



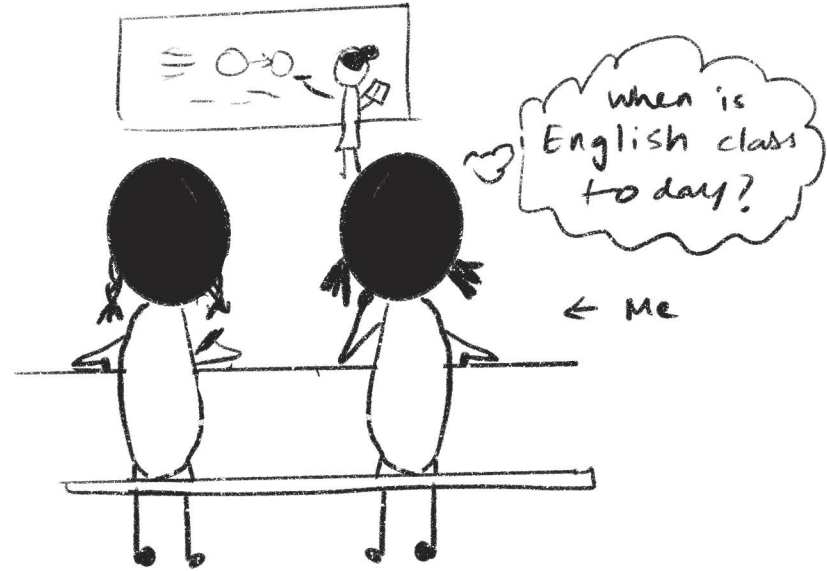
Developing a lesson plan for the topic of
“**sustainability and design**”
for class 10 CBSE students

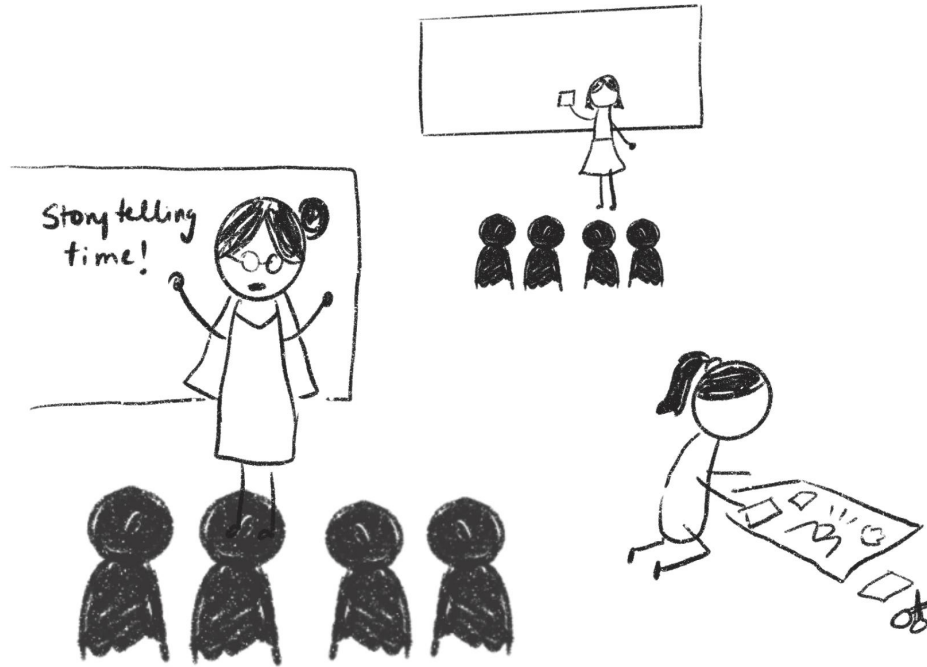
Project by **Neha Balasundaram**
guided by **Prof. Ravi Poovaiah**





*When I was in 3rd std,
everyone used to look
forward to the ...
English period!*





Every class was a
surprise, we did fun
activities, created visual
aids, show and tell...





*When I got the opportunity to design this module, I tried my best to make it as **fun**, **hands-on and memorable** of an experience as I had during English class*



Introduction

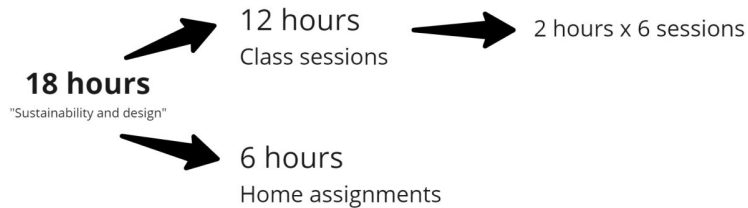


About the DT elective

- Design thinking introduced by CBSE as elective for classes 6 - 12
- **650 hours** allotted this subject
- This specific project involves developing an **18 hour module for class 10 on the topic of “sustainability and design”**

About this module

- Students understand “**why we need to design sustainably and some ways to assess and do so**”
- Attempt to bring about **attitude shift** in the minds of students
- **Fun - light - hands-on**
- 12 hours of class sessions, 6 hours of home activities



Structure of the module

Scope

- Sustainable design through **lens** of those **involved in design of products**
- Focuses only on **products**
- Designed for **physical classroom**
- Assumed **availability of all required resources**
- All teachers assumed to be **equally competent**

Challenges

- Kids find these kinds of subjects **boring and heavy**. How do we make a heavy topic fun and interesting?
- How can I make his module **relevant to such a wide target group** (CBSE students of the entire country)



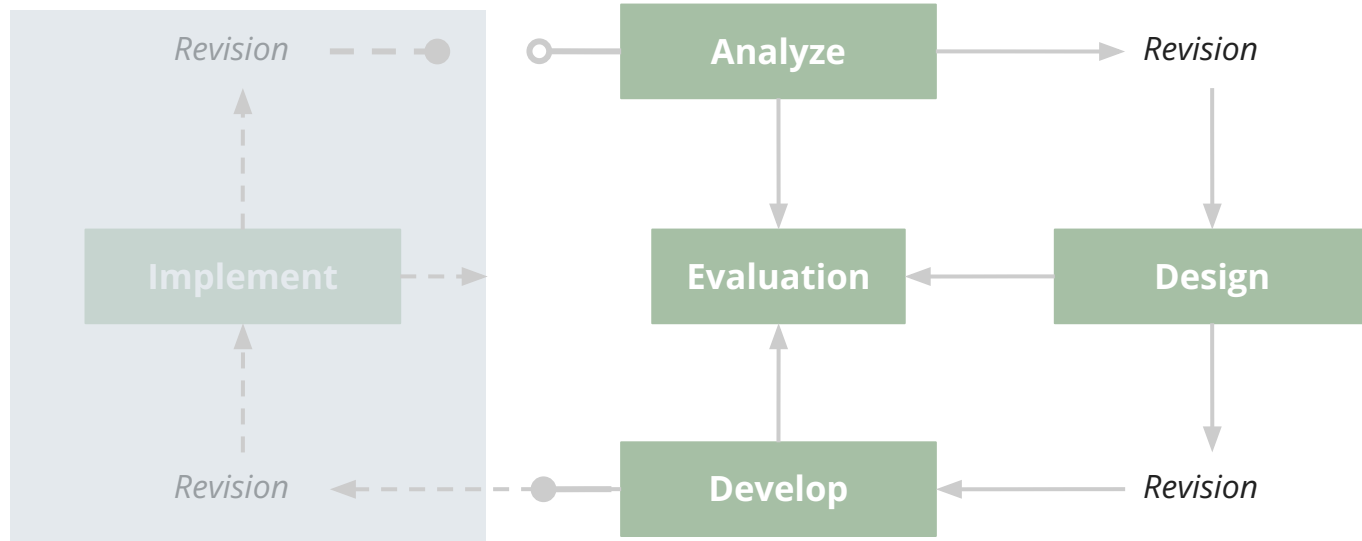
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Process

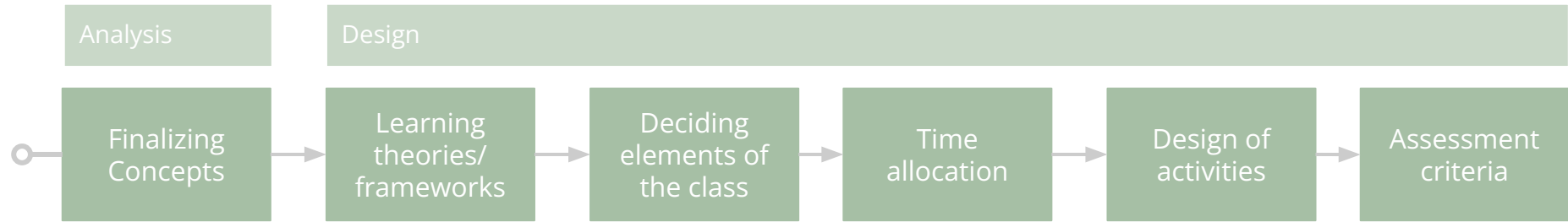


Instructional design process

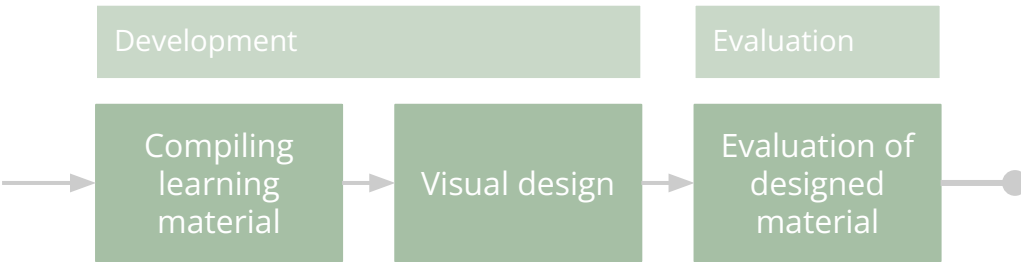
The ADDIE process was chosen, except for the “Implement” phase



Instructional design process



Instructional design process



Understanding learners

- Semi-structured interviews with students from nearby schools
- Children who were interviewed already had certain ideas about sustainability concepts - but we can not assume this of all students
- They were taught about sustainability briefly in class 10 science, but that chapter is disregarded
- Are not too keen on educating themselves on this topic

Curating content

- Existing courses
- Papers
- Web articles
- Syllabus of other schools
- Speaking to domain experts

What will students learn?

1

Whats and whys of Sustainability

*Change in usage of resources, why should we design sustainably, **aspects of sustainability***

2

Look, it's a system!

*System thinking, **ecosystem mapping**, identifying problem areas*

3

Resource to product to ... resource?

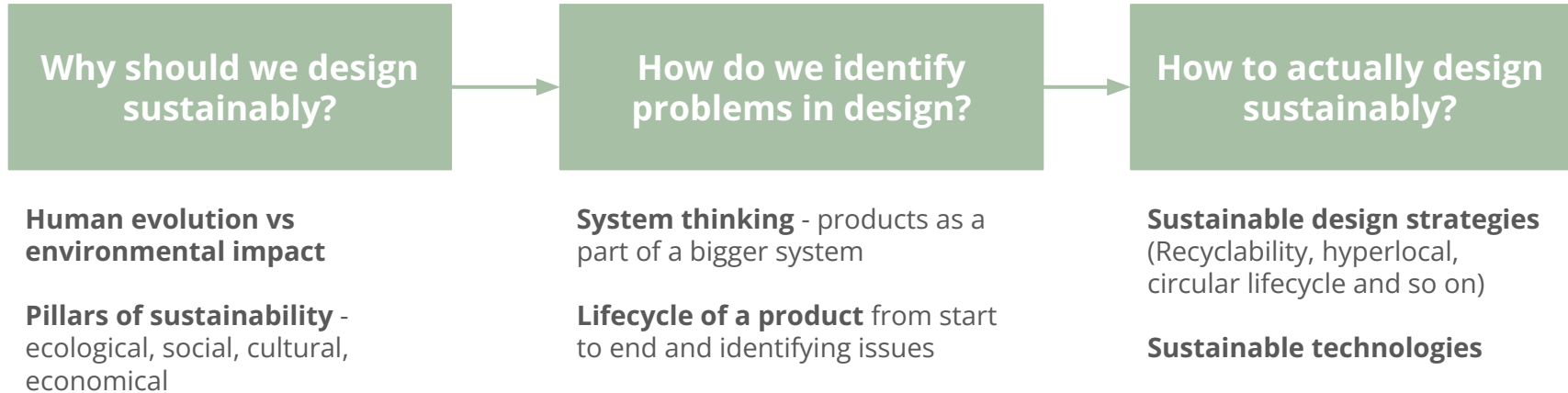
***Lifecycle of a product**, linear and circular lifecycle*

4

Sustainability strategies & technologies

*Sustainability design **strategies** and **technology***

What will students learn?



Defining learning objectives

3 kinds of LOs have been defined

Broad learning
objectives

Session wise
objectives

Desired attitude shift

Choosing the learning theory

Constructionist
theories

*Ways of learning include building on **existing knowledge**, learning by **doing**, active **engagement** in learning.*



Kolb's experiential
learning cycle

*Learning by **experiencing** the concept in action, **reflection**, **conceptualizing** the ideas and **experimenting** with them.*

What happens in class?

Activities

Discussions

Mindmapping

Exposure
presentations

Activities

There are 3 kinds of activities

Class activity

To be done in the class hours, in groups or individually

Home activity

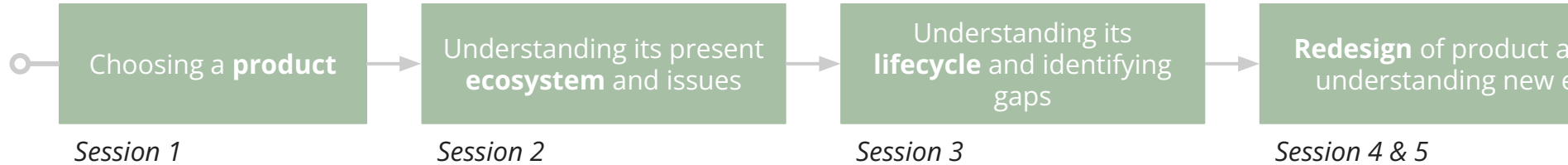
To be done individually, at home

Long activity

To be done in the class hours, in groups of 3, lasts throughout module

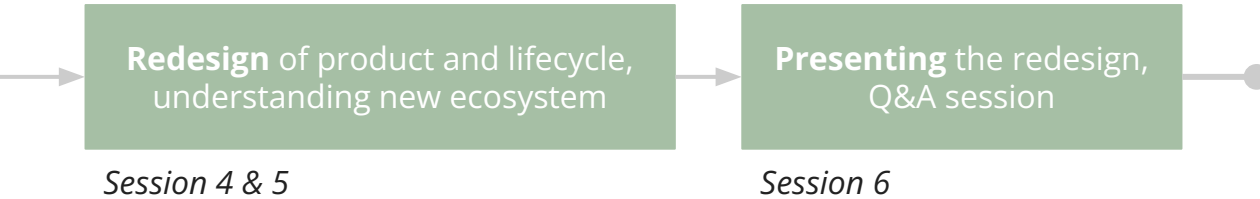
Long activity

Students work in groups to redesign a product of their choice, applying their learnings to their chosen product in each session



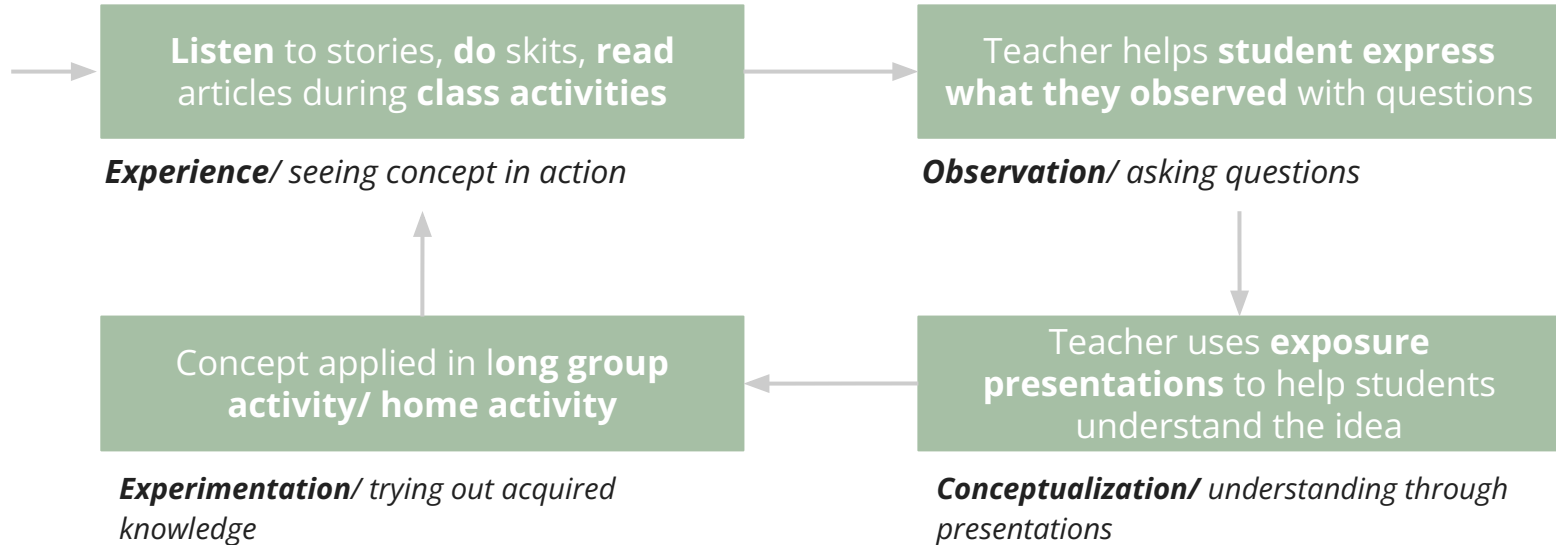
Long activity

Students work in groups to redesign a product of their choice, applying their learnings to their chosen product in each session



Structure of a session

Applying Kolb's learning cycle...



Allocating time

Topics vs sessions

Whats and whys of
sustainability

Session 1

Look, it's a system!

Session 2

Resource to product
to ... resource?

Session 3

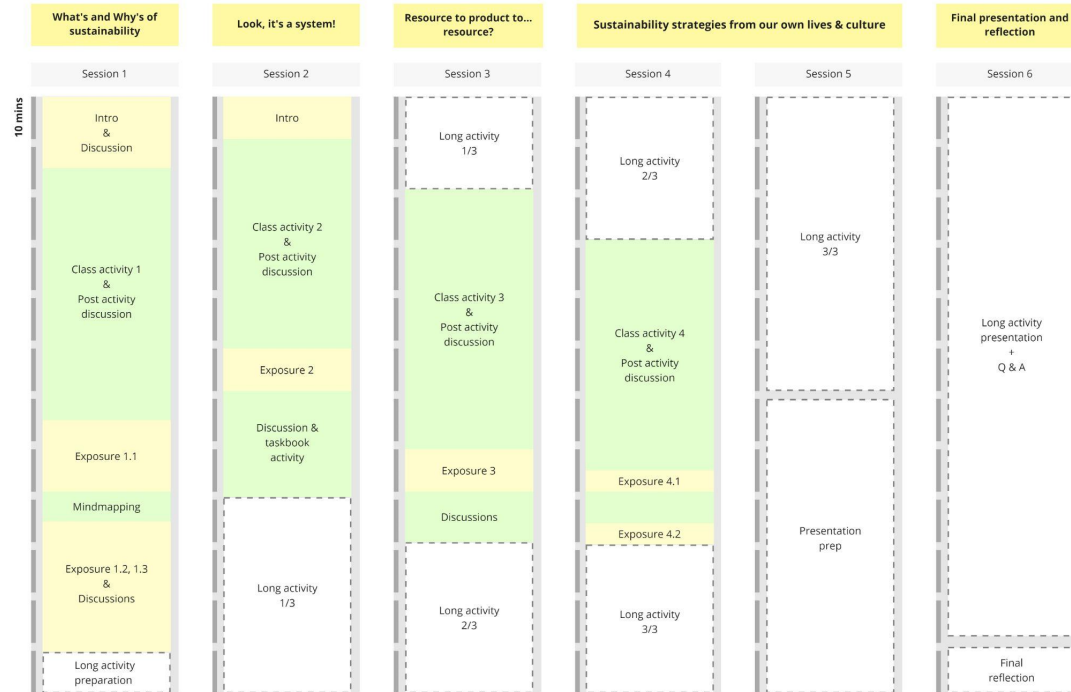
Sustainability strategies
and technologies &
presentation prep

Session 4&5

Final presentation

Session 6

Allocating time



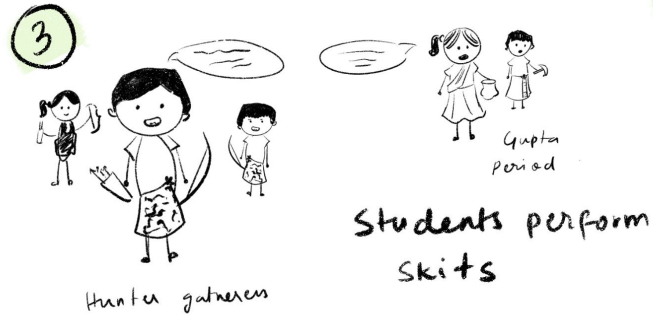
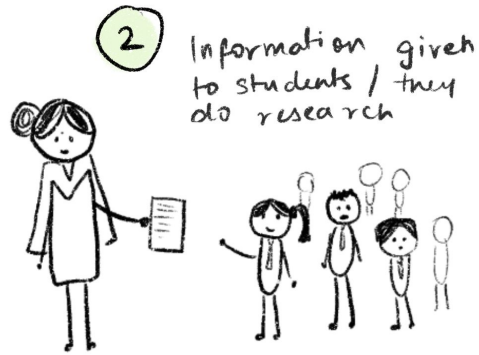
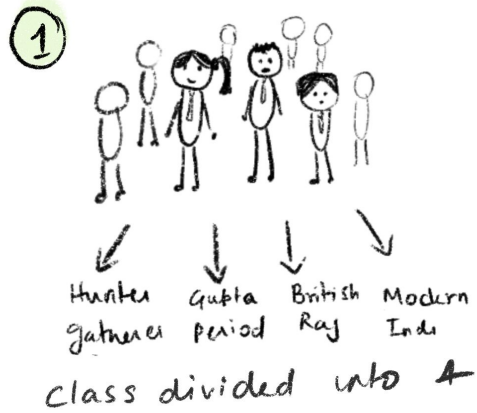
Time allocation

Design of activities

- 4 class activities
- 6 home activities
- 5 parts of long activity
- **Interchangeability** - parts of the activity can be swapped out to put in more contextual examples/explanations

Class activities

1. **Getting my lunch** - Understanding impact of human transition on environment and why the trend should change (Roleplay/skit)
2. **Mrs Preetha Prakash & her pickles - understanding system thinking by** listening to story of Mrs. Preetha, elements of her town and pickle business (drawing/mapping system)
3. **How are Mrs Prakash's pickles made? - understanding product** lifecycle thinking by enacting how Mrs. Preetha's pickles are made (impromptu skit)
4. **Sustainability charades** - Understanding sustainability strategies through charades game (charades game)

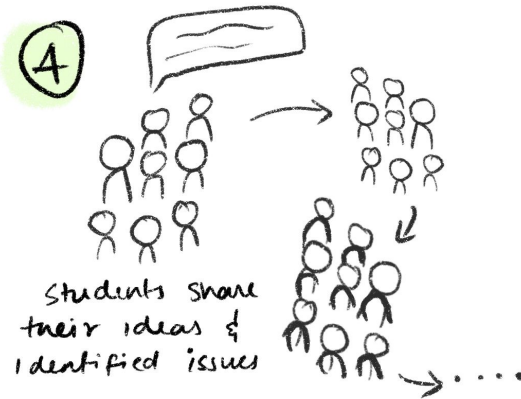
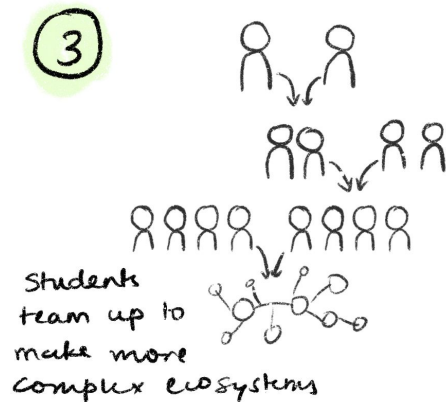


Why this activity?

As they enact out their skit they try to get into details, drives home the point that as humans progressed, they had more impact on the environment.

Class activities

1. **Getting my lunch** - Understanding impact of human transition on environment and the trend should change (Roleplay/skit)
2. **Mrs Preetha Prakash & her pickles** - understanding system thinking by listening to story of Mrs. Preetha, elements of her town and pickle business (drawing/mapping system)
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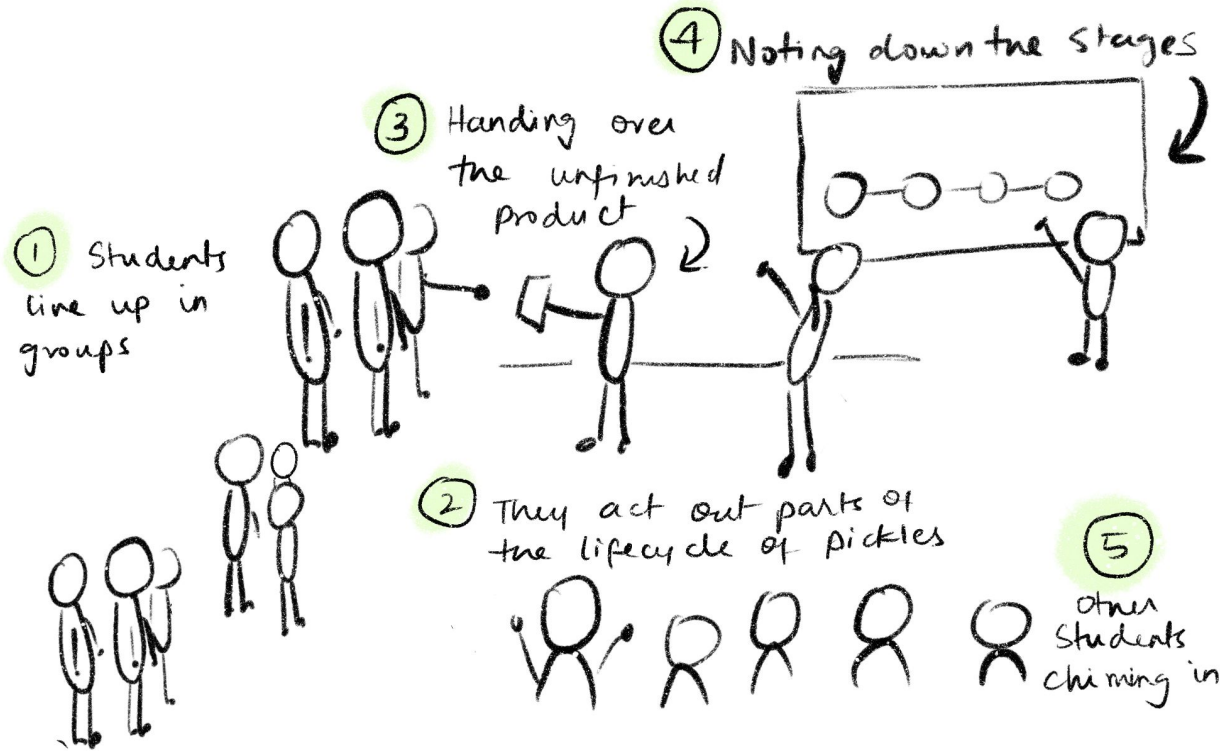


Why this activity?

Involves individual and collaborative work, which helps students to learn from each other, create detailed ecosystems and constructively criticize each other's work.

Class activities

1. **Getting my lunch** - Understanding impact of human transition on environment and the trend should change (Roleplay/skit)
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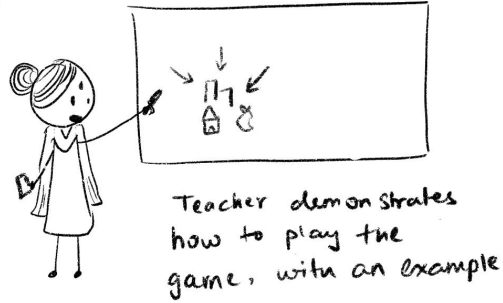
Why this activity?

Acting out scenarios also helps students identify some processes that may not be evident while simply writing or brainstorming.

Class activities

1. **Getting my lunch** - Understanding impact of human transition on environment and the trend should change (Roleplay/skit)
2. **Mrs Preetha Prakash & her pickles - understanding system thinking by** listening to story of Mrs. Preetha, elements of her town and pickle business (drawing/mapping system)
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1



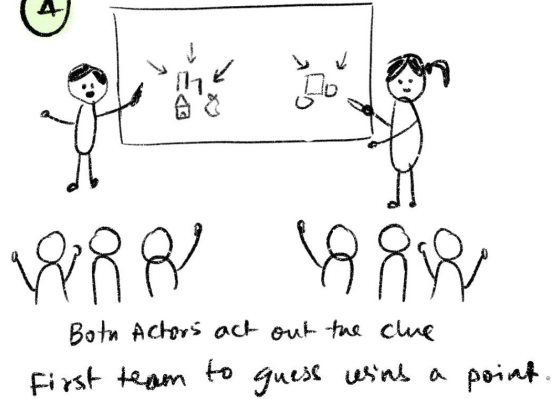
2



3



4



Why this activity?

Aim is to get students to find their own ways to explain sustainability strategies to the rest of the class, driving home the meaning and how it can be applied to products.

Assessment criteria

- Rubrics used to allot grades, which are then averaged to arrive at a final grade
- Present for each topic in every session





















Assessment criteria

Sample: Class Activity 2 - Mrs Preetha Prakash & her pickles

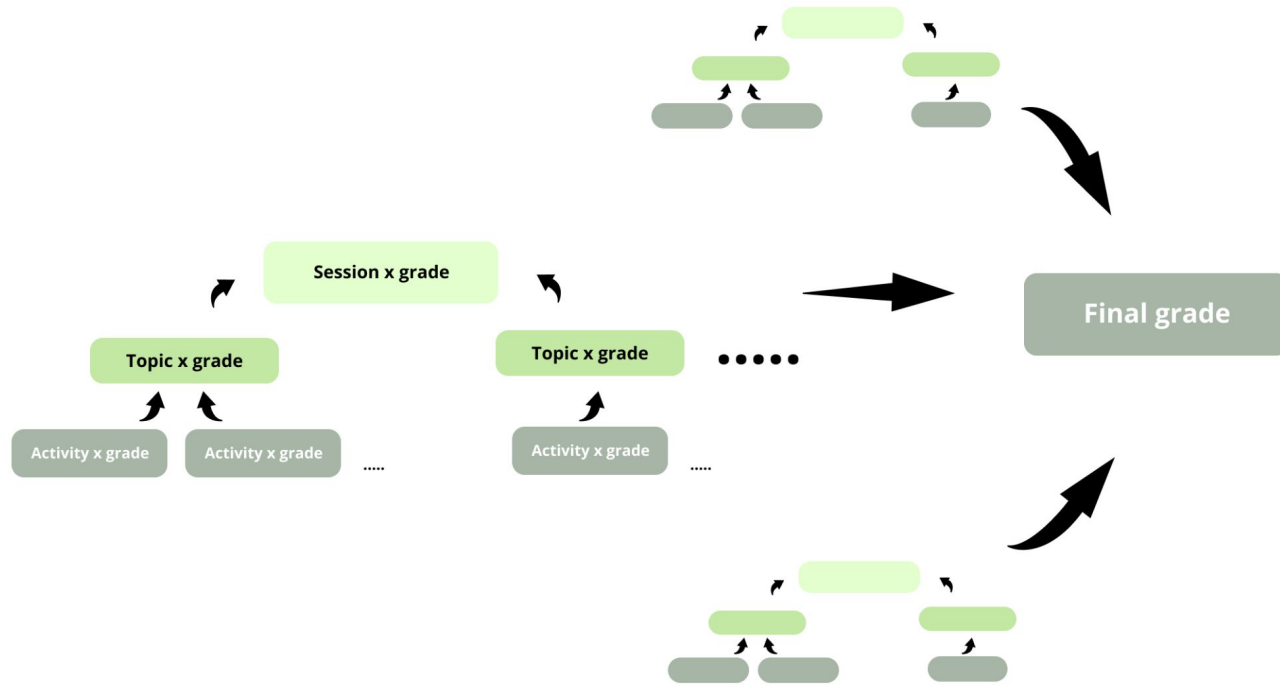
Criteria

1. Creating a visual representation of the system
2. Complexity of the detailed map
3. Identifying issues in the ecosystem
4. Clarity in representation

Assessment criteria

	Beginning 1 - 2	Developing 3 - 4	Promising 5 - 6	Proficient 7 - 8	Excellent 9 - 10
	Created a visual representation of the system	Created a visual representation of the system and identified some issues.	Created a fairly complex visual representation of the system	Created a fairly complex visual representation of the system and identified issues	Created a fairly complex visual representation of the system and identified issues. Shows general clarity of thought.
C1					
C2					
C3					
C4					

Assessment criteria



Assessment methods

Compilation of learning material

Putting together all the elements...

- Lesson plan
- Information manual
- Task book
- Exposure ppts

Visual design

Simple visual language chosen, with open sans as the font



Heading 1 | 32pt

Heading 2 | 24pt

Heading 3 | 16pt

Heading 4 | 16pt

Body | 11pt

Caption | 10pt

Diagrams

Curved boxes

Dashed lines



Stylized arrows



Drawing style

Visual language

Lesson plan

- Introduction to the module
- Session plan
 - Discussions, mindmapping
 - Activities
 - Exposure presentations
 - Long activity work time
 - Home activity
- Activity elaboration
- Assessment criteria for topics

Session 1 | Activity Elaboration

Class Activity 1 - Getting my lunch
Group
50 mins
Skit/Role-playing

Description
Helps students understand that as humans evolved, their usage patterns changed, and as the population increased, humans needed more and more, and faster. The students use the supplementary information provided, create an impromptu skit and explain their thoughts and observations to the teacher who becomes a member of the audience.

Why this activity?
Through this activity, the students have to understand how a simple thing like lunch required different ways to collect resources, and how they handle leftovers could their attitude towards resources. They get more involved in the little things that human society progressed and this drives home the point that as society progress their impact on their surroundings increases.

Session 1 Plan | Class

Events	Materials	Duration																																		
<p>Topic 1: How did we use resources? How did it change?</p> <p>Preparation</p> <ul style="list-style-type: none"> Th his day the So to + + + + Ar pe re <p>Learning object</p> <p>Session 1 Assessment</p> <p>Topic 1: Understanding the relationship humans had with resources Class activity 1</p> <p>Criteria</p> <ol style="list-style-type: none"> 1. Presence in skit 2. Contributions to skit 3. Noting observations of activity 4. Involvement, enthusiasm <p>Scoring</p> <table> <thead> <tr> <th></th> <th>Beginning 1-2</th> <th>Developing 3-4</th> <th>Promising 5-6</th> <th>Proficient 7-8</th> <th>Excellent 9-10</th> </tr> </thead> <tbody> <tr> <td>Impl</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>• Sk</td> <td>Only present in the skit.</td> <td>Present in the skit and has contributed in the planning.</td> <td>Present in the skit and has noted their observations in activity book.</td> <td>Present in and contributed to creating the skit and has noted observations in activity book.</td> <td>Present in and contributed to creating the skit, noted observations in activity book and displayed involvement and enthusiasm</td> </tr> <tr> <td>• SO</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>• A</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>• Th</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Topic 2: What does the term sustainability mean for us? Home activity 1</p> <p>Criteria</p> <ol style="list-style-type: none"> 1. Wrote about how product was introduced 2. Impact in social, environmental, economic, cultural pillar 3. Representation of information collected in a different format 4. Relevance of information collected/creativity in representation 		Beginning 1-2	Developing 3-4	Promising 5-6	Proficient 7-8	Excellent 9-10	Impl						• Sk	Only present in the skit.	Present in the skit and has contributed in the planning.	Present in the skit and has noted their observations in activity book.	Present in and contributed to creating the skit and has noted observations in activity book.	Present in and contributed to creating the skit, noted observations in activity book and displayed involvement and enthusiasm	• SO						• A						• Th					
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Information manual

- Session wise learning objectives
- Umbrella questions
- Topics and subtopics
- Content
- Material for activities
- Further reading
- References

Information sheet 1

Overview

Why do we need to change the way we make things? This is an interesting question. Students first learn about the change in relationship between the environment and society. They then learn about sustainable design. Students first learn about the change in relationship between the environment and society. They then learn about sustainable design. Students first learn about the change in relationship between the environment and society. They then learn about sustainable design.

Summary of main ideas and topics

The big question

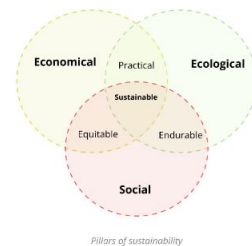
Can we continue the current relationship we have with our environment? What needs to be done to change that trend?

Other guiding questions

- How did we use resources? How did our usage change?
- Transitions of human society
- Understanding how resource use changed
- Do we need to change the way we use resources? How?
- What does sustainability mean for us?
- Is it up to us to "save the Earth"?
- Pillars of sustainability
- Social ecology

Session specific learning objectives

- **Describe** how humans used resources as they transitioned
- **Justify** why the trend of intensive resource usage by humans is unsustainable
- **Elaborate** on the different pillars of sustainability, and the progress in each of the pillars.
- **Analyze** the positive and negative impact of an object in the world



Example for the pillars of sustainability: the plastic bag (for discussion 1.2)

We all know the impact of plastic and its various forms on the environment. We have witnessed in first hand the issues caused by plastic. What are some of the issues?

What changed after they entered the world? Impact to environment - impact to culture (use and disposal). *How much plastic is thrown away? Impact to the economy - although production costs may be low, disposal costs may be high.*

On her way back home, she wondered how her actions lead to this, what other things could happen and what she could do to change this situation...

Sample map to show to students at the end of the activity:



be done?

lal_ecology_(Bookchin)

futurelearn.com/info/

40 Years - EcoWatch -
natural-resources-tripled-in-40-

enly.earth/blog/3-pillars-of-

ture

lars-of-sustainable-

Material for home activity 2 - Vasudhaiva Kutumbakam

Vasudhaiva Kutumbakam...What's That?
(Vasudhaiva Kutumbakam...What's That? - The Seeds of Vandana Shiva - vandanaashivamovie.com)

In numerous traditions of indigenous thought, the sharing of food is treated as a ceremony. Each ritual reflects the understanding that giving and receiving is a sacred transaction. You give and receive in appreciation of your interdependence with others—not only with your family and community but also with the farmer, the food provider and the vast non-human family that populates Earth's. Every bird, every bug, every microscopic microbe—every living organism interconnects in the great web of life. As school students we learn that all life is made of the same basic elements—earth, water, air—yet as adults we tend to forget it. But the facts are the facts. We drink water that

Pages form
information manual

Task book

- Introduction
- “Big questions”
- Activity outline
 - Time, group/individual, type of activity
 - Description
 - Instructions
 - Further questions/prompts
 - Area to write/draw/stick
- Appendix

Session 1

Whats and whys of Sustainability

The big questions ...

Can we continue the current relationship we have with our environment ?

What does sustainability mean to us?

Before you begin

What is the module about?

Welcome to the “Sustainability and design” module! You will learn about sustainability concepts and skills. For the next six sessions, you will explore how we design things and how we can make that change.

We will be doing different kinds of things in this module.

Games Activities Mindmap

Class activity 1 | Getting my lunch

Let's talk about time!

- Class activities
- Home activities
- Long activities
- Presentation

In many of the activities, you will need more area than is provided on your task book.

Exercises

CL1 What is your time period? What role did you play in the skit and why was it significant?

CL2 Once you are done with your skit, fill up the box below with the observations you made about the people from the different times. What changed, how and why? Try to answer the big question and feel free to draw pictures or write your thoughts.

Let's ask so

Let's start this module by asking some questions.

- Can we continue the current relationship we have with our environment?
- What does “sustainability” mean to us?
- Can we view things differently?
- How are things changing?
- Are there strategies to make a change?

You will be using these questions in the next sessions! Let's try to answer them.

Let's get into a different time period! We have different time periods in our lives. How do we get things done in our time periods?

Group activity

50 Minutes

Activity 1

Let's get their breakfast.

What items do they cook the food?

How do they do with the leftovers?

And you have to create a short 5-minute skit.

During this period, your teacher may provide you with articles, links and you have to go through the internet, if access is available.

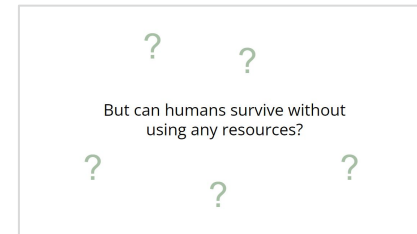
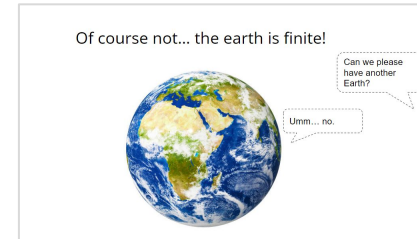
So, you will have to observe the details, of how habits in our lives are changing. We will talk about it in the next part of the activity.

If more space is necessary, use an A4 sheet, fold and stick along the grey dashed line.

Pages from task book

Exposure slides

- Title slide with big question
- Prompt about activity
- Content explained visually
- Slides with questions for discussions



Slides from sample exposure ppt 1



Final design



Links to final designs

1. **Lesson plan** (Issuu) - <https://issuu.com/nehabala/docs/lessonplan>
2. **Information manual** (Issuu) - <https://issuu.com/nehabala/docs/informationmanual>
3. **Task book** (issuu) - <https://issuu.com/nehabala/docs/taskbook>
4. **Exposure ppt**

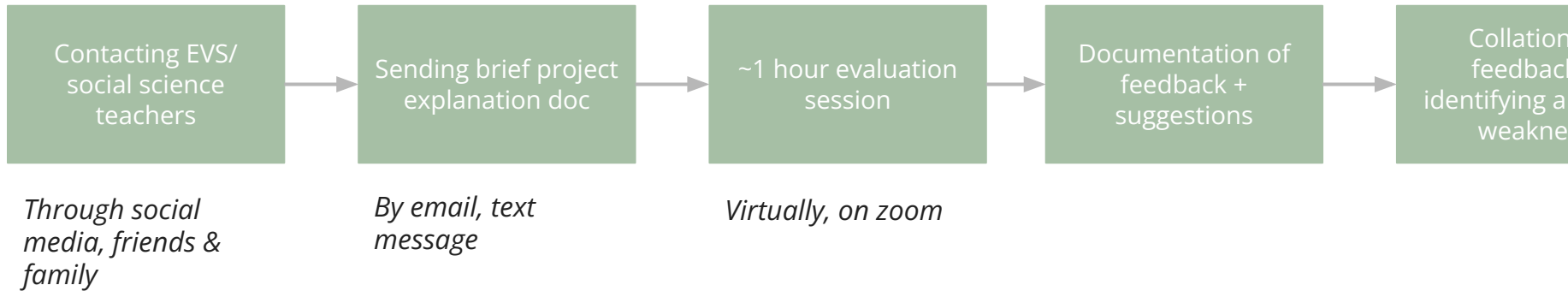


Evaluation & Next steps



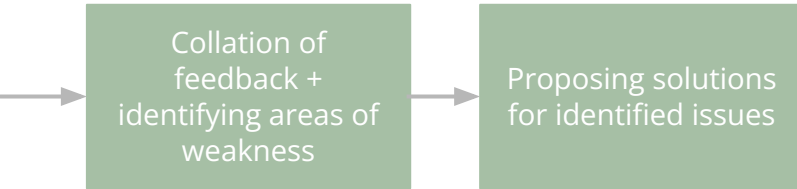
Evaluation plan

The designed learning material was evaluated in the following manner



Evaluation plan

The designed learning material was evaluated in the following manner

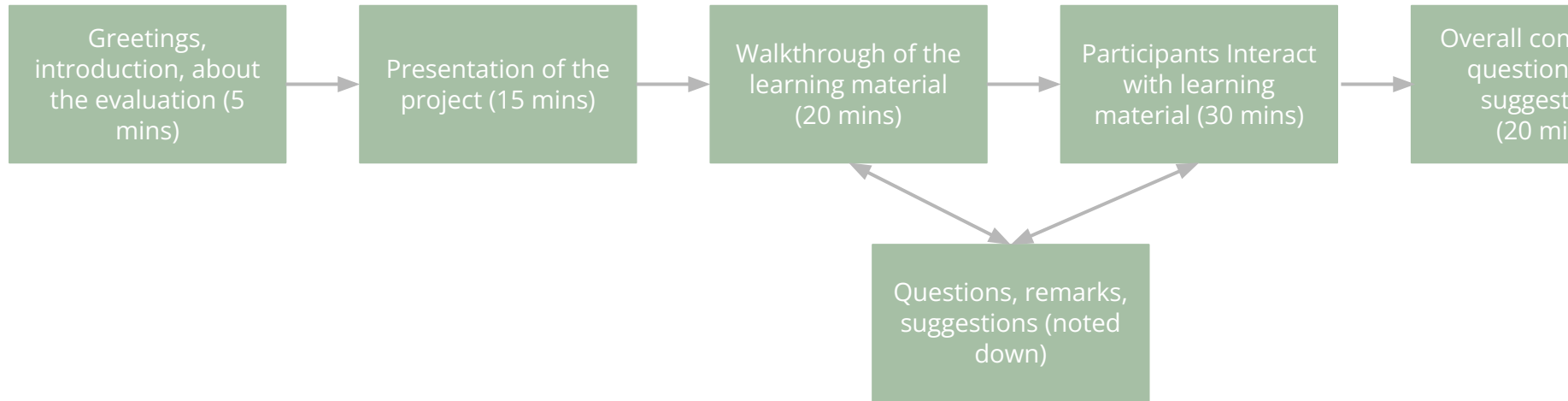


Participants' demographics

- 5 Teachers of class 10 EVS/ Social science in CBSE school
- 5/5 female
- Experience level - Teachers who are just starting out - Currently teaching - retired
- 4/5 from Chennai, 1/5 from Mumbai
- From different kinds of schools

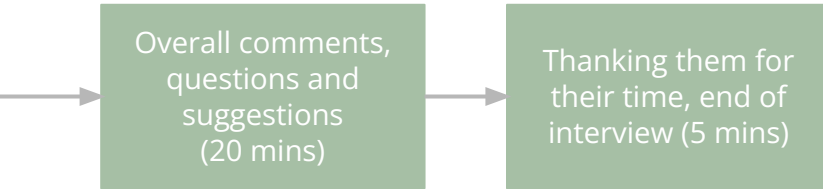
Conducting the evaluation

The following was the process followed during the evaluation sessions



Conducting the evaluation

The following was the process followed during the evaluation sessions



Identifying problem areas

- First the feedback, questions and suggestions were transcribed
- Card sorting to form groups
- Identifying different types of issues
 - **Specific to learning material**
 - **General issues**

Issues specific to learning material

- **Amount of content** is either enough or can be increased
- **Assessment methods** are unclear/need clearer criteria/placing assessment in the task book/ modifications to attitude shift assessment -
- **Activity specific suggestions**
- **Session plan** being hard to interpret - some were okay with how it was at that

Next iteration

- **Amount of content** - should probably remain the same
- **Assessment methods** - need to redefine criteria with the help of a subject matter expert, and add the assessment (or a summary) to task book
- **Activity specific suggestions** - can be implemented in the next iteration
- **Session plan** being hard to interpret - an alternate visual representation shown in this slide



and so on...

Alternate lesson plan representation

General issues

- Issues with **structure** of class/ learning material
- **Timing** issues - especially regarding activities
- **Novelty** - too different from existing methods
- **Feasibility** - implementation may be hard at first

Next iteration

- **Structure** of class/ learning material - Combining lesson plan + information manual
- **Timing** issues - making activities simpler with more supporting materials
- **Novelty** - adapting to teacher's manuals issued by CBSE
- **Feasibility** - making assessment easier for teachers, giving more clear guidelines regarding activities



Reflections



Growth as a designer

- Practiced my recently acquired instructional design skills, developed an interest
 - Exposure to new learning theories
 - Designing learning materials
 - Iteration - iteration - iteration!
- Not falling in love with my work - learning to adapt and empathize with who I am designing for
- Still working on my visual design skills

Growth as a person

- More in-depth understanding of the domain of sustainability
 - Did a couple of courses on sustainable design myself
 - Speaking to domain experts was **enlightening**
 - Looking at the various ways (Idealistic, practical) people approach sustainability
- Learning how to communicate better - most important part in teaching! (Creating materials for teaching)
- Learning to network and connect with people - they kept me going!



On the whole, it was an

**Enriching learning
experience!**

Thank you!



Developing a lesson plan for the topic of
“sustainability and design”
for class 10 CBSE students



Project by **Neha Balasundaram**, guided by **Prof. Ravi Poovaiah**

