulary, comprehension, and communication abilities.
- Cultural Understanding: Stories often include cultural and moral lessons, helping children understand and connect with their own and other cultures.
- Emotional Development: Through stories, children learn to empathize with characters, understanding emotions and developing emotional intelligence.

- Learning and Memory: Stories make learning enjoyable and memorable, often teaching lessons and values in an engaging way.
- Attention and Listening Skills: Regular storytelling encourages children to listen attentively and concentrate, enhancing their focus.
- Problem-Solving Skills: Stories with conflicts or challenges teach children about problem-solving and decision-making. (Myers, 2012)
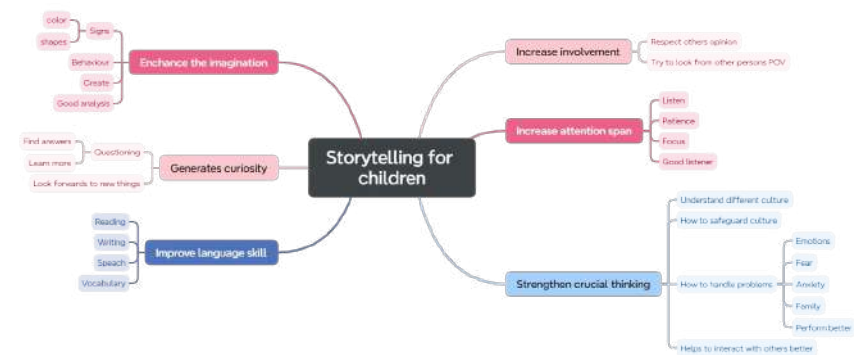
Fig. Storytelling for children

4.6.2. Ways of storytelling in Indian states

Storytelling in India varies across states, reflecting the rich cultural diversity of the country. Here are examples from some states:

- Kashmir: Bhand Pather, a traditional folk theatre style, uses satire, music, and dance to tell stories, often based on social and political themes.
- Uttar Pradesh: Known for 'Kathak', a classical dance form that combines storytelling with dance. Narratives often revolve around historical tales and local legends.
- West Bengal: Famous for 'Patachitra', a unique storytelling form using vividly painted scrolls. Storytellers, known as 'Patuas', sing stories as they unroll these scrolls. Rajasthan: 'Kathputli', traditional puppetry, is a popular storytelling method. Puppeteers use marionettes to narrate folk tales and local legends. Kaavad storytelling, where intricate wooden shrines with multiple doors are used to unfold stories, typically involving a traveling storyteller.
- Tamil Nadu: Therukoothu, an energetic form of street theatre, and Villu Pattu, a musical storytelling form using a bow as a primary instrument.
- Karnataka: The practice of 'Yakshagana', a theatrical form, combines dance, music, and dialogue to tell stories, often drawn from Hindu epics.

- Punjab: 'Bhangra' and 'Giddha' are dance forms that often include narrative elements. They are performed during festivals and celebrations, telling stories of rural life in Punjab.
- Maharashtra: Tamasha, a traditional folk theatre form incorporating music, dance, and drama, often with a comic touch.

4.7. Children

4.7.1. Age group: 7+ yrs

Concrete Operational Phase: In this stage, often referred to as the "Concrete Operational Phase" in Jean Piaget's theory of cognitive development, children's thinking undergoes significant changes. They start thinking more logically and realistically. At this age, kids begin to understand concepts such as time, numbers, and space more clearly.

Children in this age group can organize objects into categories based on common features, a skill known as classification. They also start to grasp the idea of conservation –understanding that quantity doesn't change even when its shape does, like realizing a tall, narrow glass of water holds the same amount as a short, wide one.

5. Primary research

Primary research for this project involved conducting surveys and interviews with children and educators to understand their knowledge, perceptions, and preferences regarding the Ganga River. Through these interactions, valuable insights were gained into the target audience's interests, learning styles, and technological capabilities. Additionally, field visits to the Ganga's banks provided firsthand experiences and observations, enriching the authenticity and depth of the project's content. This research served as the foundation for designing engaging narratives, visuals, and interactive elements that resonate with young readers and effectively convey the river's cultural, natural, and spiritual significance.

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5.1. Book store visits and observations

- flat book
- curious in one time
- individual scenario focused
- less engagement

- very Indian tradition theme
- restore old game
- 2-d flat illustration
- hindi audience

- opens like a globe
- 5 pages max
- good for one scene, less text
- less engagement time

- flip flap book
- open fold
- continuous folds

- flap book
- good for kids 3-4 yr
- bright color illustration
- less engagement time

- Play Shifu's AR game
- Learn Geography
- Interactive

- flap book
- good for kids 3-4 yr
- bright color illustration
- less engagement time

- animal in centre
- no tech
- basic open, cut out

6. Design brief

6.1. Approach

- Gather Insights: Research the Ganga's culture, history, and ecology through interviews and studies, ensuring content depth and authenticity.
- Develop Stories: Craft narratives that combine the Ganga's cultural, historical, and ecological aspects into engaging stories for young readers.
- Create Visuals: Commission artists for vibrant illustrations and work with AR developers for interactive experiences, making learning about the Ganga fun and immersive.
- Design for Ease: Ensure the AR app is user-friendly, with simple instructions for a seamless experience.
- Prototype and Test: Develop a prototype of the book for user testing with children to refine content and design.
- Produce and Launch: Manufacture the book using sustainable materials and launch it with interactive sessions for widespread engagement.
- Engage and Update: Organize community workshops and continuously update the content based on feedback, keeping the educational tool relevant and inspiring.

6.2. Design Consideration

- User-Friendly Interface: Ensure the AR app is intuitive, especially for young users, with straightforward navigation and interactive elements.
- Vibrant Visuals: Use colorful, engaging illustrations to captivate children's interest and visually represent the Ganga's story.
- Interactive Elements: Incorporate AR features like animated stories and quizzes that are not only fun but also educational, enhancing learning through interaction.
- Sustainability: Select environmentally friendly materials for the book to reflect the project's commitment to conservation.
- Accessibility: Make content easily accessible and understandable for a young audience, ensuring a balance between education and entertainment.
- Cultural Sensitivity: Accurately represent the cultural significance of the Ganga, respecting its heritage and the communities connected to it.
- Scalability: Design with future updates in mind, allowing for the addition of new content and features based on user feedback.

6.3. Target user

The target users for this project are primarily children aged 6 to 12 years. This age group is at a developmental stage where engaging storytelling and interactive learning can have a profound impact on their understanding and appreciation of cultural and environmental topics. Additionally, the project aims to reach:

- Educators and schools looking for innovative teaching tools that integrate technology with curriculum subjects like geography, history, and environmental science.
- Parents seeking educational and meaningful content that promotes cultural awareness and environmental stewardship in a fun and interactive way.
- Libraries and cultural institutions interested in hosting interactive exhibits or workshops that connect communities with their natural and cultural heritage.

6.4. Desired Outcome

- Kids learn about the Ganga River's cultural and natural importance in an engaging way.
- They develop a sense of pride in their heritage and an understanding of environmental conservation.

- The use of AR technology makes learning fun and memorable, encouraging children to explore more about their world.

6.5. Evaluation

- Checking if kids can recall facts and stories about the Ganga River after using the book.
- Observing their interest and engagement while interacting with the AR features.
- Getting feedback from children, parents, and teachers on how much they enjoyed and learned from the book.

- Measuring any increase in awareness about environmental conservation among the users.

7. Purpose

The purpose of this project is to educate and engage children with the cultural and ecological significance of the Ganga River through storytelling and augmented reality. By blending interactive technology with rich narratives and visuals, the project aims to foster a deep appreciation for India's heritage and environmental sustainability. It seeks to ignite curiosity, promote cultural pride, and inspire a new generation.

8. Scope

In today's world, where digital learning and environmental awareness are increasingly important, this project has significant scope. It leverages technology to make learning about culture and nature interactive and fun, addressing the educational needs of a tech-savvy generation. With growing concerns about environmental conservation, it also plays a crucial role in educating children about the importance of rivers and ecosystems. By promoting cultural heritage and env stewardship, this project meets the contemporary demand for educational content that is both engaging and meaningful, making it highly relevant and impactful.

9. Ideation

Initially, Ideated with few key words, to narrow down the structure:
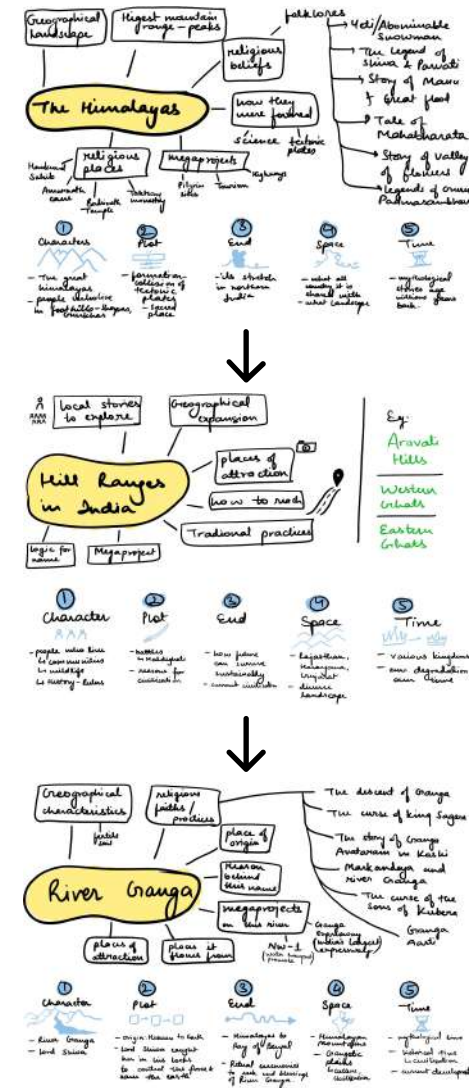
Fig. The ideated keywords

9.1. Idea 1: Interactive Storybook

- Concept: An illustrated storybook that narrates the origin of the river Ganga from the Himalayas and its journey through the northern plains. The book will include pop-up elements and interactive pages where children can slide tabs to reveal facts, open flaps to see underwater life, or spin wheels to change seasons along the river. This tactile experience enhances learning and keeps young readers engaged.

- User Interaction: Kids use their hands to move parts of the book to see different things.

- How it will work:

1. Opening the Book: Begin by opening the storybook to any page you like.
2. Exploring Pop-Ups: When you see a raised tab on the page, gently pull it to reveal a pop-up feature, such as a tree or an animal related to the river Ganga.
3. Sliding Tabs: If you find a horizontal or vertical tab, slide it to discover hidden illustrations, like fish in the river or birds in the sky.

4. Lifting Flaps: Some pages have flaps. Lift them to uncover hidden pictures or facts about the river Ganga.
5. Turning Wheels: On pages with circular wheels, spin them to change the scene, showing different seasons or times of day along the river.

- Pros:
1. Kids can have fun touching and moving parts of the book. It helps them learn in a fun way, without needing any gadgets.

- Cons:
1. The moving parts might get worn out.
2. Limited amount of knowledge can be put in a put.
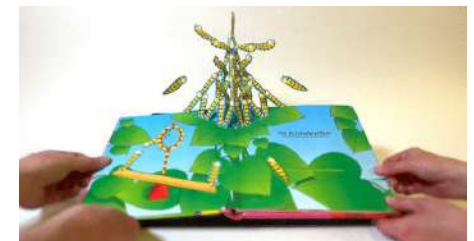
9.2. Idea 2: Augmented Reality (AR) Adventure Book

- Concept: Utilizing AR technology, create an app that brings the river Ganga to life in the children's surroundings. As they point their device around, they can see the river flow through their room, animals that live in its ecosystem, and historical events that took place along its banks.
- Interactive elements like cleaning the river from pollution, helping animals, and planting trees along the banks can teach children about environmental conservation in an engaging way.

- User Interaction: Kids tap on the screen to interact with the river and animals.

- How it will work:

  Launching the App: Start by opening the AR app on your AR capable device.
  1. Scanning the Environment: Use your device's camera to scan the room. The app will overlay images of the Ganga river, animals, and plants onto your real-world environment.
  2. Interacting with Elements: Tap on virtual elements, like animals or trees, to learn more about them. Each tap reveals facts or stories about the river and its ecosystem.
  3. Participating in Activities: Engage in virtual clean-up activities by dragging trash to a bin icon or plant trees along the river by selecting the tree icon and placing it in a chosen spot.

- Pros:
  1. It's a very cool way to learn with a phone or tablet.
  2. Kids can see the river and its animals as if they are right there with them.

- Cons:
  1. Kids need a phone or tablet that can use the app.
  2. Some might need help from an adult to use it.

9.3. Idea 3: Board Game

- Concept: A board game that takes players on a journey along the Ganga, from its source in the Himalayas to the Bay of Bengal. The game can include challenges like cleaning up pollutants, saving endangered species, and answering questions about the river to move forward. This can be a fun way for children to learn about geography, environmental issues, and the significance of the river in Indian culture.

- User Interaction: Kids move their game pieces on the board and follow the game's rules.

- How it will work:

1. Setting Up the Game: Unfold the game board and place it on a flat surface. Each player chooses a game piece and places it at the start.
2. Rolling the Dice: Players take turns rolling the dice to move their pieces along the board, following the path that represents the Ganga's journey.
3. Completing Tasks: When landing on a task space, read the task aloud. Tasks may include answering a question about the river, performing a simple act like pretending to pick up trash, or mimicking an animal found in the Ganga.
4. Advancing and Learning: Successfully completing tasksallows players to move extra spaces or gain educational cards that provide facts about the river.
5. Reaching the End: The first player to reach the end, wins.

Pros:
1. It's a fun game for kids to play with family or friends. They can learn a lot about the river by playing.

Cons:
1. It takes time to set up the game and learn the rules. It's only a board game, so it can't change or get updates.

9.4. Final Idea: Accordion book with game on reverse side

- Concept: This project aims to create an accordion book that illustrates the journey of the Ganga River from its source to the delta, integrating augmented reality (AR) to bring to life the cultural, ecological, and historical aspects of the river. The continuous flow design allows for a seamless narrative, enriched with interactive elements that enhance learning and engagement.

- User Interaction:
- AR Icons: Placed throughout the book, these icons serve as gateways to augmented reality experiences, accessible through a smartphone or tablet app.
- QR Codes: Specific QR codes can direct users to more in-depth content, such as videos, soundscapes, or interactive maps.
- Physical Interaction: The accordion format itself encourages users to unfold the story in a physical, engaging manner, simulating the journey along the river.

- How it will work:

1. Starting the Journey: Users open the accordion book, revealing the Ganga River flowing across the pages.

2. Engaging with AR: Upon encountering an AR icon, the user scans it with a device, activating an immersive experience related to the content on the page, such as witnessing the Ganga's wildlife in 3D or listening to the river's sounds.
3. Exploring Content: As users progress through the book, they interact with various AR experiences that educate and entertain, from historical narratives to ecological insights.
4. Learning and Interaction: Each section of the river's journey offers unique learning opportunities, from the river's source, through cities, past wildlife, and to its delta, all the while emphasizing the importance of conservation.

• Pros:
 1. Enhances learning through AR interaction.
 2. Boosts cultural and environmental awareness.

• Cons:
 1. Limited access due to technology needs.
 2. Increased costs for production.

10. Design Process

- To achieve a simple and seamless interaction into the book, I decided to include the following set of information based on below mentioned parameters.

- **Through tangible product:** The continuous flow of the Ganga River across the accordion pages stands out as the central theme, accompanied by vivid illustrations of its journey through diverse landscapes and cities. Key landmarks, wildlife, and cultural activities depicted along the river's path invite interaction, with specific segments highlighting the river's source, the flora and fauna it supports, and the communities it sustains. Users are encouraged to unfold the book to reveal the Ganga's course, with AR icons strategically placed to bridge the physical and digital experience.

- **Through digital interface:** Scanning a QR code or AR icon with a device transports users to a digital realm where the Ganga's story unfolds further. Here, they'll explore the river's mythology, ecological importance, and the challenges it faces. The interface provides detailed narratives of the river's significance in Hindu culture, its role in supporting biodiversity, and the efforts made towards its

conservation. Users will have the option to dive deeper into specific topics, such as viewing different aspects of the river's impact on agriculture, city life, and spiritual practices. Each topic will offer three selectable perspectives to enrich understanding and engagement.

10.2. Exploration with final idea

To understand the expected idea further, few existing books were analyzed for their structure of construction.

I began by mapping out a grid inspired by the path of the Ganga River across various states. This process revealed key points where the river changes direction, guiding the placement of folds in the book to mirror its flow. The river starts in Uttarakhand, flowing horizontally through the northern plains before veering vertically as it merges into the Hooghly River in West Bengal. With the river traversing five states, allocating one page per state or dividing features and facts presents a significant challenge.

Then I created various shapes in different styles or cutouts so that the user can unfold them like an accordion book to see how the river moves and flows.

1. The book has a spiral circular shape, allowing kids to open multiple flaps and interact with it. It's a fun way for them to learn about cutting and arranging shapes. The circular shape is inspired by cyclones, like those near Ganga River.
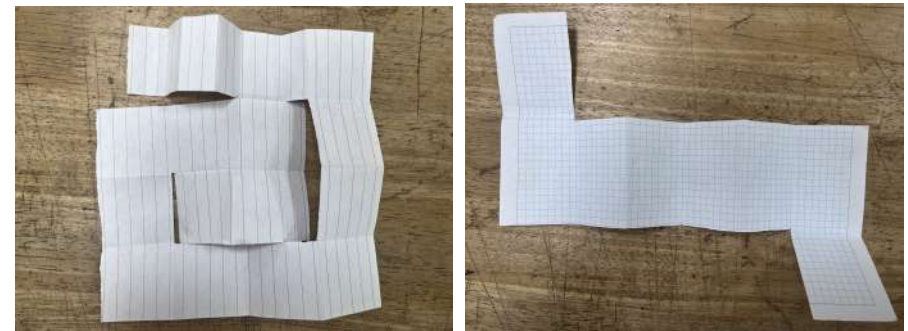
Fig. Prototype 1 & 2

2. Then I tried to make another design for the book, which was inspired by the shape of the Ganga River on a map. The book has flaps on the first and last pages. The first flap opens upward to show the river's vertical side, while the last page opens downward, representing the Ganga flowing into the Bay of Bengal through the delta.

3. The next idea was to cut the book to match the river's path. The top of the book was cut this way to show the shape and details as the river flows. The book was like a zigzag with each page for a state or city. Another idea was to have each page focus on a theme like plants, animals, pilgrimages, farming, or mangroves. Each page could have a flap to see underwater life.
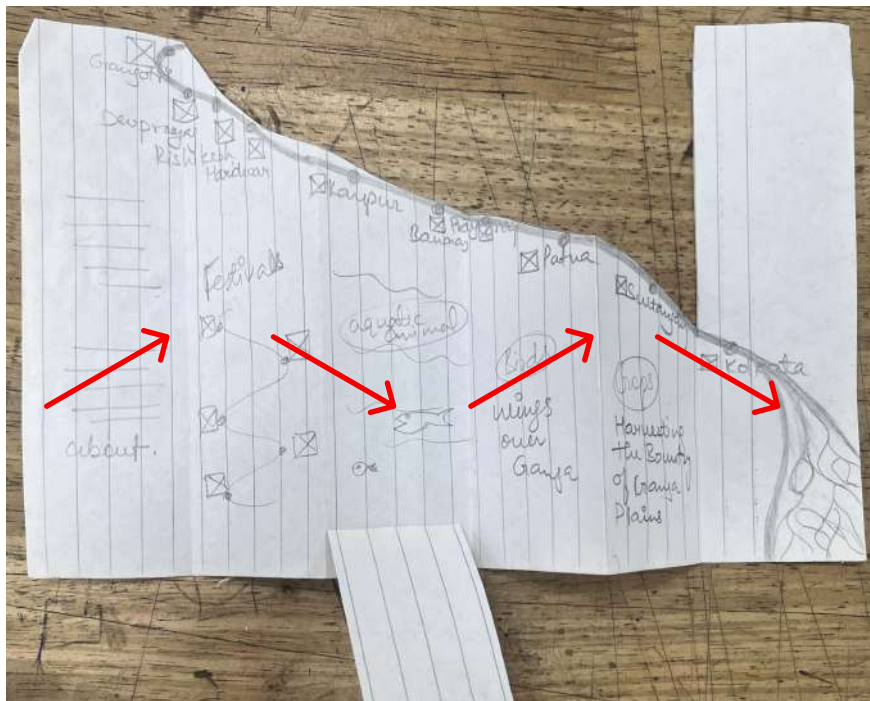
Pros:
- Understanding the river better becomes clear.
- The flaps use the river's length to show info as it flows.
- Easy to open the book

Cons:
- Space limitation on one side only.
- AR may display fewer overlapping things per page.

4. The book was split into grids to match it precisely to the river's path, but handling it all at once was challenging. I created illustrations on this model to help me understand how to place the information in actual size.
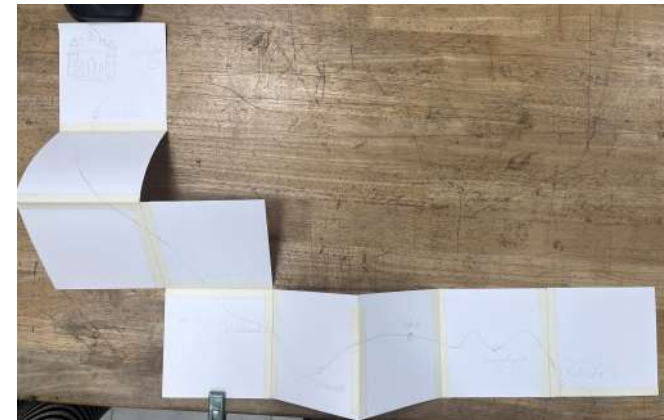
Fig. Prototype 3

Fig. Prototype 4(a)

Fig. Prototype 4(b)

Pros:

- Can easily incorporate additional elements.
- Each page can serve as a suitable AR marker.
- One element per page can highlight the impo. of a city

Cons:

- Unfolding the book was not easy for children.
- The book requires ample space to open and view the big picture at once, also handling it is a complex opening

5. The earlier ideas seemed okay, but they didn't feel right for a 7+ year old to enjoy opening, reading, or playing with the book. So, I decided to start with the traditional book layout, with pages back to back. I tried to make it look interesting and factual by illustrating it in a simplified version. However, it ended up feeling like any other book, which a kid might not find very exciting to interact with.
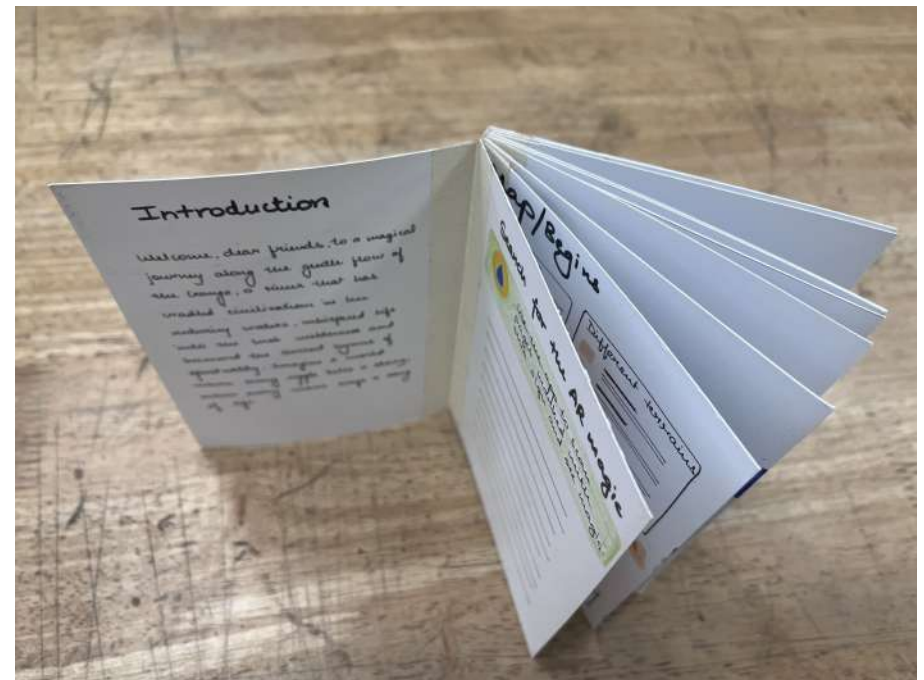
Fig. Prototype 5(a)

Pros:
- The book feels typical and similar to others, making it easy to fit an AR marker.

Cons:
- The AR may have overlapping elements.
- The book lacks the ability to spark curiosity in kids to find reasons to read it.
- Even the illustration style was very generic and not explored.
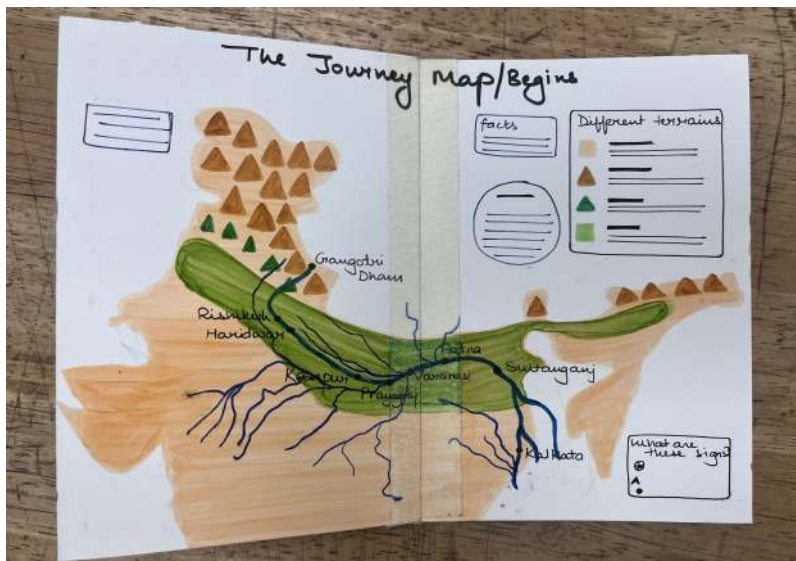
This book helped me draw by hand first to figure out where to put each element. It showed where each element would go. I collected information during this stage. The book was mostly drawings with facts written. It focused more on writing and the pictures were bright.

6. This exploration was very versatile. I got to add many pages and use both sides of the pages without connecting them to the back of the book.

Fig. Prototype 5(b)

Fig. Prototype 6(a)

Most books have only 4-5 pages, but I experimented with joining 7-8 pages at first to see how it would look, how the illustrations would flow, and what they would depict. In the first stage, I organized the illustrations into sections. For example, some pages showed the glacier, while others depicted the Ganga Aarti, the river's geographical location, iconic monuments, or festivals.

Fig. Prototype 6(b)

Pros:
- The book's length is good for showing illustrations. It divides the Ganga into sections to talk about different topics.
- Also, there's room to add a game.

Cons:
- Only one part of the Ganga is being used despite the book's length.
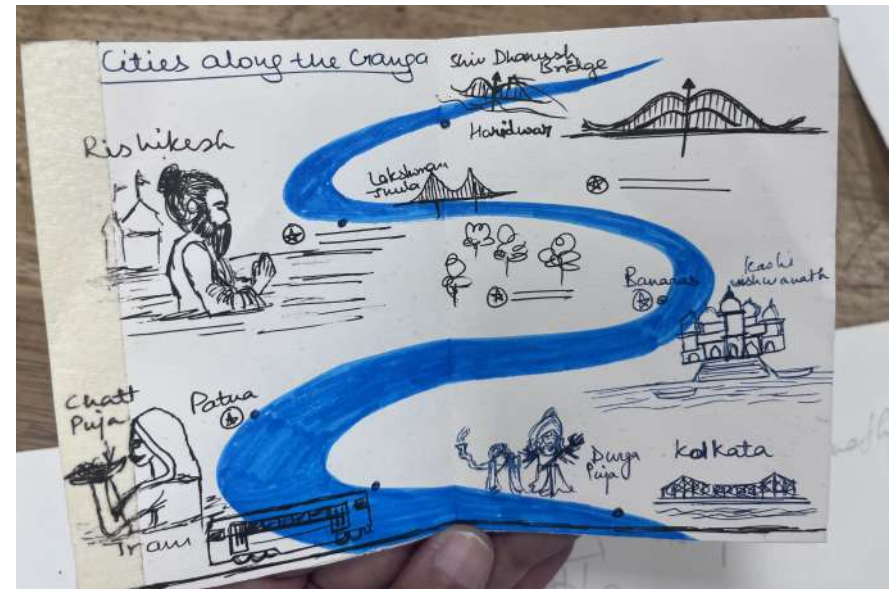
Fig. Prototype 6(c)
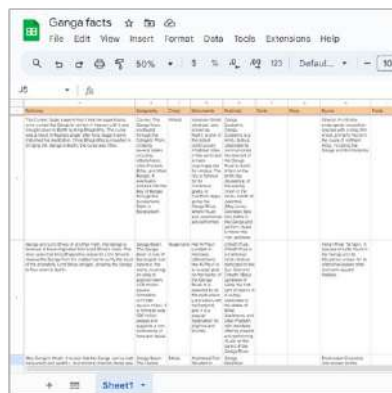
10.3.Moodboard for visual styles
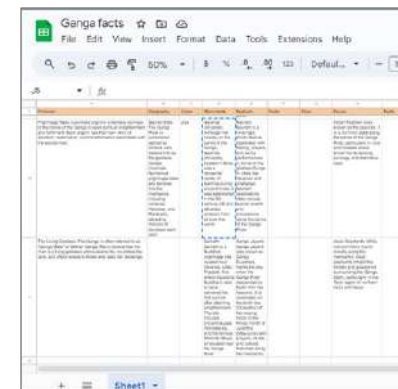
Fig. Reference images, taken from Pinterest and generated using Ai(Dall-E)

10.4. Information architecture
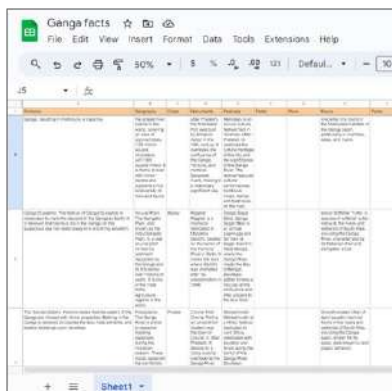
For the final book the authentication of the data is very crucial, hence I collected the data from verified sources as mentioned:

10.5. Preparing the data

- Front Cover: Illustrate a vibrant, engaging panorama of the Ganga River, flowing from the Himalayas to the sea, adorned with wildlife, cities, and cultural elements. A small, interactive AR icon invites users to begin their exploration. Empower readers with actionable insights on conserving the Ganga. An AR feature could project future visions of the river based on conservation efforts.

- Page 1: Source of the Ganga – Begin with the icy vistas of the Gangotri Glacier. The AR feature animates the glacier melting into a stream, the very start of the Ganga, complemented by sounds of the Himalayas.

- Page 2: The Journey Unfolds – Show the river's early path, introducing key tributaries and landmarks. Pop-up AR facts explain the geography and mythology of its origins.

- Page 3-4: Through Forests and Wildlife – As the river flows through dense forests, highlight terrestrial wildlife like tigers and elephants. AR brings to life a 3D tiger or elephant, allowing interaction.

- Page 5-6: The River Nourishes - Depict the agricultural areas enriched by the Ganga, with AR showing the cycle of crops. Include flora like alpine forests transitioning to the mangroves of the Sundarbans.

- Page 7: Cities and Spirituality – Capture the essence of cities like Varanasi and Haridwar. Use AR for a virtual tour of a ghat, blending in tales of spirituality and daily life.

- Page 8: Aquatic Life and Conservation – Focus on the Ganges river dolphin and efforts to combat pollution. AR experiences offer an underwater tour and visualize conservation successes.

- Page 9: Cultural Echoes – Explore the river's influence on art, literature, and historical tales. AR could bring artworks to life and narrate poetry or short stories inspired by the Ganga.

- Page 10: Delta and Beyond – Conclude with the Sundarbans, emphasizing its ecological importance. AR provides a guided tour of this unique ecosystem.

10.6. Exploration with final illustrations using Ai (DALL-E)

Initially I begun by generating the human figures, and then generating similar characters to keep the consistency in the book. So here are the examples:

1. to generate a sadhu in ganga ghat all in similar art style

Prompt given: create a 2d flat, minimal(need it for a children's book of 5-6 year-old children), illustration vector style, here a sadhu is flipping his hair out of river water during a dip in the river. The sadhu is joining the hand looking upward and standing in the middle of river water, do not show the background focus only on sadhu.

The sadhu should be 35-40 years of age. take the color scheme style bright-colorful, in the illustration. show the side view of him, while coming out of water. It should be only solid color, do not do an outline, no gradient and no 3d effect.

Follow up prompt 1: use this same art style, keep all commands the same, and create a sadhu like this. He is standing and holding a 3 tier diya lamp in his right hand and a bell in his left hand. He has hair color same as in the above image. he is happy doing the Ganga aarti. He's wearing an orange cloth piece like him. Show the side view of Sadhu
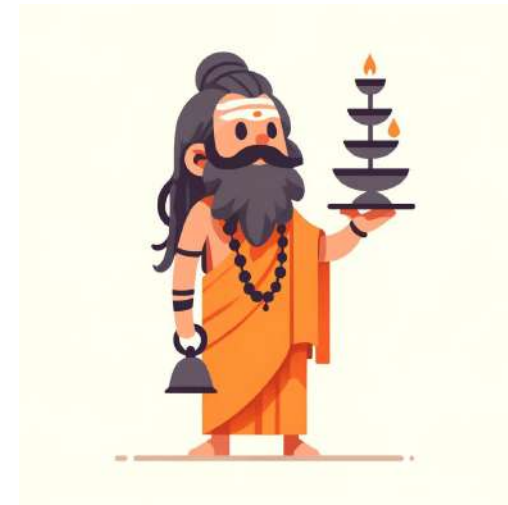
Follow up prompt 2: use this same art style, keep all commands the same, and create a sadhu like this. He is sitting with his legs folded and he is writing with a peacock feather on a book in front of him. He's wearing an orange cloth piece like him and has white long hair that are tied. Show the front view of Sadhu.

Follow up prompt 3: use this art style, keep all commands the same, and create a sadhu same like this, worshipping the river for Ganga arti, do not create the background, focus on the sadhu only in the same art style as above. Keep the color scheme similar. This time keep the full body of Sadhu, he's

standing with and worshipping river Ganga. He is conching a shell from both his hands while standing in a river. Show the side view of sadhu.

2. To generate the woman doing chatt puja in all traditional attire:

Prompt given: a woman doing chatt puja in Bihar, has as red sindoor from her head to the nose, morning time, wearing a saree, has soop in her hand, she is holding the soop with both hands, which has few fruits to worship and standing in the middle of the water, do not draw background keep it plain,

focus only on woman, a woman age 30-40, follow the art style of the sadhus shared above. Make it 2d flat vector illustration, is easy to trace, and I need to put it in my book for children so keep it beautiful and engaging.

3. To generate a group of girls in similar style doing Dhunichi

Prompt given: generate an illustration of dhunichi, ladies

performing the dance, make them in white saree with a red border and dancing to it. make it 2d flat illustration vector style.

It was crucial for human characters, plants, animals, monuments, and other elements to be made in the same style and be relatable from a kid's perspective. For example, I couldn't include an aggressive illustration of a sadhu in a children's book, so finding the right style was very important.

10.6. Illustration making

The main ideas were written down first in the prototype of the straight book. I planned for the first and last pages to open from the cover like a flap, and the last page to slide. The river was mapped out the way I originally planned it. Each place had info like Rishikesh with sadhu baba meditation and Ganga arti.

Fig: Illustration prototype 1

Each page here, had a significant marker in the design of a Indian motif, but it felt little distracting at this stage probably because of multiple elements.

Fig: Illustration prototype 2

I experimented with different illustration styles for both the storytelling and the game sections. The goal was to maintain consistency and connection throughout the book, so I was developing a design language.

Fig: Illustration prototype 3

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10.7. Exploration with technology - AR

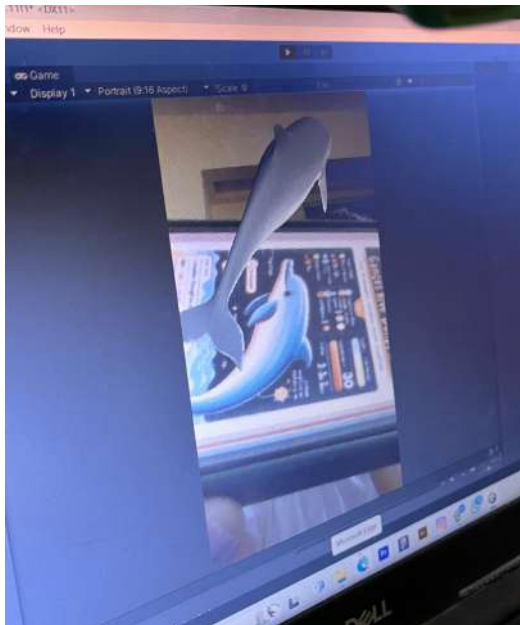The first try to use AR with a dolphin picture, as a start for our project's early stages.

Fig. Experimenting AR element, dolphin on marker

After making sure the testing worked, I planned the pages using the content and what assets I had. I added pictures, videos, and 3D objects to help understand better.

To get the AR application, for further interaction in detail and description, I tried to explore the possible tech features which can ease the user, when he/she/they want to explore the image in AR.

QR code scanning was most convenient method for the phone carrying users to scan and explore the application.

The step includes:

There is a QR code given on the first page of the book
↓
Scan the QR using an android mobile scanner
↓
Every page in the book will give a brief information about the page and the asset linked to it.
↓
The user hovers the camera on different pages.
↓
The viewer can now see different images, few videos, and 3d model in augmented reality.

11. Final concept and design

"River Tales" is an exciting book that takes you on a journey to discover the wonders of the Ganga River. Inside, you'll find amazing stories, beautiful pictures, and fun games to play! When you read the book, you'll learn all about the Ganga River and the animals and plants that live there. But that's not all! You can also flip the book over to play cool games on the back. And if you have a special device, you can use it to see things in 3D with augmented reality (AR)! It's like magic!

The core concept of "River Tales" is to help kids learn about the Ganga River in a fun and interactive way. The Ganga River is very important to India and to many people who live there. It gives water to farms, provides a home for animals, and is a special place for spiritual ceremonies. That's why it's essential for kids to understand how amazing and precious the Ganga River is. In this book, you'll explore the river's cultural significance, discover its diverse wildlife, and learn why it's essential to take care of our environment.

"River Tales" is more than just a book—it's an adventure waiting to happen! So grab your copy and join us as we dive into the incredible world of the Ganga River. Get ready to read, play, and explore like never before!
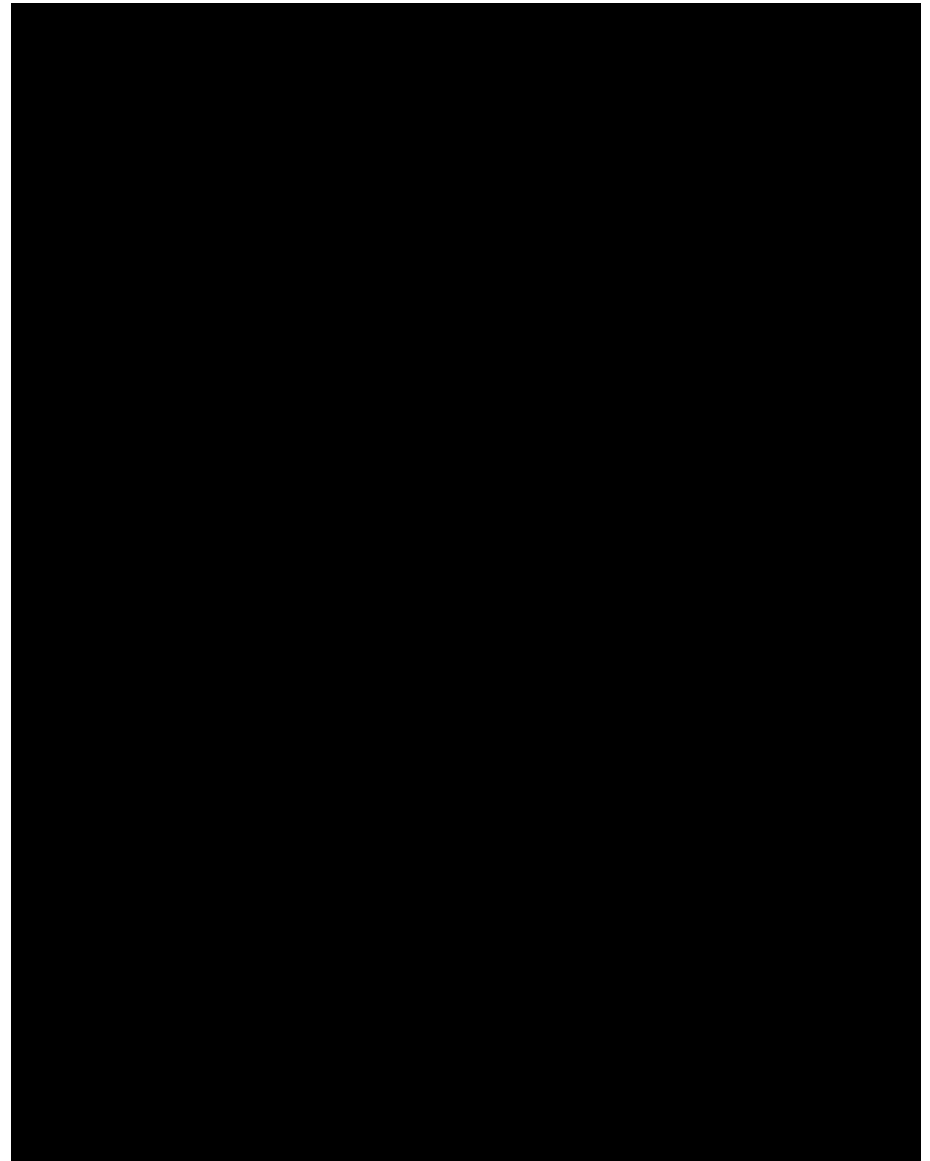
11.1. Final illustrations of book - Front side   Introductory Page

Page 1

Page 2

Page 3

Page 4

Page 5

Page 6

Page 7

Page 8

Page 9

Page 10

11.2. Game illustrations of book - Back side

Introductory Page

Introduction to the game page

Rules of the game page

Page 1

Page 2

Page 3

Page 4

Page 5

Page 6

Page 7

Page 8

Page 9

11.3. AR objects

Once I checked that the testing was successful, I arranged the pages using the content and the resources I had. I included pictures, videos, and 3D objects to make it easier to understand.

Page 1: The great Himalayas
Page 2: Lord Shiva
Page 3: A tourism video ad of Uttar Pradesh
Page 4: Banaras ghat
Page 5: A turtle
Page 6: Chatt puja video
Page 7: Wheat crops
Page 8: Durga Puja
Page 9: Yellow taxi from Kolkata
Page 10: Tiger

12. Evaluation plan

To assess the effectiveness of our project, we will implement a comprehensive evaluation plan that includes measures of impact on awareness, positive feedback, critique feedback, and assessment of the augmented reality (AR) experience.

Impact of Awareness:
We will measure the impact of the book on awareness regarding the Ganga River through pre- and post-reading surveys. These surveys will gauge participants' knowledge and perceptions of the Ganga's cultural, natural, and spiritual significance before and after engaging with the book. An increase in awareness will be indicated by higher scores on post-reading surveys compared to pre-reading scores.

Positive Feedback:
Positive feedback will be gathered through user testimonials and reviews. We will encourage readers, educators, and parents to provide feedback on their experience with the book, highlighting aspects they found engaging, informative, and enjoyable. Positive feedback will serve as an indicator of the book's effectiveness in achieving its educational and entertainment objectives.

Critique Feedback:
To gather critique feedback, we will conduct focus group discussions and interviews with a diverse group of readers, including children, parents, and educators. Participants will be encouraged to share their honest opinions about the book, including areas for improvement, aspects they found confusing or lacking, and suggestions for enhancements. Critique feedback will provide valuable insights for refining the content, design, and interactive features of the book.

Assessment of AR Experience:
The AR experience will be evaluated based on its usability, interactivity, and impact on engagement. We will observe participants' interactions with the AR features and gather feedback on their experience. Measures of success will include the ease of accessing AR content, the clarity of instructions, the level of immersion provided by AR elements, and the extent to which AR enhances the overall reading experience.

Overall, the evaluation plan will provide valuable insights into the effectiveness of the book in achieving its educational objectives, engaging readers, and fostering a deeper appreciation for the Ganga River

13. Challenges and Learnings

Challenges:

• Illustration Creation: Facing difficulties in creating illustrations due to lack of prior experience in such large-scale artwork.

• Book Design: Struggling to finalize the shape and style of the book and plan its content, being unfamiliar with book-making processes.

• Game Development: Overcoming the challenge of designing a game, specifically the concept of a snakes and ladders game, without prior experience in game development.

• Cultural Exploration: Although a personal learning experience, understanding and representing the cultural significance of the River Ganga posed challenges.

• Tech Hurdles: Difficulty in working with Unity software for augmented reality (AR) implementation, despite limited prior experience in technical aspects.

Learnings:

• Illustration Techniques: Gained knowledge in illustration creation, collage making, and composition skills.

• Design Principles: Learned how to distribute space effectively for text and images, maintain consistency, and create a connected accordion book.

• Iterative Prototyping: Developed skills in creating and refining prototypes at each stage of the project, incorporating feedback to improve each version.

• Information Sourcing: Enhanced understanding of sourcing information and conducting research effectively for project development.

• Tech Awareness: Gained insight into AR technology and its applications, even though faced challenges in its implementation, providing exposure to new technological advancements.

14. Reflections

This project has been a rewarding journey for me, where I not only enjoyed the process but also developed valuable skills along the way. Coming from a background where I had never worked on a visual-related project, especially one involving tech incorporation, I embraced the challenge with enthusiasm. It was a joy to work on both tangible and intangible aspects, from creating illustrations to implementing augmented reality (AR).

I particularly relished the opportunity to collaborate across disciplines, merging communication design and interaction design to create a cohesive project. Having people around me who supported and assisted with the digital and visual aspects was invaluable, enhancing both the quality of the project and my learning experience.

Through this project, I expanded my skill set beyond my core expertise, gaining proficiency in areas such as illustration, design principles, and technical implementation. I am proud of the progress I've made and the knowledge I've acquired throughout the process. These newfound skills will undoubtedly be beneficial in my future endeavors, enriching my capabilities and enabling me to tackle a broader range of projects with confidence and creativity.

15. Conclusion

In conclusion, this project has been a deeply fulfilling experience, both personally and professionally. Through the process of creating the book and incorporating augmented reality, I have not only expanded my skill set but also gained a newfound appreciation for the importance of the Ganga River in Indian culture and spirituality.

One of the most rewarding aspects of this journey has been the opportunity to raise awareness about the Ganga River among young readers. By presenting its story in an engaging and interactive format, I hope to instill a sense of pride and responsibility in them towards our natural heritage.

Furthermore, collaborating with experts in digital and visual design has been an enriching experience, allowing me to learn from their expertise and create a more impactful project. Their support and guidance have been invaluable in shaping the final outcome.

Overall, this project has been a journey of growth, learning, and creativity. I am grateful for the opportunity to contribute positively to the dialogue surrounding the Ganga River and to inspire others to cherish and protect this vital natural resource.

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