Helping children understand sustainability in traditional lifestyles through an interactive installation.

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Introduction

What do we think of when we hear the word “sustainability”? Perhaps we associate it with buying eco-friendly products, using solar energy or driving electric vehicles. Maybe cloth bags, paper straws and metal water bottles come to our mind. Although these things can be considered sustainable practices and products, there is much more for us to understand regarding the term.

The Cambridge dictionary defines sustainability as “the quality of being able to continue over a period of time” (“SUSTAINABILITY | definition in the Cambridge English Dictionary”, 2022). That definition fits in the environmental context too. Sustainability can be achieved by using earth’s resources wisely, causing little or no damage to the environment, and that requires more than just a few band-aid solutions. It requires a mass mindset change, a more permanent solution. One really needs to feel that they are not the centre of the world, that resources are limited. This change can not happen overnight, but only by slowly changing aspects of our lifestyles, our perspectives on various things and eventually, our actions.

Many cultures had, and still have, sustainability is interwoven into their lifestyles. It was not something that they had to “remember to do”, it was just how they lived. Many cultures emerge from the biosphere around them and utilise traditional knowledge systems to function. These cultures, with a more life-centric worldview, had a common

set of sustainability principles, which were expressed differently based on the context of the community. Over time, people's attitudes changed, as technology entered their lives, shifting towards more "human-centric" or anthropometric ways of thinking and living. Presently, large scale industries rule the world, and their methodologies are centred around either "making money" or "satisfying the customer", unbothered about the impact they have on the environment and the people around them.

The future of our world is in the hands of the young, the ones who have grown up in a world that seems to have an unlimited amount of resources. Yes, children are taught lessons in school about sustainability and things they can do to "save the world", but do they understand that it's our ways of thinking and living that need change? Is there a way to simplify the concept of traditional knowledge and the life-centric worldview into something that can be understood by a child?

This project explores what traditional cultures say about sustainability. An interactive installation meant for children was built, one that explains various aspects of culture that we can incorporate into our lives to be sustainable. Evaluation of the installation's impact on the children is also done in the end through a feedback session.

About the Project

Aim

This project will help children understand the concept of traditional knowledge, respect for nature and other important sustainability principles that are common in different traditional cultures. The current topic takes a zoomed out view on sustainability in cultures, not really focusing on a particular area, but with further research, a more focused approach might be taken. This was done as the main aim was to explain some key principles in these cultures, perhaps with the help of examples of events, movements or practices.

Children already have a certain amount of knowledge about sustainability, environmental pollution and eco-friendly practices, so rather than “teach” children about sustainability, the goal of the installation is to inspire, engage and provoke thought among young and impressionable minds.

Target audience

The target audience is school-going children living in metro cities in the age group of 10-15 years. English will be the primary language used in all parts of this project. The interactive installation will likely be installed in a place visited by children very often.

Secondary research

Understanding sustainability

Principles of Sustainability

As discussed in the introduction, the first step was to understand more about sustainability, and what makes cultures sustainable. Good sustainable practices are generally based on a firm set of principles. Principles are universal, and they are contextually translated for each culture so that they become more relevant to the people. Cultures can either be life-centric/ecocentric or anthropocentric, based on which their principles are built.

Some societies are inherently ecocentric or biocentric, and they believe that nature is not just equal to humans, but sometimes even divine and more powerful than us. There are many commonalities in these kinds of cultures, the practices they follow and this influences so many aspects of their lives, ways of thinking and dealing with issues. These cultures focus on elements of the geosphere and biosphere and consider them to be sentient. When cultures don't recognise the biosphere as sentient, alive or as having life-giving properties, then their strategies, and approach to life itself are very different.

Ecocentrism, Anthropocentrism

"Ecocentrism sees the ecosphere – comprising all Earth's ecosystems, atmosphere, water and land – as the matrix

which birthed all life and as life's sole source of sustenance" (Washington, 2017). This worldview sees the ecosphere as something sentient, and life-giving. Ecocentrists are not only concerned with humanity, they respect and care about all forms of life. Homo sapiens evolved out of the ecosphere and other species literally are our cousins and relatives. This places in our hands moral responsibilities towards all species and helps us recognize that we are a part of nature, not apart from nature; this erodes notions of human supremacy (Washington, 2017).

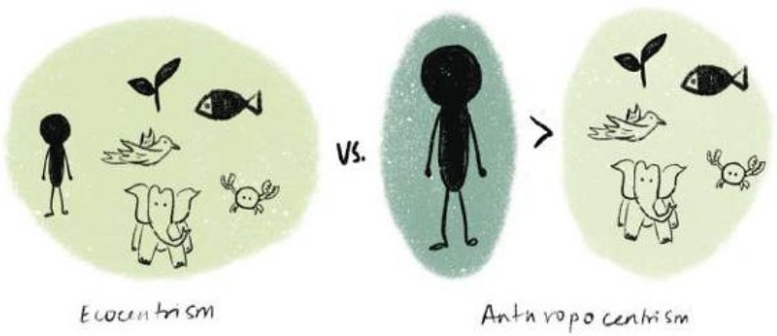


Fig. 1 *Ecocentrism vs Anthropocentrism*

Another environmental philosophy is deep ecology which says that every living being has its own inherent worth regardless of its value to humans and pushes for the restructuring of modern human societies in line with this ideology.

The other point of view is anthropocentrism, which is the belief that human beings are the central or most important entity in the universe. In the present, it is the prevalent ideology in most societies around the world and is given more importance in academia and domestic and international governance. (Washington, 2017)

Social ecology

Social ecology studies how human societies behave, interact with and respond to the environment around them, and how these mannerisms affect how they treat society and the environment as a whole, concluding that our views on society are a direct reflection of our views on nature. Murray Bookchin was one of the first people to talk about this, back in the 1960s, and he said that "all the problems we have in society today arise because humans strive for dominance over nature and constant prosperity at the cost of everything else, and eventually this lead the humans dominating over themselves, creating problems such as racism, casteism, genocide, etc". Ramachandra Guha and Madhav Gadgil are some of the thought leaders who have spoken about it in the Indian context.

Traditional ecological knowledge

In the paper titled 'Traditional Ecological Knowledge, Biodiversity, Resilience And Sustainability" authored by Berkes, Folke and Gadgil, it is mentioned that "traditional knowledge represents a summation of millennia of

ecological adaptation of human groups to their diverse environments. It is important not just for its own sake but for its potential to help design more effective conservation for biodiversity and for ecological systems in general." (Berkes, 1994). They also mention that we have very little understanding about how indigenous knowledge of nature has been translated to the usage of resources and how these are implemented by using social conventions, myths, taboos and similar methods.

Fig. 2 *Ritual inside a sacred grove in the western ghats*

Gadgil and Berkes, in 1991, identified some of the ways that resource use restraint is practised, in indigenous communities, and that has been quoted:

1. **Providing total protection to some biological communities or habitat patches** - Including sacred ponds, groves or mountains. In another paper by Gadgil, "The sacred groves of Western Ghats in India", he says that the preservation of this biological diversity, sacred groves, that are present in many parts of India, Asia and Africa, is economically significant as the species so preserved serve as sources of drugs being used locally. If these plants vanish, the knowledge about the traditional use of these will also vanish.
2. **Provide total protection to certain selected species** - Local people were often aware of the importance of Ficus as affording food and shelter for a wide range of birds, bats and primates, and this understanding was converted into widespread protection of Ficus trees in parts of India. Ficus is commonly known as banyan in some regions.
3. **Protect critical life-history stages** - In south India, fruit bats may be hunted when foraging away, but not at daytime roosts on trees that may be in the midst of villages. Similarly, Cree Indians of James Bay in the subarctic are avid hunters of the Canada goose, a major subsistence resource, but never kill or even disturb nesting geese ([Berkes, 1982)
4. **Organise resource harvests under the supervision of a local expert or group of people** - Fish are permitted to be killed by using poisons only once a year at the time of a communal feast in the month of April in the river Yamuna in Mussoorie situated in the

State of Uttar Pradesh in India (Maund festival). This might have been done to assess the status of prey populations and their habitats. This may have helped in adjusting how much is to be harvested, to sustain yields and conserve diversity.

(Gadgil, 1991)

Could cultural practices have deeper meanings?

The Indian landscape is rich and diverse. It has six types of physiographic regions - mountains, plains, plateaus, islands and deserts. The cultures of different regions have grown out of and are therefore governed by their geographic and climatic conditions and are so diverse because of the different kinds of landscapes. Many festivals and rituals have ecological bases, and the gap between traditional and scientific knowledge is decreasing with more studies being conducted to understand the intent of many practices in certain cultures. We shall now explore some of the traditional practices and see if there are logical reasons to follow them.

Harvest festivals

The South-West monsoon winds bring rain to the region, mainly from June to September. The monsoon also controls the economy of the entire subcontinent, as India is heavily dependent on agriculture, which is a huge contributor to the GDP. Over half of the population works in the agriculture sector. In many regions, especially India, the cultural calendars are heavily influenced by the harvest cycles and in turn, the natural monsoon and weather cycles. Harvest festivals are celebrated in many cultures and in many forms. These mark the end of the harvest season and also mark important astronomical and climatic events like the changing of seasons. These are also the fruit of labour, which unites the different communities. This is all the more important in agrarian societies as agriculture is a big part of their lives.

Kolam

Fig. 3 *Woman creating an elaborate kolam with rice flour*

In her book titled “Feeding a thousand souls: women, ritual, ecology in India – An exploration of the kolam”, Vijaya Nagarajan talks about the kolam, which are patterns drawn by women on house thresholds with rice flour. She relates the kolam to mathematics, spirituality, and the act of hospitality and says that it “repays the debt humans owe to

animals, by letting small insects, birds, and myriad such creatures feed on the rice flour".

Burlang Yatra

Fig. 4 *Burlang yatra celebrations*

Burlang Yatra is a festival that is celebrated on a yearly basis, starting with the women farmers of each village carrying seeds kept inside painted pots, placing them on their heads and walking to the host village in a procession that is then followed by the worship of seeds with the traditional lighting of diyas. This is followed by a collective exhibition of seeds, and then the exchange of seeds takes place between the farmers. Beneath this simplistic and commonplace description of the festival, however, a closer look reveals deeper intentions, like display and exchange of Seeds, sharing of food, cooking recipes and non-food products, sharing knowledge about farming practices and felicitation of farmers. (Saxena, 2020)

Shravan fasting during the monsoon

The Shravan fasting is done during the monsoon months, where women fast every Monday for 16 consecutive Mondays. Although science has no evidence, there is a commonly accepted reasoning behind this. The monsoon brings with it a host of diseases, and it is also the time where nature, especially aquatic life, procreates and ensures resources for the rest of the year. So could fasting and not consuming much during this fecund period ensure the availability of resources throughout the rest of the year? If so, this could be a resource use constraint that is a part of the traditional knowledge system.

Food-related practices

Vegetarianism, which is heavily encouraged in many cultures, is low energy consumption, less resource-intensive method of living. Hyperlocal cuisines based on food availability. According to present-day research, vegetarian diets are reported to be healthy options. Most plant-based foods are not too resource-intensive and taxing on the environment compared to the production of animal-derived foods. (Fresán & Sabaté, 2019). Food wastage is looked down on in many cultures. Serving food in leaf plates is a part of many festivities in India, and was done on normal days too. As we can guess, the leaf plates and cups are

renewable, biodegradable, non-toxic and antioxidant-rich along with their medicinal importance in Indian culture. (Kora, 2019)

From the rest of the world - Aboriginal culture

In the paper titled "Lessons for sustainability from the world's most sustainable culture" by Nick Wills-Johnson published in 2010, we find some important learnings from the ways of life of the Aboriginal Australian community, which are still relevant in the modern world. Aboriginal Australians have been living in the Australian landscape for a long duration and while changes have occurred, the landscape has been stable for thousands of years, suggesting that their methods are very efficient. Although colonization ended most traditional Aboriginal practices, they have continued to maintain their environment however possible. Some of the characteristics of their ways of life discussed in the paper are:

- Diffuse power of control over resources
- Reciprocity, within the community and externally
- Limited importance placed upon material wealth
- No overarching state
- Deep, spiritual commitment to sustainable resource governance.

The author also looks for evidence that modern cultures exhibiting similar characteristics may also be more environmentally stable, and after a lot of calculation and tabulation, he confirms that the claim holds true. But this is beyond the scope of this literature review so details about it will not be discussed here. (Wills-Johnson, 2010). This model is quite similar to the social ecology model discussed in the previous section, and they treat their people the same way they treat nature.

Fig. 5 *Australian Aboriginals using fire for land management*

Indigenous culture saving lives - stories of the Moken

A very classic example of traditional knowledge is the story of how the people of the Moken tribe survived the massive tsunami in the Indian Ocean that happened in 2004. A lot of destruction occurred to the mainlands of many countries, but the tribespeople from the smaller islands and archipelagos in the path of the tsunami were perfectly safe. Specifically, the Moken tribe residing in the Mergui Archipelago near the coast of Myanmar and Thailand. They

had stories of the “Laboon”, the giant “waves that eat people”, sent from up above to cleanse the earth of evil. Their stories told them about the receding water before the Laboons arrived, they saw other subtle signs and made it to higher ground in time. ("The Contribution of Traditional Knowledge and Technology to Climate Solutions", 2021)

Traditional practices leading to sustainability

Some examples of people and communities that used traditional knowledge to achieve sustainability in the Indian context are discussed below.

Auroville

Auroville is an experimental township, where people from all parts of the world reside. It is located in Tamil Nadu, on around 20 square kilometres of what was a barren wasteland. It has been transformed into a self-sustaining town with the use of a combination of traditional and modern science in the areas of land restoration, water management, waste management and so on. They undertake many environmental projects, which include:

- Sadhana forest - a piece of barren land was transformed into a lush green forest in 11 years.
- Auroville earth institute - which studies and builds sustainable buildings with natural materials.
- Solitude farm - does natural farming and has over 100 kinds of vulnerable plants.
  (Green practices, Auroville)

Kedia Village

Kedia is a village in Bihar, whose soil was leached of its natural nutrients and water retention capacity due to the overuse of chemical fertilizers. The farmers then used science, traditional knowledge, and their own experiences to restore their soil which brought prosperity to the community. They reduced their dependence on chemical inputs while enjoying healthier yields. (“How a Remote Bihar Village Ushered in an Organic Farming Revolution in Just 4 Yrs”,2019)

Waterman of India - Rajendra Singh Rana

Rajendra Singh is a water conservationist, who has helped villagers from regions near the Thar desert take charge of water management using traditional techniques like Johads, rainwater storage tanks, check dams and other efficient techniques. He started his work in 1985, and as of now, he (through his NGO “Tarun Bharat Sangh”) has helped build more than 8,600 johads and other water conservation structures, bringing water back to over 1,000 villages and reviving five rivers in Rajasthan, which were dried up. (“This man helped build over 8000 water tanks in over 1000 Rajasthan villages“, 2018)

Installation design, children

Interactive installations are a great way to engage people and especially kids and leave a long-lasting impact and memory of what is being conveyed. Engagement is much deeper than traditional digital media. Hands-on experiences are almost always a better way to really understand something. “What separates interactive installations from other types of art installations is that the work is only realized through a participant’s actions, and those actions do not require special training or talent to perform” (Wrinkler, 2000).

Factors contributing to the audience experience
The paper titled “Audience Participation and Response in Movement-Sensing Installations” by Todd Wrinkler published in 2000 examines factors contributing to the audience experience and talks about **4 factors to understand complex relationships** in movement sensing installations (Wrinkler, 2000)

- Digital factor: anything that uses a computer
- Physical factor: installation space and set. How people move around in this place matters
- Social factor: examines the relationships between people before, during, and after the installation experience. The ability to have companions and interact with them together is generally appreciated.
- Personal factor: Some might enjoy the attention of an audience, others might be intimidated by spectators, or body-conscious and uncomfortable being watched.

Designing the installation
An important insight was noted while examining the project titled “Food Force II: Community Learning through Storytelling”. It says that classical stories for children are based on simple yet **powerful abstract concepts** such as good and bad, courage and cowardice, which can be easily understood by children (Gupta, 2008)

The paper by Gordon Tiemstra titled “Guidelines to Design Interactive Open-ended Play Installations for Children Placed in a Free Play Environment” examines how children play with an interactive open-ended play installation where children can create their own game goals and rules. They proposed certain **guidelines to overcome challenges** including how to get children started with creating games, and develop rules as they play, and how an interactive open-ended installation can be flexible in including different amounts of children and play objects. The guidelines are formulated in such a way that they are multi-interpretable and applicable to a variety of installations. The guidelines are as follows:

1. Communicate the action possibilities of the installation through clear and consistent semantics
2. Provide feedback and feed-forward on interaction opportunities.
3. Social interaction should provide advantages for the game that is played
4. The enjoyment the installation triggers should be subordinate to the number of players that are engaged.
5. If designing for a system that allows easy joining during ongoing games, physical boundaries should be eliminated
6. The objects the installation should be at a level of abstractness that does not demotivate the children.
7. Provide opportunities that support change in the characteristics of the play activity

(Tiemstra, 2011)

Another paper, called "Designing an Interactive Installation for Children to Experience Abstract Concepts" by Anna Carreras et al in 2009, emphasizes that "**users' actions must be placed at the centre of the design** and the meaning must be generated by making the users live the concepts through designing accurately their attitudes". This helps them understand the interaction in more depth, knowledge can then be gained through the interaction. It also highlights the advantages of using **full-body interactions**:

- Helps include more actions and activities to the gameplay and explore richer communicative dialogues.
- Users need not wear any sensors, cables or markers, making the installation extremely accessible to all sorts of the public.
- Users can approach the installation and start interacting right away and can focus on the content instead of the wearable technologies.
- Non-invasive systems and especially artificial vision systems achieve an interaction without having to manipulate physical elements, hence maximizing robustness and minimizing maintenance.

(Carreras, 2009)

Some more insights from the paper titled "Learning from interactive museum installations about interaction design for public settings" by Eva Hornecker et al in 2006 have been listed (Hornecker, 2006)

- **Creative, communicative and personal interactions** are valuable for installations in public spaces. Vice versa, museum installations seem a useful testbed for exploring these types of interactive experiences
- The only exhibits that succeeded in reaching all types of visitors (as observed by them during the analysis of data gathered) were the **hands-on interactive exhibits**.

Significant case studies

Gravity

This installation, which was designed by French-Chinese artist Shen Yuan for the West Bund Museum, talks about marine pollution. Instead of directly communicating the message, the artist has put together a project that requires little reflection and a lot of hands-on activities. The audience is invited to play a part in cleaning up the ocean. Parents and their kids are told that they are in a fantasy underwater world and that there is a lot of rubbish in it, as a museum guide points to a pile of empty plastic bottles, packaging and cardboard. Then, the kids, with the help of the guide and parents, begin knitting simple rugs resembling the ocean floor. ("This interactive installation teaches kids about environmental protection", 2021)

Fig. 6 *Audience interacting with "Gravity" at West Bund*

"Duck Off"

This was created by Stephanie Romig-Orr, with the Urban Green Line in 2012. This was a project for the British Waterways Trust in Hackney, who wanted volunteers to pick up litter. Narrative environment design was used to make litter-picking into something fun, and "capture people's imagination". Beyond the installation itself, the campaign included posters, social media content and events during the litter-picking session to make it more fun. The impact of the project was measured by the number of volunteers who turned up, which increased substantially with the project. (""Duck off" with the Urban Green Line – Stephanie Romig", 2021)

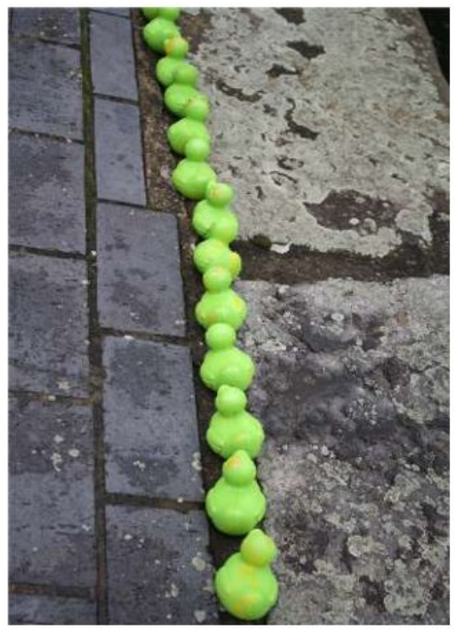


Fig. 7 *Duck off by Stephanie Orr*

Pollution Pods

This experiential installation was created by artist Michael Pinsky, and consists of five geodesic domes, recreating five environments of contrasting air quality, including nitrogen dioxide, sulphur dioxide and carbon monoxide levels. The audience can experience breathing in Tautra, Norway, in direct comparison to that in cities like London, New Delhi, Beijing and Sao Paolo. Immersing the audience, asking them to breathe while imagining certain conditions is a powerful way of engaging the public. ("Pollution Pods — Climart", 2021)

Fig. 8 *Pollution pods by Michael Pinsky*

Breathe with me

In the central park, New York, a path with wave-like walls was erected and people were invited to draw two blue lines in a downward direction every time they exhaled. It aimed to shed light on air quality and climate change, as well as highlighting that breathing is an act done by the entire society, not just individuals. This kind of community installation brings people together and has the potential to create deeper forms of engagement on a local level. ("'Breathe With Me' Art Installation Reaches Millions to Inspire Action for the Global Goals", 2021)

Fig. 9 *Breathe with me, Central Park, New York City*

Primary research

Goals of discussions

The main aim of these discussions is to understand their level of knowledge regarding sustainability, how culture plays a role and their interest to learn about these things. Some of the major questions asked were (not only limited to these):

- What do you understand by the term sustainability?
- Where do you hear it often?
- What have you learnt about it in school?
- Do you think it's necessary to be sustainable, is it a real issue in today's world?
- Do you think your grandparents know about sustainability? Do they follow sustainable practices?
- Do you think our culture is sustainable?
- Why do we celebrate festivals? Why do you think certain festivals are celebrated at certain times of the year? Is there any logic to it?
- Would you like to learn more about our traditions and the reason why we practice them?

Some questions regarding fun interactions and experiences were also asked:

- Have you visited a museum or art show?
- What were the most fun and memorable exhibits?

- What was one thing you saw or did there that made you think deeply when you went back home?

Parents and grandparents were also interviewed. Although they are not the target audience, they might have valuable insights about their children's behaviours, thoughts and interests.

Major insights

Based on the interviews conducted already, a few important observations were made.

- Students already have a considerable amount of knowledge about sustainability, resource conservation
- Places, where they hear about sustainability, are mostly schools, and sometimes social media, television environmental enthusiasts and events like a nature walk or awareness campaigns.
- They think the older generation of people do follow eco-friendly practices, using old things again and again
- They do feel the need to be conscious of our actions, and they give examples such as using less plastic, conserving electricity.
- Elders mainly teach us morals, and how to think and act, and that kids don't really follow it.
- They feel that old practices were more sustainable and eco friendly and festivals were more about religious beliefs and prayers.
- They mentioned that some festivals might be in full mood and new moon days, and in different seasons.
- Most of them said that they would like to know more about traditional practices and the reason behind them.

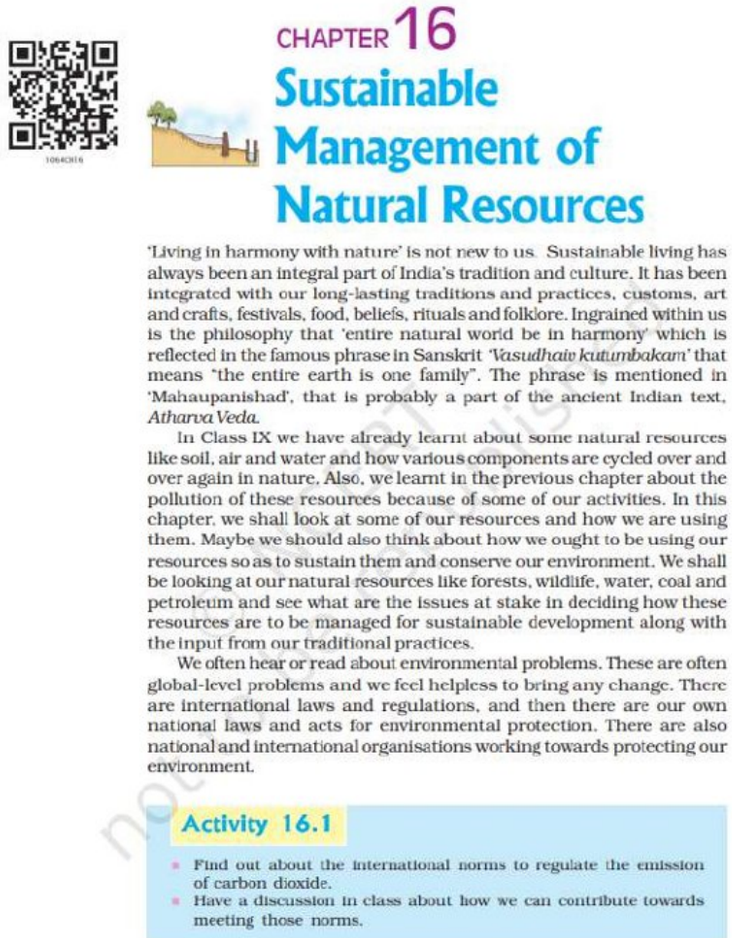
NCERT lesson on sustainability

The NCERT class 10 textbook has a chapter called "Sustainable Management of Natural Resources". It talks about a wide range of environmental issues and suggests solutions. The highlights:

- Our resources like forests, wildlife, water, coal and petroleum need to be used in a sustainable manner.
- Refuse, Reduce, Reuse, Repurpose and Recycle
- Management of forest resources has to take into account the interests of various stakeholders.
- Dams are harmful, locale-specific alternatives must be allowed, power should be given to locals
- Fossil fuels need to be used judiciously as they will get exhausted at some point.

The curriculum (by CBSE) taught to them is human-centric, and they are not exposed to other approaches like social ecology, ecocentrism or any other worldviews. It only talks

about fixing the problems that we create, but not really about how we can create lesser problems. In fact, all who were interviewed were not familiar with terms like traditional knowledge, ecocentrism, anthropocentrism and so on. It is also taught to them at a late stage of class 10.



CHAPTER 16

Sustainable Management of Natural Resources

'Living in harmony with nature' is not new to us. Sustainable living has always been an integral part of India's tradition and culture. It has been integrated with our long-lasting traditions and practices, customs, art and crafts, festivals, food, beliefs, rituals and folklore. Ingrained within us is the philosophy that 'entire natural world be in harmony' which is reflected in the famous phrase in Sanskrit *'Vasudhaiv kutumbakam'* that means "the entire earth is one family". The phrase is mentioned in 'Mahaupanishad', that is probably a part of the ancient Indian text, *Atharva Veda*.

In Class IX we have already learnt about some natural resources like soil, air and water and how various components are cycled over and over again in nature. Also, we learnt in the previous chapter about the pollution of these resources because of some of our activities. In this chapter, we shall look at some of our resources and how we are using them. Maybe we should also think about how we ought to be using our resources so as to sustain them and conserve our environment. We shall be looking at our natural resources like forests, wildlife, water, coal and petroleum and see what are the issues at stake in deciding how these resources are to be managed for sustainable development along with the input from our traditional practices.

We often hear or read about environmental problems. These are often global-level problems and we feel helpless to bring any change. There are international laws and regulations, and then there are our own national laws and acts for environmental protection. There are also national and international organisations working towards protecting our environment.

Activity 16.1

- Find out about the international norms to regulate the emission of carbon dioxide.
- Have a discussion in class about how we can contribute towards meeting those norms.

Fig. 10 *Page from the class 10 science lesson*

Redefining the Aim

What is the problem?

Based on the primary and secondary research, a few things were clear; Although students are taught about sustainability, eco-friendliness in school, all the knowledge imparted is mostly about the existing problems, and although solutions are suggested, there is no mention of the deeper lifestyle and mindset changes required to achieve actual sustainability. The syllabus is human-centric, and exposure to life-centrism at a young impressionable age can definitely provoke thought. School is not the only place where they learn about this, they are exposed to it from social media, friends, news and so on.

Also, based on the discussions conducted in the primary research phase, children do not seem to be aware of the concept of traditional, and underlying logical reasons of why certain practices were (and are) followed. It is mostly associated with religion, which is completely fair on their part as that is what they are taught. There is no knowledge about the broader ideas of ecocentrism, social ecology, but only surface-level knowledge of western notions like “saving the environment” when in reality, we are just trying to save ourselves from extinction.

After secondary research, the importance of traditional knowledge was understood. A multitude of scientists and ecologists recommend using it to design better and decentralized ecology management systems. One can also

understand that most cultural practices were elements of a wider system of a particular region's biosphere and geosphere, where every person played their part in paying the environment its due respect, using resources carefully and allowing time for nature to heal, when resources are taken.

My personal take

On a personal level, one should not dismiss the knowledge they inherit from their previous generations, it is years of tacit knowledge collated and documented, that is passed down from generation to generation. At the same time, blindly following practices without understanding or trying to understand why it was done is of no use and causes more destruction. On a more general note, more research should be encouraged to bridge the gap between traditional knowledge systems and modern science. Ignoring it and starting from scratch would be like reinventing the wheel. Exposing children to topics such as social ecology, anthropocentrism, and traditional ecological knowledge will encourage future generations to hold on to their roots and make use of this knowledge to design better solutions to sustainably coexist with nature.

Refined aim: What the installation has to convey

This installation experience must show the audience that

- In many traditional cultures, most practices were elements of a bigger system of their environment, where every person inherited traditional ecological knowledge, played their part, saw the bigger picture and was therefore inherently sustainable.
- These practices were encapsulated in a cultural layer, which is a more normative way of sharing knowledge.
- When these layers get detached, things like taboo, superstitions arise, but audiences will be encouraged to dig deeper to see whether it is something really beneficial or not, to both us or the environment.
- Sometimes traditional practices may not apply in every situation or geographic condition. One must understand the deeper intentions and then proceed to adapt the knowledge to current scenarios.
- Traditional knowledge doesn't have everything figured out, but we need not dismiss it and rely purely on modern science. We need not be polarized about the superiority of either traditional knowledge or modern science, but try to use both to achieve sustainability.
- The audience must leave pondering about seeing the bigger picture, and how they can incorporate what is done in traditional lifestyles into their current lifestyle.

Ideation

Content

As described in the previous section, the main parts of the content would be understanding traditional ecological knowledge and how it plays an important role in preserving nature, cultural layers in which the scientific layer is wrapped, and understanding that we are all part of a bigger picture. Instead of making claims about the deeper meanings of practices, questions were posed to the audience themselves.

The content was written and has been mentioned in **Appendix (A)**. It is split into 7 parts, with examples and a drawing prompt for each of them. It has been summarized below.

- What the traditional definition of **sustainability** is.
- What is **traditional knowledge,** how it's passed down from generation to generation.
- How this knowledge is wrapped in **layers of culture** and is known to us as rituals, songs and stories.
- How **culture asks us to be more respectful towards nature**.
- How knowledge is knowledge, no matter if it's traditional or modern.
- The need to adapt traditional practices to current situations, **understand the intention** and find better

ways to practice them

- Summary & examples of communities that are putting all this into practice.

The content is of 3 types - Main content, examples and interactive prompts.

Fig. 11 *Types of content*

The content is summarized in the image below:

Fig. 12 *Summary of the content*

Key takeaways from the secondary research about installation design:

1. Factors that contribute to audience experience, digital, physical, social, and personal. Consider the location, the kind of audience - are they willing to interact with it in public, or collaborate with other viewers
2. Consistent semantics, a certain level of abstractness can make the audience inquisitive, but not so much that they lose interest.
3. Some desirable attributes when designing for kids
    - Collaborative installations
    - Hands-on interactive
    - Full body interactions
    - Non-invasive - not having to wear/hold things for long periods of time to witness the installation.

Pandemic restrictions

Some important things to keep in mind while designing during the pandemic were highlighted in the “Hubub guide to creating impactful installations”, which were found useful to this current project too ("Creating Impactful Installations | 2021 Report | Hubbub", 2021):

- What are the specific Government guidelines that we need to adhere to; limit the number of people

interacting with the installation at any given time, make sure visitors wear face masks, make hand sanitiser available, implement a one-way system?

- What issues are people concerned about, and how have their priorities changed in the current crisis?
- Will people be less willing to stop and interact with strangers? How can we make them feel more comfortable?
- How can we create an engaging installation while also limiting social interaction?
- What senses can still be utilised (e.g. sight, sound and smell can be more relevant than tactile approaches)?

Mind mapping

Mind mapping is to be done to further explore how to present the content to a child in their context. These maps will aid in idea generation.

Mapping a child's world

A mindmap of the average child's actions, things and people they interact with and places they go to was created. These aspects while deciding where to put up my installation

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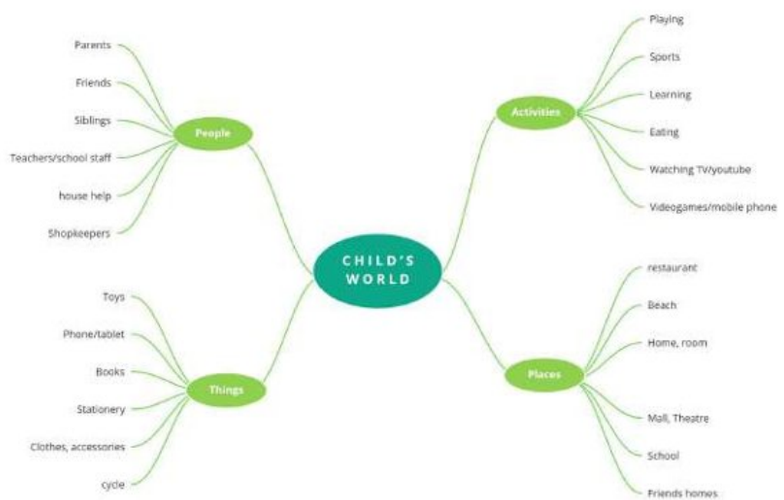

Fig. 13 *Mind map of a child's world*

Sensory mapping

The sensories that can be utilized were mapped out, keeping in mind the pandemic restrictions. Visual, auditory, proprioception and touch were explored, in that order of preference. From the discussions with the target audience, it was understood that the most impactful installations/interactive exhibits were ones they could interact with, most importantly touch. So, a strategy to minimise touch but somehow give the same experience must be sought after.

Collaborative experiences were also encouraged by every piece of literature that was surveyed till this point, so a collaborative but not crowded experience will be ideal.

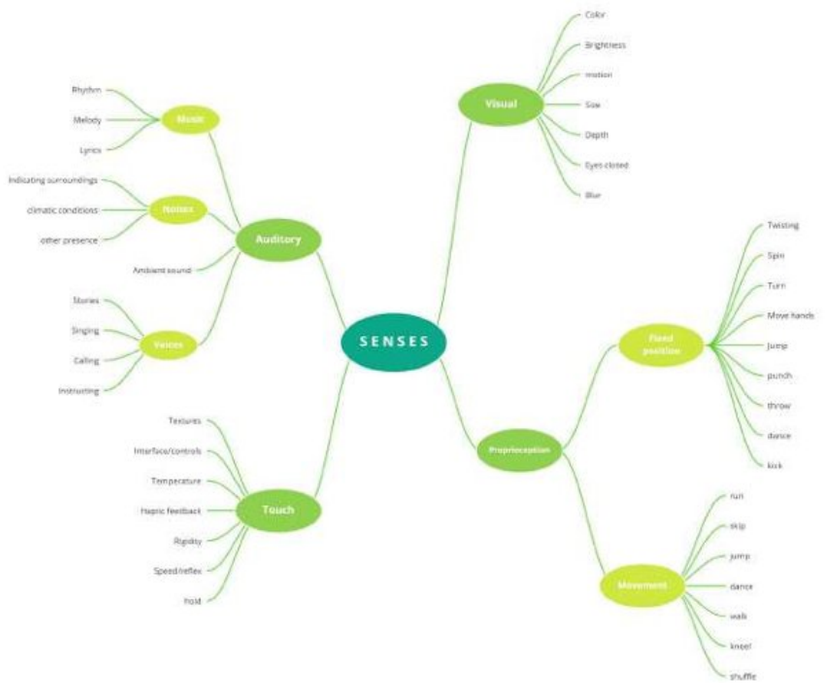

Fig. 14 *Sensory mapping*

Media map

Media mapping was done to understand the potential kinds of media that can be used. They have been categorized as tangible and intangible, and further technological and non-technological to make it easy to make multiple combinations.

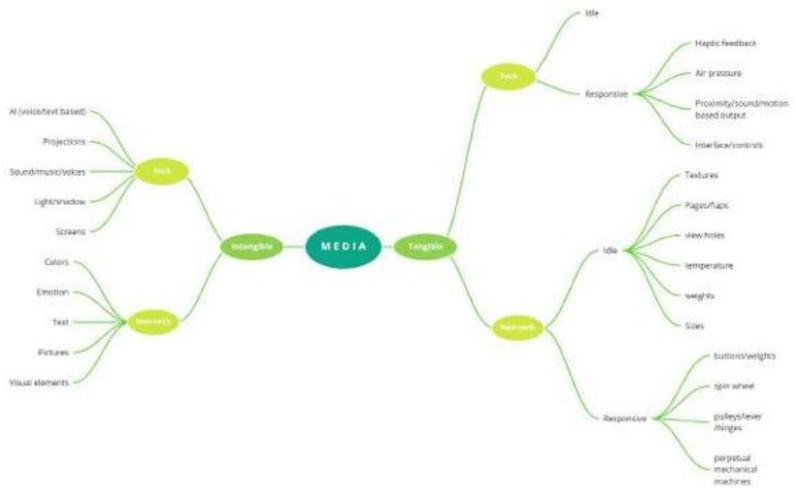

Fig. 15 *Media mapping*

Common interactions

Keeping the pandemic scenario in mind, a word cloud of common methods of interactions are listed below.

Fig. 16 *Word cloud of interactions*

Initial Ideas

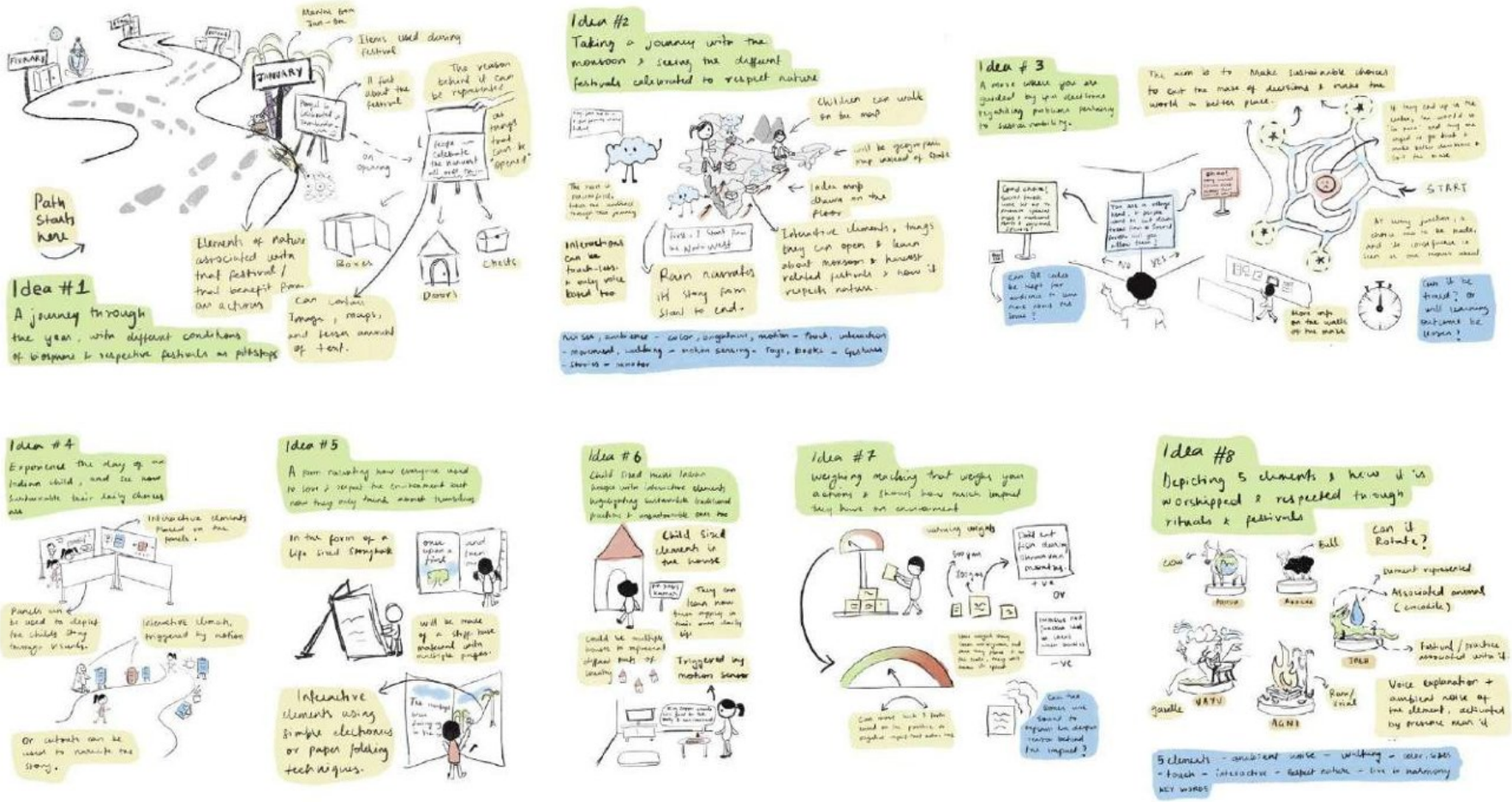

Fig. 17 *Ranking the ideas*

Based on the literature review, some Initial ideation was done, and the issue with most of them was that the content that they would convey was extremely different for each of the ideas. Therefore, ideation was done again.

Refined Ideas

Sustainabili-tree

This installation will involve the tree at the IDC entrance, from which will hang “fruits of wisdom”, which are audio devices that will play a voice recording of each part of the content. Next to these fruits of wisdom, posters, images and interactive elements will also be suspended.

Fig. 18 *Sketch of the sustainabili-tree*

The audience will **consume** the information, **observe** the supporting content and **act upon** what they have learnt through prompts to write and draw their thoughts. The main sensories one would need to use here are auditory (listening to the fruits of wisdom), tactile(interactive elements, prompts for drawing) and visual(posters and images), in the order of prevalence. This uses fewer materials and generates less waste and also fits the theme of sustainability very well.

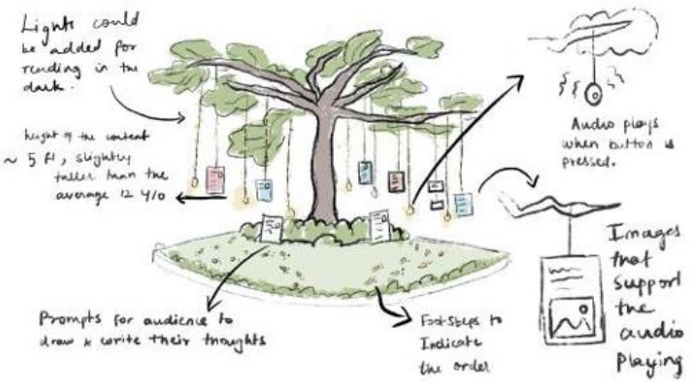

Fig. 19 *Features of the sustainabili-tree*

The content placement will be in the manner shown in the diagram below and the numbering corresponds to **figure 12** shown previously in this section.

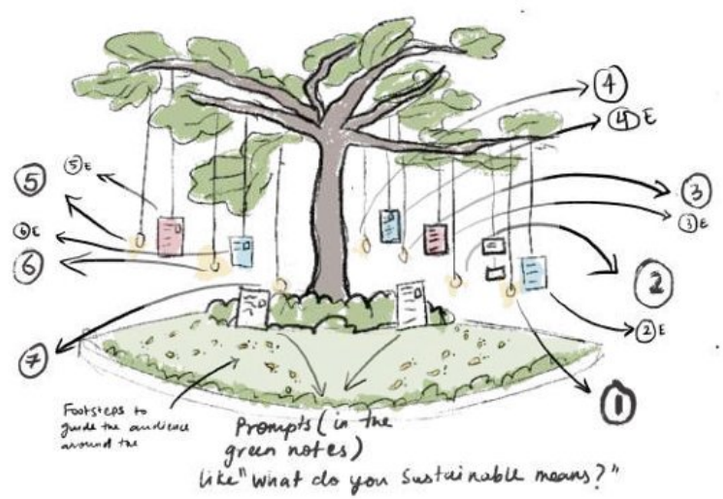

Fig. 20 *Content placement for the tree of knowledge*

The interactive elements of the installation have been highlighted in the image below.

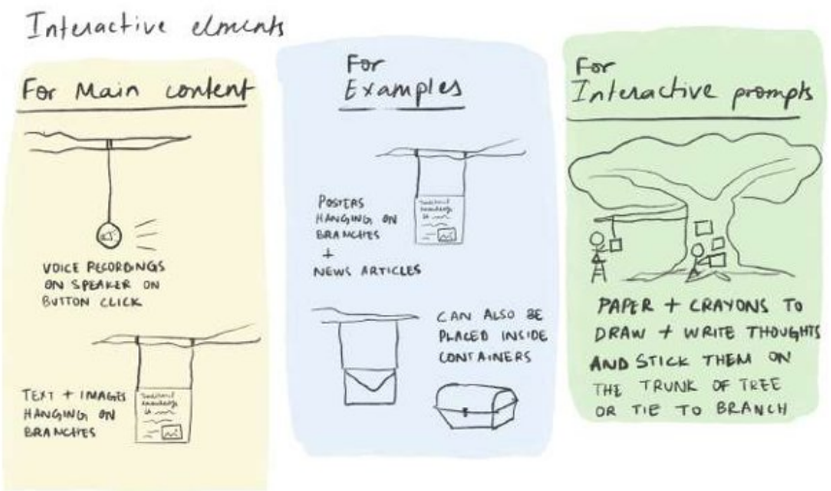

Fig. 21 *Interactive elements for the sustainable-tree*

Hands-on experiences are much more memorable, and the drawing prompts give the audience the chance to reflect on their thoughts as soon as they learn something new.

Storyboard for the sustainable-tree

The story shows the experience of 2 children who live on the IITB campus who visit the installation.

Fig. 22 *Storyboard for sustainable-tree*

Path to sustainability (version 1)

This installation will be a path with many turns, with content put up on the walls of the path. Posters and interactive elements like doors and windows will also be put up. The path may split into 2 and rejoin for questions or examples.

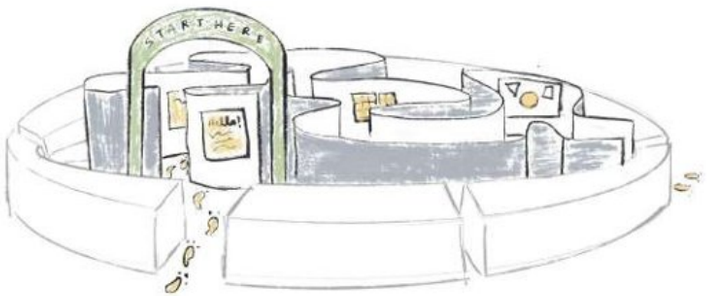

Fig. 23 *Sketch of the path to sustainability v1*

The features of the installation have been explained in the image below:

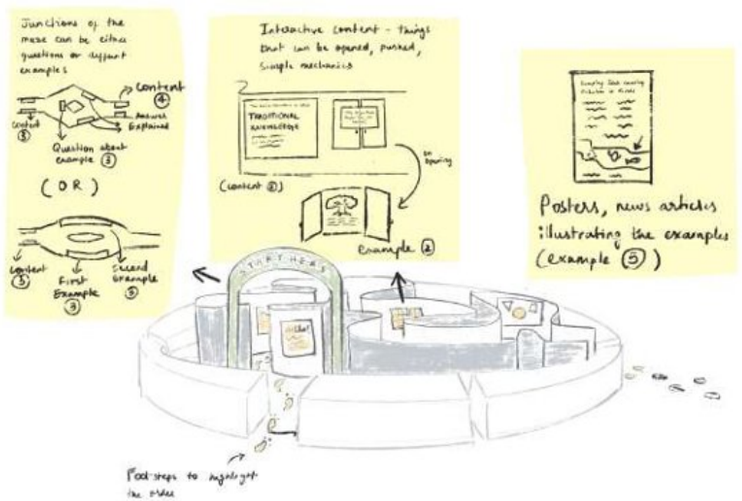

Fig. 24 *Features of the path to sustainability v1*

The content placement will be in the manner shown in the diagram below, and the numbering corresponds to figure x.x shown previously in this section.

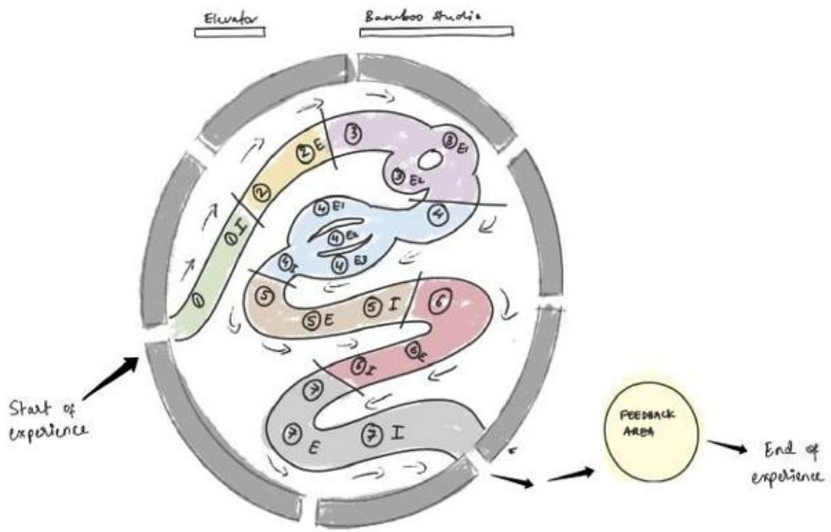

Fig. 25 *Content placement of the path to sustainability v1*

The audience enters, unaware of how culture can teach us sustainability principles, enter the path, answer questions, learn new things and come out as more aware individuals. Narrative installations make use of paths quite often to deliver information chunk by chunk, and this one tries to do just that.

The interactive elements of the installation have been highlighted in the image below:

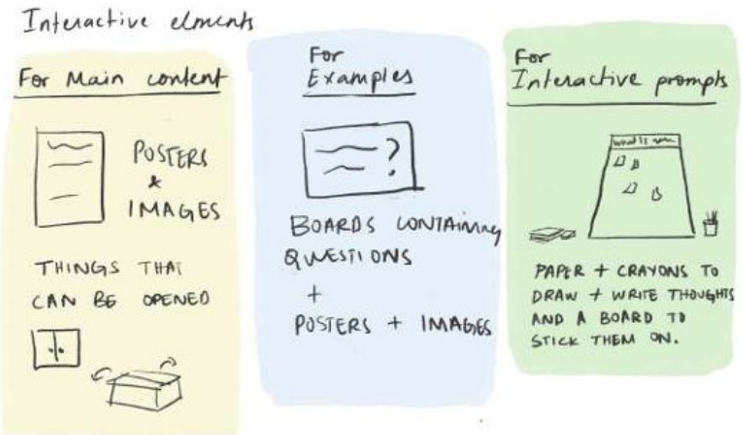

Fig. 26 *Interactive elements for the path to sustainability v1*

Storyboard for the path to sustainability v1

The story shows the experience of 2 children who live on the IITB campus who visit the installation.

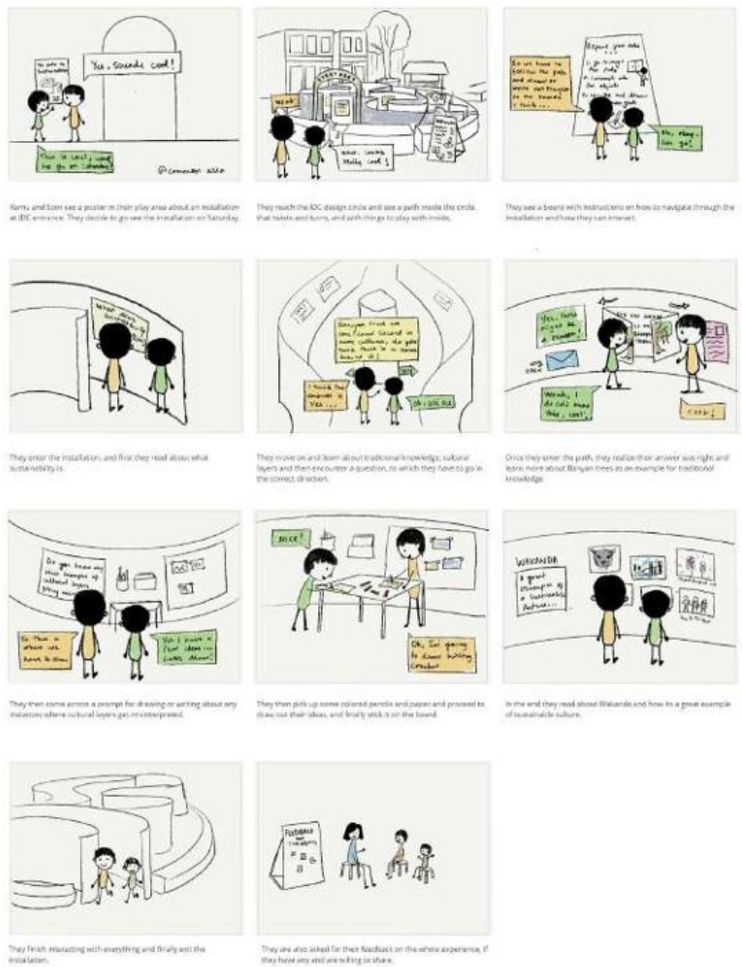

Fig. 27 *Storyboard for the path to sustainability v1*

Path to sustainability (Variation 2)

This installation will be a path around the design circle. It will be split into 3 parts - introduction, “how is culture sustainable” and “in the current context” and the audience has to pass through doorways to move to each part, signifying opening doors to new knowledge. The features and content placement of the installation: Features and content placement are shown below:

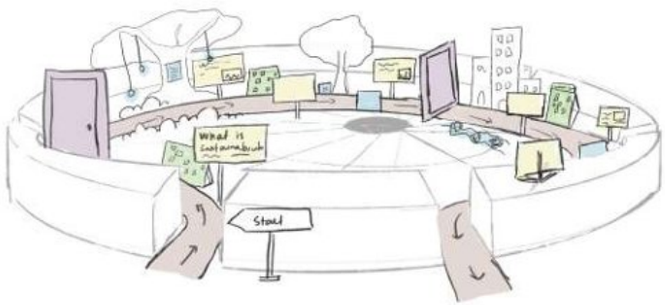

Fig. 28 *Sketch of the path to sustainability v2*

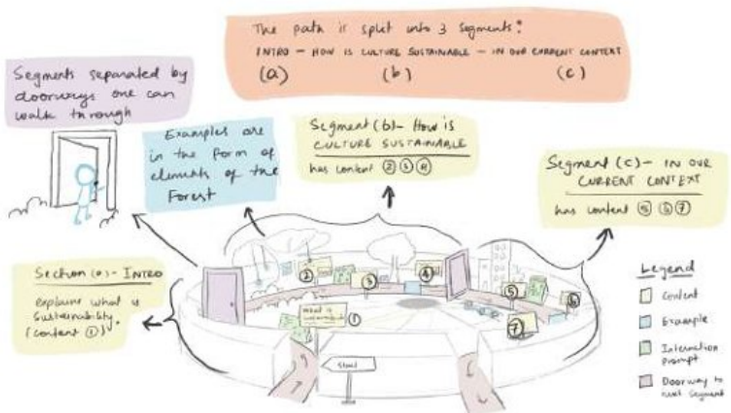

Fig. 29 *Features, content placement of path to sustainability v2*

The backdrop will be populated with cardboard cutouts to illustrate the content. Posters will be used for the primary content and the backdrop will have interactive elements, like fruits hanging from a tree or a polluted river.

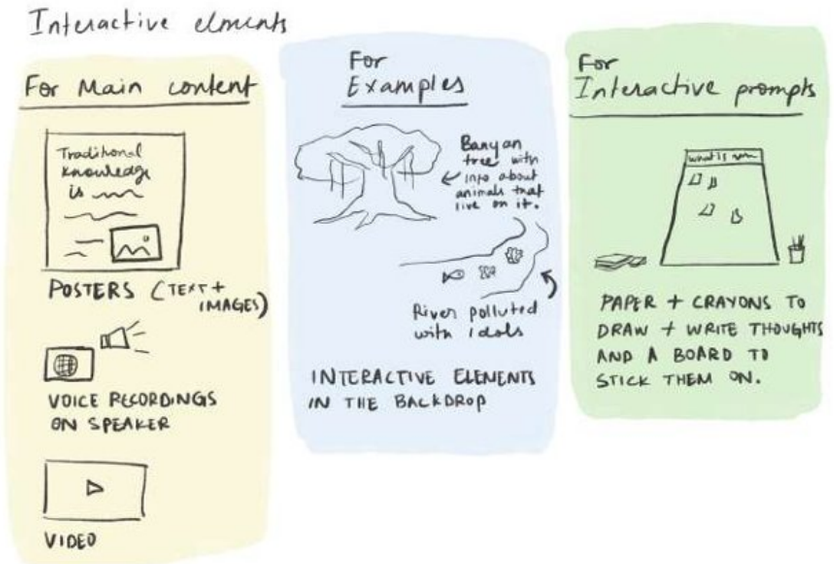

Fig. 30 *Interactive elements for the path to sustainability v2*

There are many interactive elements in this variation and will be quite interesting for the *audience* because of the feeling of moving from one environment to another through a door. As discussed in the literature review, full-body and collaborative aspects make the experience more wholesome, and this idea achieves that.

Storyboard for the path to sustainability v2

The story shows the experience of 2 children who live on the IITB campus who visit the installation.

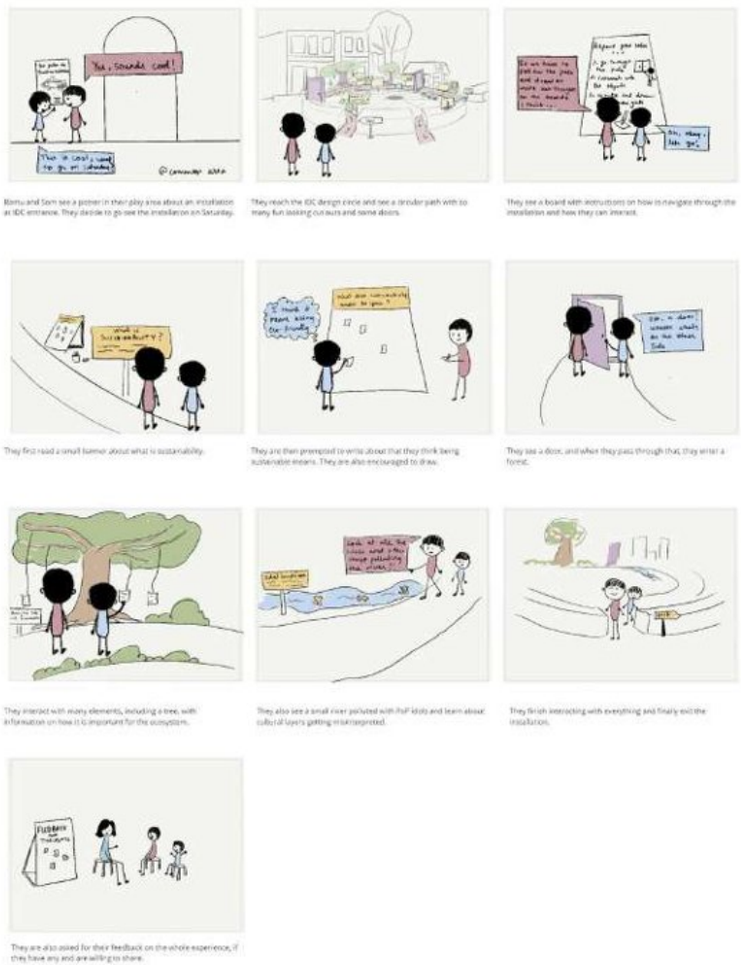

Fig. 31 *Storyboard for the path to sustainability v2*

Ranking the ideas

To pick an idea, ideas were ranked, were shown to target audience members and feedback was noted

Ranking

Based on the literature review, some parameters on which the ideas can be scored and ranked have been listed below, to pick one idea to proceed with. All scores were out of 10, with a final score out of 40. (Content is the same and hence it has not been included in the scoring process)

- Engagement (Low - high)
- Collaboration (Low - high)
- Interactivity (Low - high)
- Technical feasibility (not feasible - feasible)

Parameters/Ideas	Engagement	Collaboration	Interactivity	Technical feasibility	Overall (40)
Sustainabili-tree	7	7	8	9	31
Path to sustainability v1	8	9	8	5	30
Path to sustainability v2	8	8	8	6	30

Fig. 32 *Ranking ideas*

The tree of knowledge scored the highest, as it was more technically feasible. It also suits the theme of sustainability as it is less resource-intensive and feels closer to nature since it is built around the tree.

Discussion with audience

After having discussions with three members of the target audience, some important insights were gathered. When asked their preference, most of them preferred the path to sustainability version 1 and the tree of knowledge.

Fig. 33 *Comments from target audience members*

Based on the feasibility and comments, **the tree of knowledge idea was taken forward.**

Idea elaboration and execution

Why sustainabili-tree?

A tree is a great example of a self sustainaing ecosystem, It houses so many other creatures, and gives much more than it takes. The tree is also a very familiar to children, and since the tree is the center of this theme, it will work well in communicating the idea to the audience. Walking in the grass, around the tree is a refreshing experience, and it feels closer to nature, therefore boosting the installation's impact.

Narrative

A simple narrative, of the tree wanting to tell people about sustainability in culture, was added on top of the existing idea, to make it more interesting, and like a conversation between the audience and the tree. It has been outlined in the image below:

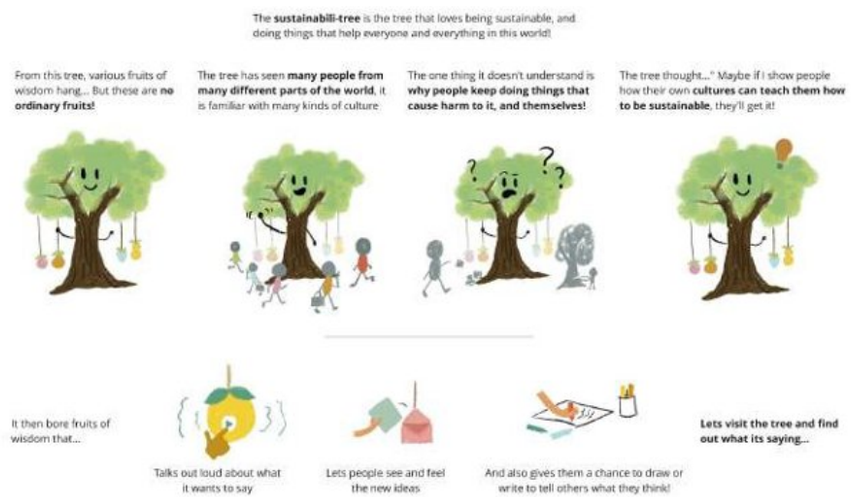

Fig. 34 *Ranking ideas*

Technicalities

The installation was proposed to be built around the tree at the entrance of IDC, and various elements will be suspended from the branches of the tree. The audience can walk around the tree, interacting with the elements and also drawing and writing their thoughts in prompts placed in every junction. Precautions like social distancing and hand sanitiser will be enabled when audiences interact with the installation. Biodegradable, recyclable and repurposed materials and borrowed items will be used to build this.

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Parts of the installation

The various parts of the installation have been summarized:

1. **"Fruits of wisdom"**
    - Audio recordings of the script are first made.
    - Mobile phones are placed inside a fruit shaped cover, with a bit of touch screen exposed. When the play button is pressed, audio of the content will be played.
2. **Visual content**
    - Other content to support the audio playing - examples in the form of posters, images, news clippings
    - Can be interactive, like opening envelopes to read the content
3. **Tactile/interactive elements**
    - Objects, interactive posters shall also be suspended next to the audio devices. Could involve playing with clay, opening up cards.
4. **Drawing prompts**
    - In certain sections of the content, there are prompts for the audience to draw or write what they think about what they just learned.
5. **Other elements**
    - Face on the tree to make it look animated.
    - Cutouts of footsteps shall be placed to nudge the audience into interacting with the elements in the correct order
    - An instruction banner will be placed in the front, explaining how to interact with the fruits of wisdom, drawing prompts and other elements. Covid protocols to follow will also be mentioned.
    - Ambient music will be played through a speaker placed in the centre.
    - Signage, event posters

Shown below is the manner in which the items will be hung from the branches of this tree:

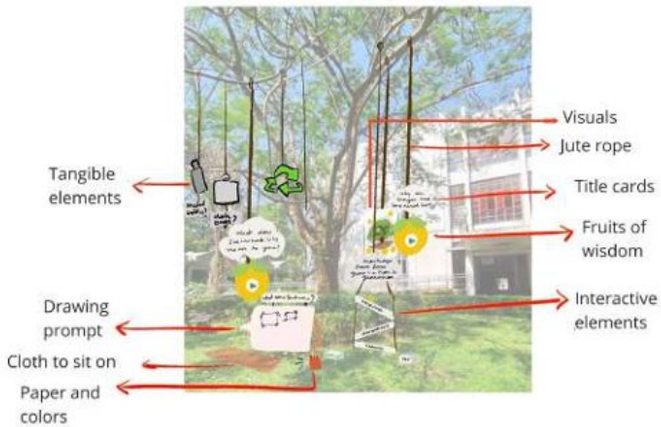

Fig. 35 *Ranking ideas*

Modifying the content

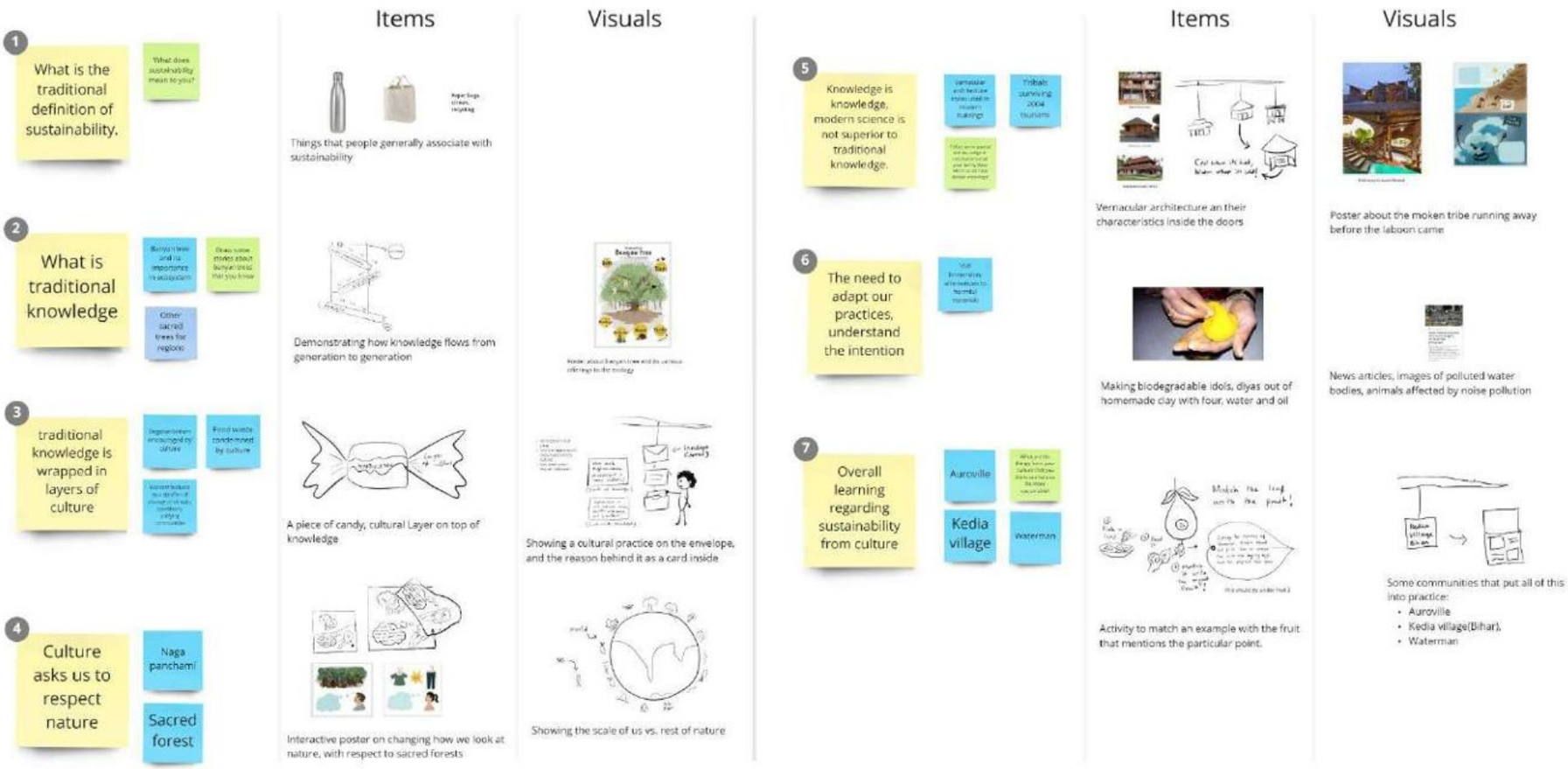

Fig. 36 *Mapping of content to interactions*

The content was kept the same but the tone of delivery was changed. Statements were changed into questions. The interactive elements were also customized for each part of the content. The script can be found in **Appendix B**. The entire mapping of content (script) to interactive elements is in this [miro board](#).

Location

Fig. 37 *Tree in front of IDC*

Fig. 38 *Paper model of tree in front of IDC*

The tree in front of the IDC entrance and the area around it is the proposed location for the installation. After analysing the area, a rough paper model of the idea was made.

- The tree had 7 sturdy branches to hang up the audio devices, and other minor branches to hang the posters and interactive elements.
- The elevation of branches ranged from 3 metres to 8 metres.
- The prompts could be placed on the ground, next to the relevant audio device

This is meant to be a one time installation and therefore a conscious effort was made to only use biodegradable materials, or repurpose items that were discarded.

Prototyping

Interactive elements

Firstly, the fruits of wisdom were first prototyped using a mobile phone, with an HTML page that plays the audio recording when the play button is tapped. A title card was placed on top to inform the audience what the content is.

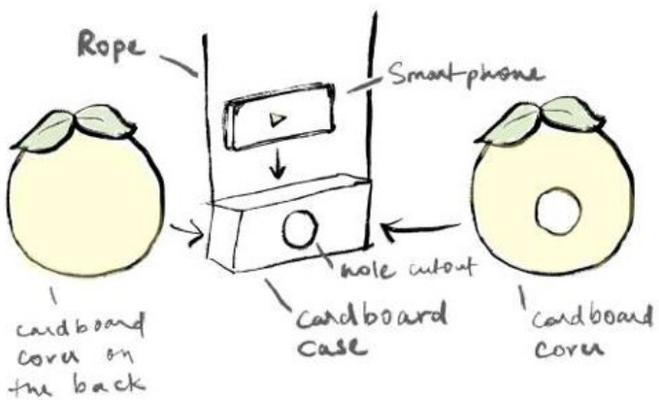

Fig. 39 *Sketches of proposed fruits of wisdom*

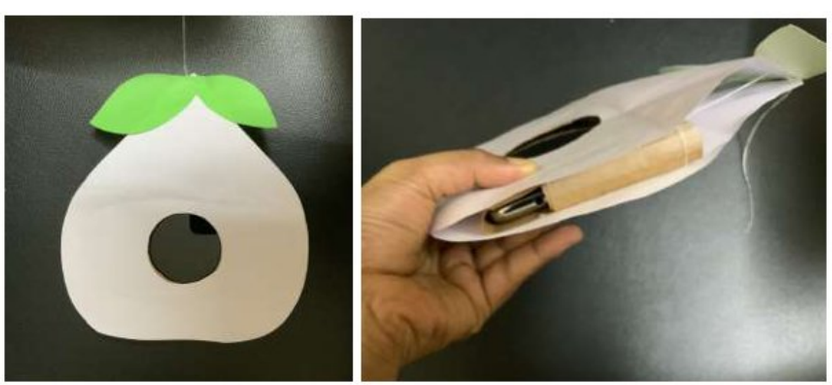

Fig. 40 *Initial prototype of fruits of wisdom with smartphone*

Fig. 41 *FInal prototype with a title card*

Other kinds of interactive elements were created, a few of which will be shown below.

- Knowledge ball (**Fig. 42**) - To indicate that traditional knowledge passed down through generations, a ball (which is knowledge) rolls down a path of ancestors, grandparents, parents and finally reaches “you” when it drops into the box.
- Envelopes of culture (**Fig. 43**) - Envelopes were suspended, indicating the cultural layers, with cards inside them indicating the traditional knowledge.
- Traditional houses (**Fig. 44**) - for the 6th part which talks about how traditional knowledge and science

are being used together, traditional house cutouts were suspended. On opening their doors, one discovers a unique feature of the house.

- How we look at nature (**Fig. 45**) - This interactive visual element initially shows our attitude towards nature and our consumption habits. On turning the flap, one discovers a better way of thinking.

Fig. 42 *Knowledge ball prototype, placing the ball on top*

Fig. 43 *Back of the envelope, removing the card from the envelope*

Fig. 43 *Traditional house cutout, the door of the house opened*

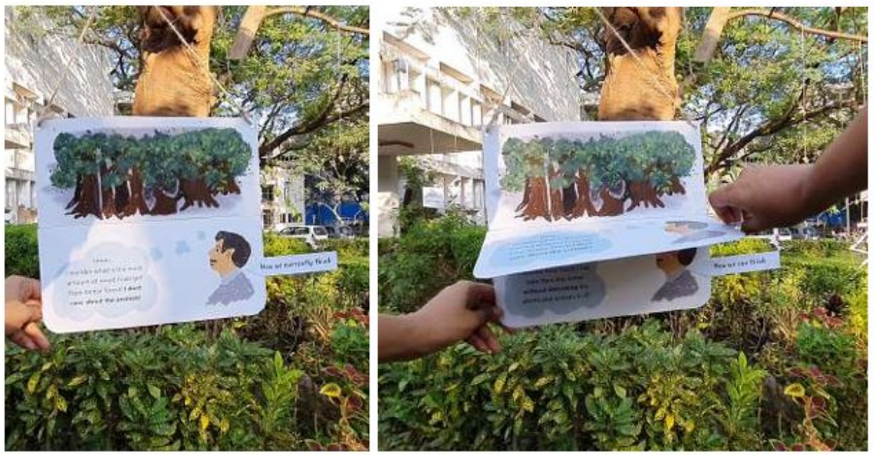

Fig. 44 *"How we look at nature" poster, opened*

Interactive prompts.

For most of the 7 parts of the content, a relevant interactive question prompt is raised. These would prompt the audience to draw/write or make something relevant to the question asked. A few examples are shown.

- Prompt asking the audience what they think sustainability means to them. The audience can use sticky notes to write or draw (**Fig. 46**).
- A prompt that asks the audience to tell a story about a banyan tree. This is placed on the floor and is meant to be done while sitting on the cloth. Colours have been placed nearby (**Fig. 47**).
- A prompt that asks the audience to make (out of homemade, biodegradable clay) something symbolizing their culture, related to the content that talks about idol immersion ceremonies (**Fig. 48**).

Fig. 45 *Prompt - "what does sustainability mean to you?"*

Fig. 46 *Prompt - "draw stories about banyan trees"*

Fig. 47 *Prompt - "make something symbolizing your culture with homemade clay"*

Fig. 48 *Event poster design*

Visual elements

The colours chosen are slightly less saturated which is milder on the eye**. Nunito** was chosen as the body font, which is very easy to read and **Caveat brush** was picked as the display font. The illustration style uses simple shapes, dry ink textures and no outlines. More white space was used to minimize ink usage. Eco inks shall be used to print these, on recyclable paper. These elements were also parallelly displayed along with the interactive elements and fruits of wisdom. Some of the visual elements are shown in the following images.

Fig. 49 *Poster about the Laboon*

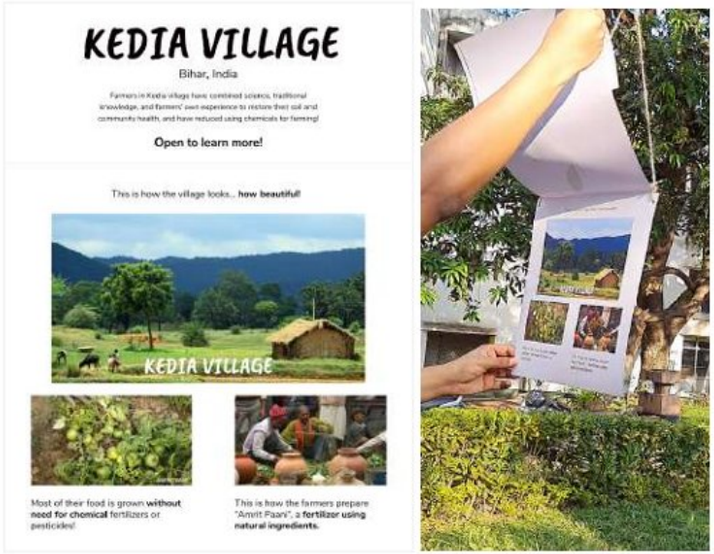

Fig. 50 *Poster about Kedia Village*

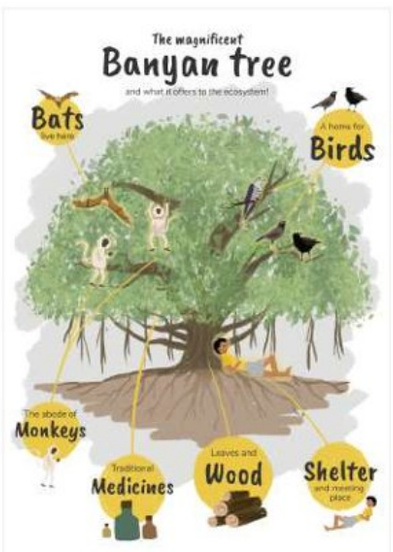

Fig. 51 *Poster about the importance of banyan tree*

Evaluation

To evaluate this project, around 20 members of the target audience, from the Campus school in IIT Bombay, have been invited to interact with the installation. Their actions and reactions will be observed, and a few casual questions will be asked to determine the impact the installation has had on them. This casual interview will happen right after they exit the installation. The drawing prompt responses will also be analysed, as they give a good idea of their understanding of each section. The report shall be updated after the evaluation is completed.

Responses from casual interviews
Following is a set of questions asked and the answers received from the audience.

Q: How was your experience?
A: "I enjoyed it!", "I liked doing this with my friends", "I love this place, I will come again!"

Q: What were your most favourite parts?
A: "I liked the ball thing about ancestors", "Making flower out of clay was nice", ""The envelopes were very fun"

Q: Tell me what you understood from this experience?
A: "We should respect nature", "There are stories in our culture too like this one about the tsunami", "Putting idols in river causes pollution so we can use these eco-friendly clays

to make the idols", "Knowledge goes from ancestors, parents to me"

Other observations

The impression received from the audience interactions is that most of the audience enjoyed the experience, and the visual and tactile impact was the biggest.

The **content might have been too heavy** for some of the audience members, as it was noticed that the audience started dropping off towards the end of the journey. Many participants were able to recollect what they read and saw, in bits and pieces.

Similarly, some of the prompts, especially the last prompt, "What is something from your culture that can help us be sustainable", might have been too complicated. Very few responses were received for that specific one.

In terms of the physical prototype, there were certain things which could have been done differently. Firstly, the path around the installation was not implemented properly, and many audience members got confused and lost, and had to be redirected. A set of footsteps to guide the audience was proposed, but due to lack of time, rocks had to be used as a substitute, and therefore, there was a lot of confusion.

Secondly, since most of the elements were suspended from branches from a single thread, they kept spinning and moving due to strong winds, which was not accounted for while designing the prototype. It made it difficult for the audience to read or listen to the content without holding the element.

Some of the images captured during the interaction are displayed below.

Fig. 52 *Audience visiting the installation*

Fig. 53 *Reading the guidelines before entering*

Fig. 54 *Listening to the fruit of wisdom*

Fig. 55 *Audience doing the clay prompt*

Fig. 57 *Clay item created by the audience*

Fig. 58 *Audience answering the prompts*

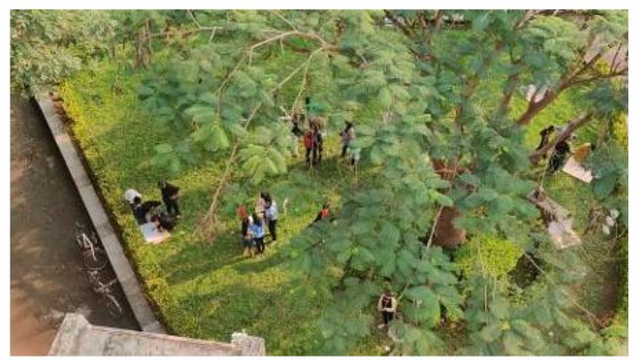

Fig. 59 *Overhead shot of the audience interaction*

Some of the drawing prompt responses, and feedback is shown below.

Fig. 60 *Feedback from the audience*

Fig. 61 *All the clay items made by the audience*

Fig. 62 *Responses for the prompts*

Conclusion

This project explored the many aspects of sustainability in traditional cultures. Literature review helped arrive at a certain understanding of concepts like traditional knowledge and cultural layers. The installation conveyed a lighter version of all that, and my own perspective regarding this topic, which is that the learnings from traditional cultures must be adapted to the current scenario, and be used along with modern science for sustainable solutions to environmental problems. The installation itself was set around a tree and used only biodegradable and recyclable materials, and this further emphasized the point it was trying to make. On interaction with the installation, the audience showed interest and seemed to enjoy the experience, and most of them left the place with a little more knowledge about how aspects from our culture can teach us how to live more sustainably.

Reflection

I took up this project to challenge myself to venture into an unfamiliar domain of installation design, which requires an organic process for idea development and execution. I am quite used to structural design processes, so this was very new to me. Sustainability on the other hand is something that I thought I was familiar with, but I have discovered so much more throughout the four months that I worked on this project, that I never had thought about. Many new worldviews, perspectives on how to achieve sustainability and whether we can do it at all. I did struggle quite a bit with the ideation process, and I would have liked to come with better ideas, which is something about myself I should work on. I have grown as a designer, and a person, as I worked on this project and that is something more valuable than anything else. At the end of the day, even though I struggled a lot, I am glad that I took up this project!

References

Berkes, F., Folke, C., & Gadgil, M. (1994). Traditional Ecological Knowledge, Biodiversity, Resilience and Sustainability. Biodiversity Conservation: Problems And Policies, 269-287. doi: 10.1007/978-94-011-1006-8_15

'Breathe With Me' Art Installation Reaches Millions to Inspire Action for the Global Goals. (2021). Retrieved 14 October 2021, from https://www.globalcitizen.org/en/content/breathe-with-me-take-action-through-art/

Carreras, A., & Parés, N. (2009). Designing an interactive installation for children to experience abstract concepts. In New trends on human–computer interaction (pp. 33-42). Springer, London.

The Contribution of Traditional Knowledge and Technology to Climate Solutions. (2021). Retrieved 10 November 2021, from https://www.climateinvestmentfunds.org/knowledge-documents/contribution-traditional-knowledge-and-technology-climate-solutions

Creating Impactful Installations | 2021 Report | Hubbub. (2021). Retrieved 11 September 2021, from https://issuu.com/hubbubuk/docs/installation_report_horizontal_2020_packaged_exter?e=27090536/83387181

Dev, M. (2017). Indian culture and lifestyle for environment conservation: A path towards Sustainable development. International Journal on Emerging Technologies, 8(1), 256-260.

“Duck off” with the Urban Green Line – Stephanie Romig. (2021). Retrieved 14 October 2021, from http://stephanieromig.co/narrative-design/duck-off-with-the-urban-green-line/

Food waste is responsible for 6% of global greenhouse gas emissions. (2021). Retrieved 22 October 2021, from https://ourworldindata.org/food-waste-emissions

Gadgil, M., & Berkes, F. (1991). Traditional resource management systems. Resource Management & Optimization, 8(3-4), 127-141.

Gadgil, M., & Vartak, V. (1976). The sacred groves of Western Ghats in India. Economic Botany, 30(2), 152-160. doi: 10.1007/bf02862961

Gautam, D., Prajapati, J., Paterno, K. V., Bhetwal, K. K., & Neupane, P. (2016). Disaster resilient vernacular housing

technology in Nepal. Geoenvironmental Disasters, 3(1). https://doi.org/10.1186/s40677-016-0036-y

Green practices, Auroville. Retrieved November 21, 2021, from https://auroville.org/categories/23.

Gupta, M. & Singh, V. (2008) Food Force II: Community Learning through Storytelling. Designing for Children - With focus on 'Play + Learn'

Hornecker, E., & Stifter, M. (2006, November). Learning from interactive museum installations about interaction design for public settings. In Proceedings of the 18th Australia conference on computer-human interaction: design: activities, Artefacts and Environments (pp. 135-142).

How a remote bihar village ushered in an organic farming revolution in just 4 yrs. The Better India. (2019, December 2). Retrieved November 21, 2021, from https://www.thebetterindia.com/204609/organic-farming-methods-technique-results-bihar-village-model-revolution-sustainable/.

Ikuenobe, P. A. (2014). Traditional African environmental ethics and colonial legacy. International Journal of Philosophy and Theology, 2(4), 1-21.

Kora, A. J. (2019). Leaves as dining plates, food wraps and food packing material: Importance of renewable resources in Indian culture. Bulletin of the National Research Centre, 43(1). https://doi.org/10.1186/s42269-019-0231-6

Naga Panchami - Wikipedia. (2021). Retrieved 22 October 2021, from https://en.wikipedia.org/wiki/Naga_Panchami

Pollution Pods — Climart. (2021). Retrieved 14 October 2021, from https://www.climart.info/pollutionpods

Radhakrishnan, S., Priya, R., Nagan, S., & Sundarraja, M. (2011). Climate Responsive Traditional Architecture of Chettinadu Housing in Tamilnadu, India- A Qualitative and Quantitative Analysis During Summer. International Journal Of Ventilation, 10(1), 89-97. doi: 10.1080/14733315.2011.11683937

Saxena, L. P. (2020). Community self-organisation from a social-ecological perspective: 'burlang yatra' and revival of Millets in Odisha (India). Sustainability, 12(5), 1867. https://doi.org/10.3390/su12051867

Sustainability. SUSTAINABILITY | definition in the Cambridge English Dictionary. (n.d.). Retrieved January 1, 2022, from https://dictionary.cambridge.org/us/dictionary/english/sustainability

This interactive installation teaches kids about environmental protection. Retrieved 11 September 2021, from https://www.timeoutshanghai.com/features/Art-Art_Features/71954/This-interactive-installation-teaches-kids-about-environmental-protection.html

This man helped build over 8000 water tanks in over 1000 rajasthan villages. The Better India. (2018, February 27). Retrieved November 21, 2021, from https://www.thebetterindia.com/132515/rajendra-singh-water-man-rajasthan-rainwater-storage-forest/.

Tiemstra, G., Van Den Berg, R., Bekker, T., & De Graaf, M. (2011). Guidelines to Design Interactive Open-ended Play Installations for Children Placed in a Free Play Environment. In DiGRA Conference.

Washington, W., Taylor, B., Kopnina, H. N., Cryer, P., & Piccolo, J. J. (2017). Why ecocentrism is the key pathway to sustainability. *Ecological Citizen*, *1*(1), 35-41.

Wills-Johnson, N. (2010). Lessons for sustainability from the world's most sustainable culture. Environment, Development and Sustainability, 12(6), 909-925.

Winkler, T. (2000). Audience participation and response in movement-sensing installations

10 examples of contemporary vernacular architecture - RTF: Rethinking the future. RTF | Rethinking The Future. (2021). Retrieved November 11, 2021, from https://www.re-thinkingthefuture.com/rtf-fresh-perspectives/a1935-10-examples-of-contemporary-vernacular-architecture/.

Figures

- Fig. 2 - https://th.thgim.com/sci-tech/energy-and-environment/article22260102.ece/ALTERNATES/FREE_660/24SMGROVE1
- Fig. 3 - https://cultureandheritage.org/2020/10/mylapore-kolam-festival-the-festival-of-floor-painting-in-the-south-indian-city-of-chennai.html
- Fig. 4 - https://orissadiary.com/burlang-yatra-burlang-bio-diversity-festival-2020/
- Fig. 5 - https://www.abc.net.au/local/photos/2014/07/15/4046317.htm
- Fig. 6 - https://www.timeoutshanghai.com/features/Art-Art_Features/71954/This-interactive-installation-teaches-kids-about-environmental-protection.html
- Fig. 7 - http://stephanieromig.co/narrative-design/duck-off-with-the-urban-green-line/
- Fig. 8 - https://www.climart.info/pollutionpods
- Fig. 9 - https://www.globalcitizen.org/en/content/breathe-with-me-take-action-through-art/
- Fig. 10 - https://ncert.nic.in/textbook.php?jesc1=0-16

Appendix

(A) Content

Let's begin with some questions: What is sustainability? How can we be sustainable? Maybe cloth bags, paper straws and metal water bottles come to our mind. Although these things can be considered sustainable practices and products, there is much more for us to understand regarding the term.
Can a culture itself be sustainable or unsustainable? Our parents and grandparents give us a lot of advice about how to live our lives, do you think that can help us be more sustainable?

This kind of information is what is called traditional knowledge. Our ancestors have lived in their regions for ages, and they have observed, learnt and come up with many ways of coexisting with nature. This knowledge is passed down from generation to generation. It is "tacit knowledge", meaning that there is no written documentation about it, it is mostly passed through stories and songs.

Example - We are always told that Banyan trees are considered sacred and important. In reality, "local people were often aware of the importance of Banyan as affording food and shelter for a wide range of birds, bats and primates, and this understanding was converted into widespread protection of Banyan trees in parts of India." (Gadgil, 1991)

This traditional knowledge that is gathered by the ancestors is generally wrapped in a cultural layer of traditional practices, festivities and celebrations. This made it easier for the entire population to follow a common routine, and live by adapting to the changing environmental conditions. People did not resist nature but embraced and accommodated it in their lifestyles.
Example - Vegetarianism - low energy consumption, less resource-intensive method of living. Hyperlocal cuisines based on food availability. "According to present-day research, vegetarian diets are reported to be healthy options. Most plant-sourced foods are less resource-intense and taxing on the environment than the production of animal-derived foods, particularly meat and dairy from ruminants." (Fresán & Sabaté, 2019).
Another example: Serving food on leaf plates is a part of many festivities, and was done on normal days too. As we can guess, the leaf plates and cups are renewable, biodegradable, non-toxic and antioxidant-rich along with their medicinal importance in Indian culture. (Kora, 2019)

Another example is - Harvest festivals are celebrated in many cultures and in many forms. These mark the end of the harvest season and also mark important astronomical

and climatic events like the changing of seasons. These are also celebrated as the veneration of the fruit of labour, which unites the different communities. This is all the more important in agrarian societies as agriculture makes a big part of their lives.

People are but a mere part of the vast natural ecosystem, coexisting with nature, and this was emphasized in many cultures, ensuring that they remain humble and respectful of nature, taking only what was required and giving nature time to replenish itself. We all are a part of something much bigger than ourselves

For example - in the Maund festival, fish are permitted to be killed by using poisons only once a year at the time of a communal feast in the month of April in the river Yamuna in Mussoorie situated in the State of Uttar Pradesh in India. This might have served the purpose of assessing their population levels and adjusting how much they harvest so that it doesn't lead to any damage to the population levels and conserves diversity. Using this natural poison only targets the older fish, thereby not affecting the younger fish that reproduce.
(Gadgil, 1991)

Example - Sacred groves were established by locals and many myths and legends mention that those who enter these groves are either killed or haunted. “A common feature of sacred groves is the presence of unique and diverse species of plants and animals, and the myths and legends kept people from disturbing these ecosystems. They are also economically significant as the species so preserved serve as sources of drugs being used locally. If these plants vanish, the knowledge about the traditional use of these will also vanish”. (Gadgil, 1976)

In many cultures, many elements of nature are worshipped as a deity. People do this mostly out of reverence, and sometimes fear, but this ensures that no harm is caused to these elements.
Example of nature worship in Indian culture - “Naga Panchami is a day of traditional worship of Nagas or snakes observed by Hindus, Jains, and Buddhists throughout India, Nepal. As part of the festivities, a Naga or serpent deity made of silver, stone, wood, or a painting of snakes is given a reverential bath with milk and their blessings are sought for the welfare of the family. Live snakes, especially cobras, are also worshipped on this day, especially with offerings of milk and generally with the assistance of a snake charmer”.
("Naga Panchami - Wikipedia", 2021)

Since there is no concrete written documentation for most of this knowledge, and we only know them by practices that our ancestors followed. Sometimes, they tend to get misinterpreted and lead to harmful practices. We should be

wary of what is good for the environment and ourselves, and what isn't, before blindly following it.

An example is the idol immersion ceremony part of Ganesh Chaturthi. Originally, idols were made of clay, and they would naturally dissolve in running water. But the influx of plaster of Paris idols has created a lot of pollution and destroyed many living organisms in major water bodies. Traditional knowledge from indigenous communities has helped with many scientific solutions to environmental problems. Traditional agricultural techniques, rainwater harvesting systems and early warning systems for natural disasters have helped develop better systems taking care of the environment around us. Nevertheless, we still need more research to be done to properly understand the traditional knowledge that our ancestors had, and use it in tandem with modern science.
For instance, during the 2004 tsunami in the Indian ocean, a lot of destruction occurred to the Indian mainland, but the tribespeople from the smaller archipelagos in the path of the tsunami was perfectly safe. Specifically, the Moken tribe from the Mergui Archipelago off the coast of Myanmar and Thailand knew when to move to higher ground when they observed the subtle changes in their surroundings. Their folklore included "waves that eat people" and about all the signs that it was coming, through oral stories. ("The Contribution of Traditional Knowledge and Technology to Climate Solutions", 2021) Could we analyse more such stories that have been passed down to us and find the real-world knowledge in them?
Every region has its own special kind of architecture. The locals knew how to make their houses disaster-resilient(Gautam, 2016), and adapt to the climate (Radhakrishnan, 2011) with simple materials. Architects have now started using traditional building techniques along with modern ones. The Brick House by iStudio architecture, in Wada, Mumbai is a great example. They have used sustainable materials like wood, stone, brick and bamboo and other sustainable technologies. ("10 examples of contemporary vernacular architecture - RTF: Rethinking the future. RTF | Rethinking The Future", 2021)

Questions: What is the significance of Shravan fasting? (Is it done to not eat fish when they are reproducing? Is a special diet required for the monsoon season?) Why are full moon days considered auspicious? What is the significance of kolam? (is it drawn for giving back to the other small creatures in the surroundings?)

Our knowledge must always keep growing. Traditional knowledge might not have everything figured out, but neither does modern science. We should learn from all the intelligent ways that these cultures learnt to coexist in harmony with nature. Beyond knowledge, we must look at how people of these cultures looked at the world around them. We must understand that we are a part of something

bigger than ourselves, and continue to be humble and respectful towards the environment as they did, and continue to do.

There are many present-day modern societies that live in harmony with nature. The Australian aboriginals are sometimes called the "most sustainable culture", and we have a lot to learn from how they live. Everybody is responsible for taking care of resources, and they are committed to being sustainable.
(Wills-Johnson, 2010)

(B) Transcript

When you hear the word sustainability, what do you think of?

Let's begin this journey with some questions: What is sustainability? How can we be sustainable? Sustainability means **using only the resources we need while making sure that our future generations have enough for themselves.** We know many things like recycling, composting. We can think of recycled paper, cloth bags, paper straws and metal water bottles. These are sustainable practices and products, but do we always remember to do these things? **Instead of causing damage to nature and then repairing it, can we just stop causing damage**?

We all are from different parts of the world, and we have different cultures. **Have you ever wondered if our cultures can teach us how to be sustainable**? Our parents and grandparents give us a lot of advice about how to live our lives. Do you think that changing the way we live can help us be more sustainable?

Have you ever heard of ... Traditional knowledge?

The knowledge that is **passed down from generation to generation, through songs, stories and traditions, is called traditional knowledge**. Our ancestors have

gathered so much knowledge by observing their surroundings, learning and coming up with many ways of living with nature. Now that is thousands of years of knowledge we are talking about!

Have your grandparents ever told you that **banyan trees are important** and they should never be cut down? Do you remember how many stories had a big banyan tree in them? Scientists found that these magnificent trees give shelter for a range of birds and bats, and different parts of the plant have so many uses. Our **ancestors have observed this, and realized its importance in maintaining the ecosystem**, and passed down this knowledge to us as traditions and stories!

Knowledge is wrapped in colourful layers of culture!

The traditional knowledge that is gathered by the ancestors is generally **wrapped in a cultural layer of traditional practices and festivities**, just like a piece of candy inside its beautiful wrapper! This made it easier for the entire population to **understand and use this knowledge and live in harmony with nature**. People did not resist nature but embraced it in their lifestyles.

For instance, let's talk about food. Why do many **cultures encourage vegetarianism**? Research claims that vegetarianism is found to consume less energy and resources. Why was **food waste considered a bad thing in many cultures**? People always found a way to make the fullest use of their foods, like how every part of the banana tree is used in many cuisines! Current day research says that every year, 1/3rd of all food is wasted and this creates a lot of greenhouse gases when it goes to landfills.

Why do we celebrate harvest festivals?

Culture asks us to respect nature

More often than not, people are thinking about **how they can exploit nature for their own benefits**, and how to maintain it just enough so that it can still benefit humans. We, humans, are just a small part of the entire world, and this kind of thinking is followed in many cultures. **Elements of nature are respected**, and sometimes even worshipped, ensuring that **people remain humble, taking only what was required and giving nature time to replenish itself.** This way of thinking and living made their lifestyles very sustainable.

Why are there so many sacred forests? Why do people say one will get haunted if they go into a Sacred forest? These forests may have **unique and diverse species of plants and animals**, and these scary myths might have **kept people from disturbing these ecosystems**. If these plants vanish, the knowledge about how to use them will also vanish.

In Hindu and Jain cultures, **Snakes are worshipped on the day of Naga Panchami,** where idols of snakes or live snakes are worshipped and offered milk and other food. These animals are **not feared or hated, but they are respected**.

Knowledge is knowledge!

Knowledge is what we gain by understanding things around us. Traditional knowledge is a way of doing that, and so is science! **none is better or worse than the other**! Since traditional knowledge was gathered by our ancestors by observing nature for thousands of years, It is much more **connected to nature.** We need to use all the knowledge available to us, to find **better ways of taking care** of the environment around us.

Every region has its own special kinds of houses right?. The locals knew how to make their houses **survive natural disasters like earthquakes and adapt to the climate using simple materials**. Architects have now started using traditional building techniques along with modern ones.

In 2004, there was a huge tsunami that caused so much destruction in the Indian coast and other South-East Asian countries, but the **tribes from the smaller islands in the path of the tsunami were perfectly safe.** How did that happen? Let's talk about the Moken tribe who live in islands near Myanmar and Thailand. They had **stories in their culture** that talked about the “Laboons” which were "waves that eat people" and about all the signs that this wave was coming. So they **saw these signs, remembered the stories and quickly moved away from the coasts before the tsunami came**! Could we look into these stories and rituals from our cultures and understand the real meaning using modern science?

Can we blindly follow traditional practices?

In olden times, every generation made sure that all the knowledge they have gathered is passed down to their children. Nowadays, it is not given much importance. **Many bits of knowledge are lost as they are passed down**. Since this knowledge is not written down, and we mostly know them by songs, stories and rituals, **we might misunderstand them, or it may not be applicable in our current lifestyle**. Sometimes this can lead to harmful practices. We have to adapt how we do these practices and look for better ways to celebrate festivals and do rituals, instead of blindly following practices.

For many festivals, we immerse idols and garlands into rivers and the sea. Originally, idols were made of clay, so they would naturally dissolve in running water. But now we use plaster of Paris and plastic idols instead of clay ones, and that is causing a lot of **destruction to the water bodies and aquatic life in them.** Can we find better ways to do this?

So what will happen if we change our ways?

Our knowledge must always keep growing. **Traditional knowledge might not have everything figured out, but neither does modern science.** Can we learn from traditional culture to coexist in harmony with nature? Can we then use it along with modern science to live sustainably?

Apart from knowledge, what else can we observe? How did our ancestors look at the world around them? They understood that they are a **part of something bigger** than themselves, and were **humble** and **respectful** towards their environment. When we humans truly understand this, we'll start thinking twice before doing things that may not be sustainable!.

Many people have begun realizing this very thing, have looked back into their cultures and are living sustainable lives in the current day! Now, it is your turn to tell me, what are the things from your culture that you think can help us be more sustainable?