

Design & Make a Cool Gadget: Mission Brief

Learning Objectives

- Design a suitable case & display using 3D printing &/or laser cutting techniques
- Evaluate & choose a suitable embedded microcontroller board (Arduino Uno, Nano)
- Apply electronics principles during assembly of the PCB
- Select suitable electronic components & write code to program it for desired effect
- Describe the S.O.P of setting up the hardware and software to program the embedded microcontroller board
- **MAKE** cool stuff

Learning Activities

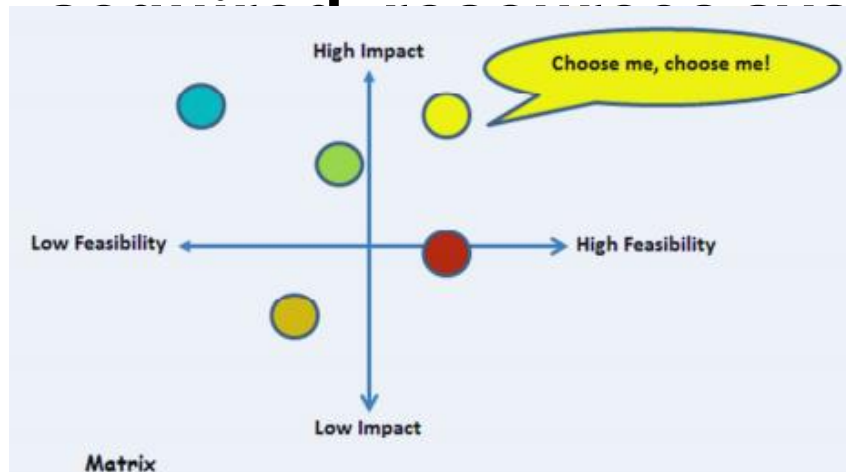
- CAD design, 3D printing & laser cutting
- Prepare hardware & Software to program the embedded microcontroller board
- Program RGB fading source code onto Arduino board
- Test the integration of RGB/neopixel LED with source code, and the 3D design gadget.
- **MODIFY/TINKER**

Design Thinking Tools to Conceive Idea: Persona

- Adopt one of the following persona for brain storming of idea. Idea to be show & tell, and prototyping of the idea.
- The entrepreneur
 - Design & Make an item for sale at this event.
- The technologist
 - Design & Make an item for functionality and engineering feasibility
- The designer/artist
 - Design & Make an item for aesthetic, visual appearance

Matrix of success

- Come out with many ideas, and then use the following matrix to assess feasibility based on a few limiting parameters: **time**, **skills to be available**.



Ideation

- Sketch the idea
- Give description to the idea
- Define steps necessary to materialize the idea
- Idea can still be further refined in due course!
- Prototype the idea!
 - Ideas are great, but implementation is everything!
 - Decisive action builds confidence and momentum!

Prototype

- **3** main factors that affect prototyping process
- Time
- Resources
 - DigiSpark, RGB LEDs, source code, ATTiny85, commonly used electronic components, 3D printers
- Skills
 - Wiring, CAD (Computer Aided Design) modelling, electronics principles, programming, troubleshooting.

Activity

- Break into a group of min 2 or max 3
- Each member of the group adopt a persona
 - discuss the design
 - What to make
 - How to make
 - Make it

CDIO Activities

- Concept, Design, Implement (partial building blocks that leads to final gadget): Day1,2,3
- Each group to **show&tell** what is the design of the cool gadget/progress:Day1,2,3
- Intense making/troubleshooting: Day3
- Group critique session: Day3



**GET
EXCITED
AND
MAKE
THINGS**

Picture credit: Matthew Magain