7.0 Module 7
Introduction to Prototyping
18 hours (12 in school and 6 at home)

Design Thinking

Exposure 1	- Introduction to Low-fidelity Prototyping
Exposure 2	- Types of Low-fidelity Prototyping

Overall Task	**Introduction to Low-fidelity Prototyping**
Task 7.1 (at School)	- Paper Prototypes
Task 7.2 (at School)	- Scenarios as Prototypes
Task 7.3 (at Home)	- Animatic for Prototyping
Task 7.4 (at School + Home)	- 3D prototyping through Card board and Clay/Plaster of Paris
Final Output	- Make a presentation on understanding the problem space
	+ Reflections, Self Assessment and References

7.0 Module 7

Introduction to Prototyping
(12 hours at school + 6 hours at home)

Design Thinking

Introduction:

The word Prototype originates from the Greek word prototipos, which means first original model.

A prototype is the first materialization of any idea which can be used to either explain your idea to others or test it if your idea will work. It can also help you make changes to make your idea work better. Prototyping in design helps designers get feedback from users to improve ideas and incorporate them in the design. It is part of the iterative design process.

Prototyping is done across different fields like Architecture, Automobile industry, Industrial Product industry, in making software and apps, etc. Prototyping helps companies to reduce investment risks and also helps them secure funding/sponsors for their ideas.

Aim of the Module:

To expose school students (in Grade 10) to basic fundamentals of various prototyping techniques so that they can use it as part of the design process to visualize their concept and in turn using it for getting feedback and in turn making it better.

In this module we shall cover low-fidelity prototypes. Low-fidelity prototypes are quick prototypes done using sketches and paper for 2D concepts and cardboard and clay/foam for 3D concepts. These are done to visualize your concepts quickly so that one gets a visual feel of the concept and this could be helpful to get feedback and suggestions on how to improve it.

Place:

Place: Task 7.1 & Task 7.2 done at School and Task 7.3 done at home

Grouping:

Grouping: Class tasks are done in groups of 3-4 and Home tasks are individually

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Equipment:

Equipment: Smart Mobile phone with Camera, Notebook/Sketchbook for sketching, Stationary (Pencils, Pens, Colours, Paper, Tracing paper, Card board, Clay, Black Ink and brush or brush pen, colour pens), students may use digital devices like computers or tablets (if available, but not necessary).

Exposures:

Exposure 1: Introduction to low fidelity prototyping
Exposure 2: Types of Low-fidelity protypes

Task Sequence:

Task 7.1 + 7.2 + 7.3 + 7.4
Exposure 1: Introduction to low fidelity prototyping (20 min)
Task 7.1: Paper Prototype (3hrs 40 min)
Task 7.2: Scenario Prototype (4 hrs)
Exposure 2: Types of Low-fidelity prototypes (20 min)
Task 7.3: Animatic Prototype (3hrs 40 min)
Task 7.4: 3D Prototype (6 hrs)

Design Thinking & Innovation Process involvement:

This task involves the following phases of the DT&I Process:

Phase 1. Observe/Empathise/Research (Explorations)

Phase 2. Understand/Analyse/Define (Trying out options)

Phase 3. Ideate/Alternate/Create (Visualising creative alternatives)

Phase 4. Build/Prototype/Detail (making the prototype – low fidelity)

Phase 5. Evaluate/Reflect/Implement (feedback from others)

Mapping SDG Goals:

The following SDG goals need to be considered while solving this task. While documenting elements and expressions, do think of gender equality and reduced inequalities and concern for life on our planet.

Task 7:

Task 7 = 7.1 + 7.2 + 7.3 + 7.4
School Hours: 12, Home hours: 6

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Task 7.0:

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Overall Task (Task 7.1 + Task 7.2 + Task 7.3 + Task 7.4):

Task Topic:

Introduction to Low-fidelity Prototyping Techniques

In this module we shall explore the following low fidelity prototyping techniques:
a. Paper Prototype – low fidelity
b. Scenario as prototype – low fidelity
c. Animatics as prototype – low fidelity
d. 3D form prototype – low fidelity

Low-fidelity Prototyping is a process where you can visualize your concepts quickly using simple and rapid methods. These prototypes can demonstrate the concept in tangible form so that one can make use of this to get an immediate feedback and consider suggestions for improvements. The low-fidelity prototypes after modifications and finalization can be made into high-fidelity prototypes.

One of the recent techniques is the use of digital technology for 3D printing of prototypes. 3D printing gives accurate parts, which can be used for building a working prototype. Do find out if the Atal tinkering lab near to your school has this facility.

Task 7.1:

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Task 7.1:
School Hours: 4, done in groups of 3-4

Paper Prototype:

Paper is a useful material for making quick concept prototypes. You can sketch your design on the paper and depending on what you are designing, paper can be folded, made into a bunch, kept one after another like a bunch of cards, etc.

Paper Prototypes are useful for making concepts for any of the following:
a. Posters
b. Books, magazines and newsletters
c. Information Brochures and Forms
d. Comic strips
e. Pop-up cards and books
f. Packaging
g. Signages
h. Card or board games
i. Application for a computer or mobile
j. Product Display Interfaces

1. Consider the tasks 4.4 (based on creative alternatives) or 6.3b (redesign of a sustainable product) from your previous modules on Creativity or Sustainability and create a paper prototype to visualize the concept

2. You could create any of the following for the concepts:

(a) Information Brochure, (b) Website, (c) Packaging for the product

3. Make paper prototype to show and visualize your concept

4. First cut the paper proportionately or keep it to the actual size

5. Sketch on the paper the visuals

6. Demonstrate the paper prototype and get feedback

7. Take suggestions and make modifications and if required make another version

or

You could create a paper prototype of a pop-up card so that your initial of your name become 3 dimensional when you open the card

(ref: https://www.dsource.in/course/pop-design)

Ouput 7.1: Present/demonstrate your concept through paper prototype to the class and get feedback

Task 7.2:

Task 7.2:
School Hours: 4, done in groups of 3-4

Scenario as Prototype:

In this task you will create a scenario of the different steps of the concept being used. A series of sketches need to be drawn (like in a comic book) explaining the concept. Additionally, a scenario could be created using a story or narrative with the users as characters demonstrating the use of the concept.

If your concept involves several steps as a process, then scenario is useful in explaining the concept.

This is helpful for explaining the following:

a. computer/Mobile applications

b. card / board games, digital games

c. design of services like shopping, banking or purchasing a ticket

d. a story book

1. Consider the tasks 1.4 (on Social Issues or on issues in your neighbourhood) from your previous modules on Communication Skills to visualize the concept

1. First, note down the different steps involved in using the concept by the user. They should be in sequential order of use.

2. Decide the size of the paper in which you would like to demonstrate each step of the concept. The size could be chosen based on the media that is used. For example if the concept is an application on the mobile, then the screen size of the mobile will be the size of each paper. If the concept is being explained using a presentation on paper, then you could choose A4 or A5 size paper. Cut the paper to the required size.

3. Sketch the different steps in each of the papers, so as to form a scenario showing the use of the concept

4. Bunch and clip the set of papers

5. You can now use this bunch of papers to show and explain how your concept works to a potential user and get his feedback and suggestions

Ouput 7.2: Make a presentation of using a scenario to demonstrate a concept and get feedback

Task 7.3:

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Task 7.3:

Home hours: 4, Done individually at Home

Task Title:

Animatics as Prototype:

Animatics is very much like the scenario prototyping with each of the sequential images as sketches played or shown one after another. You could add to this rough audio using voices, music and sound effects. The timings could be adjusted to create a sense of pace. Its best done with the support of a computer or a mobile device.

Animatics are very useful to get a feel for the following:

a. a concept for an animation film

b. a concept for a video or film

1. Consider the tasks 2.3b (on Story Creation) from your previous module on Story Creation and create animatics to visualize the concept

1. First, note down the different steps involved in your storyboard

2. Draw sequential set of images (mainly the key frames)

3. Scan or photograph these one after another

4. Play it sequentially on a computer screen or on a mobile screen

5. Add voiceover, music and sound effects

6. You can now use this to get a feel of the animation film or video

7. This is also quite useful for getting feedback, review and suggestions

Ouput 7.3: Make a presentation of the animatics

Task 7.4:

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Task 7.4: 7.4a + 7.4b

School Hours 4, done in groups of 3-4 and Home Hours: 2, done individually

Task Title:

3D prototyping through Card board and Clay

Cardboard, clay, plaster of paris and foam board are useful materials to make quick prototypes of 3D objects. In this task, we shall make use of cardboard and clay/plasticine. Cardboard is useful for making models of objects that are rectilinear or almost rectilinear and clay is useful for making objects that have a curved surface.

Students form groups of 3-4 and make prototypes in both cardboard and clay.

Task 7.4a: Using Cardboard

1. Cardboard: Consider the task 3.5 (redesign of a vendor cart) from your previous module on Creativity that involve a solution using 3D objects and create a 3D prototype to visualize the concept

2. Make the plan (top view), front view and side view of the object an A4 size paper. If the object is big, draw it to scale on a smaller size to fit it into A4 size sheet.

3. If the object is rectilinear (for example the vendor cart), then use cardboard

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4. Cardboard: Taking the plan, front and side views as reference, mark on the cardboard. Then cut it according to the markings and then stick the cardboard sheets together. Some of the surfaces will need to be repeated. There might be cutouts on the surfaces. The wheels have to be cut circular. And, there might be some adjustments that need to be done in order to fit the different pieces together.
5. You could colour and sketch details on the surfaces of the cardboard model or Clay/Plasticine to make it look more like the concept 3D object
6. Demonstrate the 3D prototype and get feedback
7. Take suggestions and make modifications and if required make another version
Output 7.4a: Presentation of the 3D prototypes in cardboard and get feedback

Task 7.4b: Using Clay/Plasticine

1. Clay/Plasticine: Consider the task 6.3b (redesign of a sustainable product) from your previous module on Sustainability and Design that involve a solution using 3D objects and create a 3D prototype to visualize the concept
2. Make the plan (top view), front view and side view of the object an A4 size paper. If the object is big, draw it to scale on a smaller size to fit it into A4 size sheet.
3. If the object has curved surfaces (for example the object being redesigned for sustainability), then clay or plasticine
4. Clay/Plasticine: Taking the plan, front and side views as reference, the clay needs to be shaped accordingly. It is best to first make a rough form of the concept and the details afterwards.
5. You could colour and sketch details on the surfaces of the cardboard model or Clay/Plasticine to make it look more like the concept 3D object
6. Demonstrate the 3D prototype and get feedback
7. Take suggestions and make modifications and if required make another version
**Output 7.4:** Presentation of the 3D prototypes in Clay/Plasticine and get feedback

Reflection:

Questions to ponder:
- Which of these methods are you confident about using for making low-fidelity prototypes – Paper Prototype, Scenario Prototype, Animatic Prototype or 3D prototyping using cardboard or clay?
- Will you use some of these methods to visualize your solutions in tangible form and get feedback?
- Will you share the methods of quick prototyping concepts with others?

Assessment:
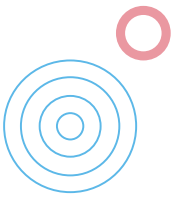
Assessment Criteria (Task 7.1 + 7.2 + 7.3 + 7.4) - Assess yourself:
- The presentation/demonstration of the concept through paper prototype to the class to get feedback is done well (Group task 7.1)

☐ *Beginning*   ☐ *Developing*   ☐ *Promising*   ☐ *Proficient*   ☐ *Excellent*

- The presentation of using a scenario prototype to demonstrate a concept and get feedback is done well (Group task 7.2)

☐ *Beginning*   ☐ *Developing*   ☐ *Promising*   ☐ *Proficient*   ☐ *Excellent*

- The presentation of using animatic prototype to demonstrate a moving-image concept and get feedback is done well (Individual task 7.3)

☐ *Beginning*   ☐ *Developing*   ☐ *Promising*   ☐ *Proficient*   ☐ *Excellent*

- The presentation of the 3D prototypes in both cardboard and Clay/Plasticine were done well (Group + Individual task 7.4)

☐ *Beginning*   ☐ *Developing*   ☐ *Promising*   ☐ *Proficient*   ☐ *Excellent*

Other References:

Other suggested References:
1. Paper Prototyping:
https://www.interaction-design.org/literature/topics/paper-prototyping

2. Cardboard Prototype - short video:
https://www.youtube.com/watch?v=qxXj2RhKjZY

https://www.youtube.com/watch?v=k_9Q-KDSb9o