

GNG1103  
**Deliverable F**

# **Prototype 1 and Customer Feedback**

Submitted by

**A01, TEAM 14**

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## Abstract

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Throughout this paper, the team will outline a prototyping test plan and develop a prototype that will be used to achieve the objectives of the plan. The team will also analyze critical subsystems, the results of which will allow the team to reduce uncertainty in future prototypes.

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**List of Acronyms**

Acronym	Definition
CEED	Centre for Entrepreneurship & Engineering Design
SD	Secure Digital
STEM	Science-Technology-Engineering-Mathematics
ETC	Estimated Time of Completion

# **1 Introduction**

The goal of this document is to display and explain the purposes of our first of three prototypes. We will be designing the layout and some of the basic functions of our map in DashBoard itself. We will be making an overall map of the first floor STEM building along with the separate maps for each of the CEED spaces. Basic features planned for the map like the clock and buttons that lead to different tabs will be added. Our first prototype will allow us to visualise how the overall map will look and where each tab will be labelled with the planned function for them. We will also be getting a more in-depth understanding of how DashBoard works and familiarizing ourselves with its features.

## 2 Prototyping

### 2.1 Testing Purposes

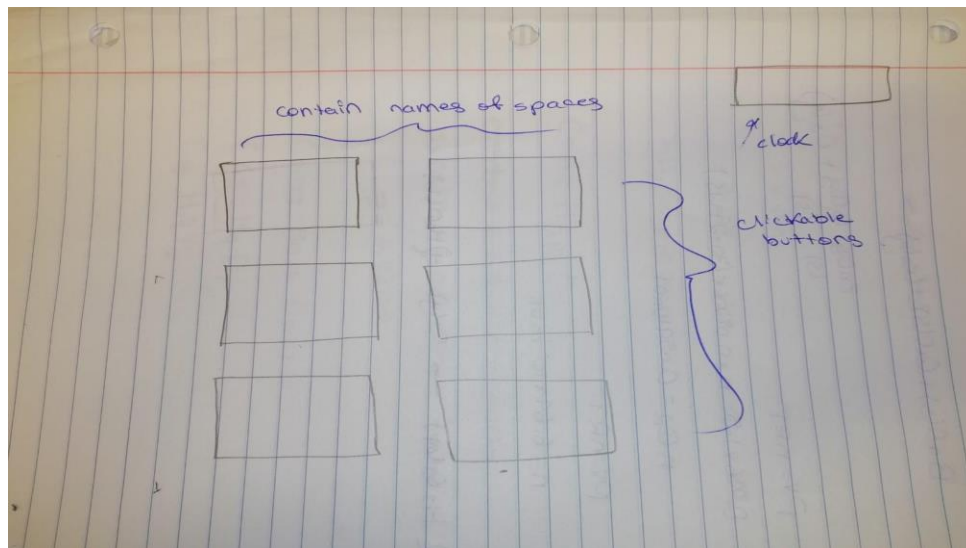
- To better visualise the outline of the map
- To make a basic outline on DashBoard to be developed further (specifically to place buttons for each CEED space into the map and enable it to open a blank page to be developed when selected)
- To finalise placements of tabs and features for product
- To add a functional clock on DashBoard

Overall: To check if the design is feasible and can be implemented within time and with the current level of expertise.

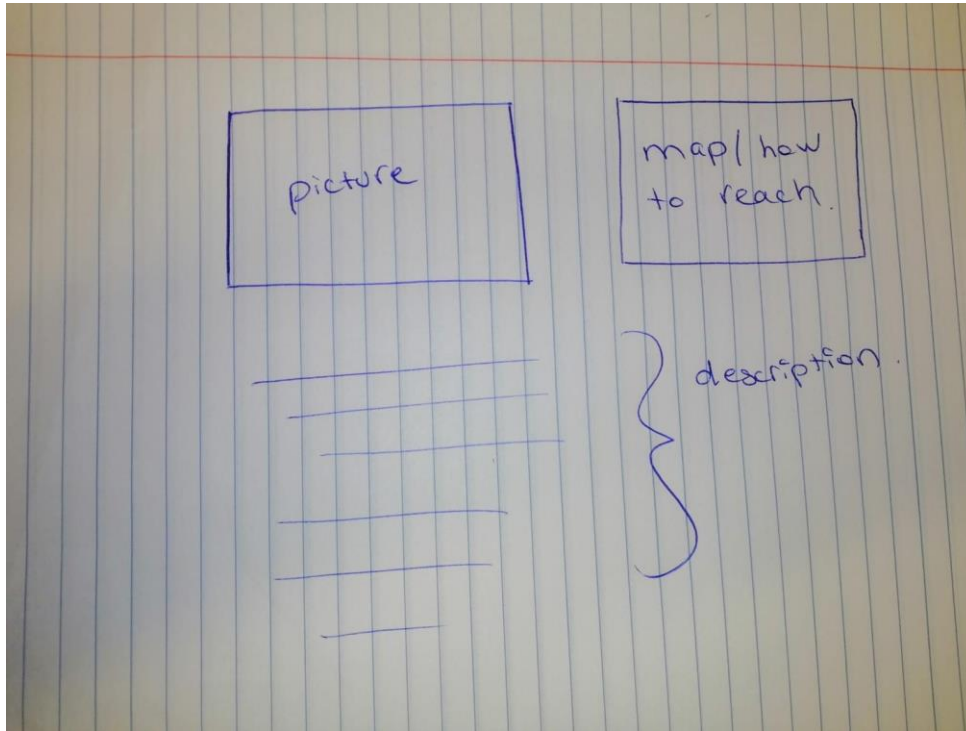
### 2.2 Design Concept

- Floor plan of the entire first floor of the STEM with labels on each of the rooms showing which room is which
- Can click on each room and leads you to a new tab
- At each new tab, there will be a floor plan for that room
- The floor plan will have the machines in it and will show when they are in use

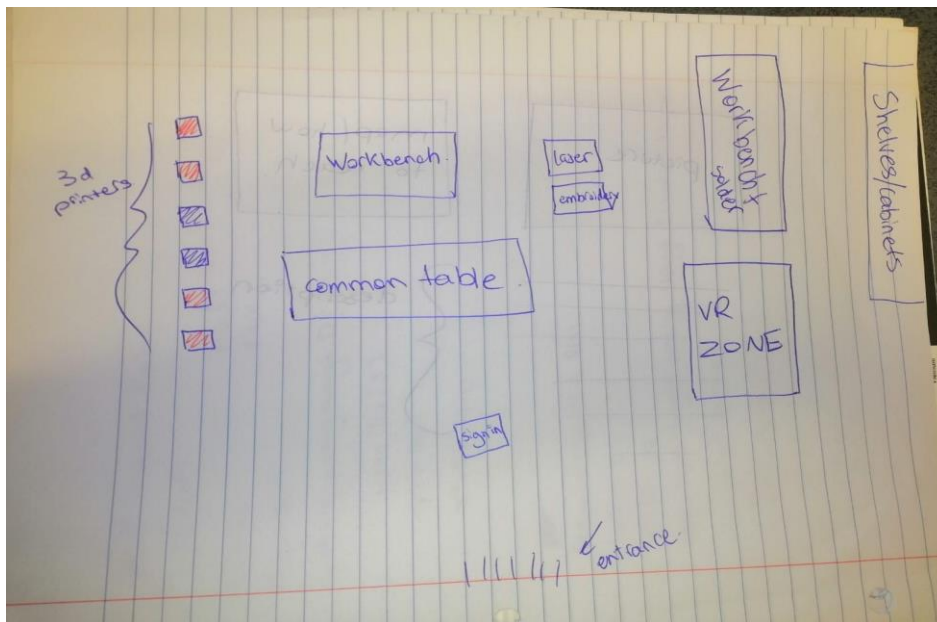
After the last meeting, our team came up with a rough graph of what the map is supposed to look like as clearly portrayed in the picture below:



After clicking on one of the buttons, a new page will appear, where the overall layout will include:



The layout of MakerSpace and Brunsfield will differ from the others though. This is because, as discussed in the previous deliverables, a sign-in system is being developed for them, and will see light after the integration of the Nodemcu Board in prototype 2. For an idea, the rough picture below was sketched for MakerSpace:

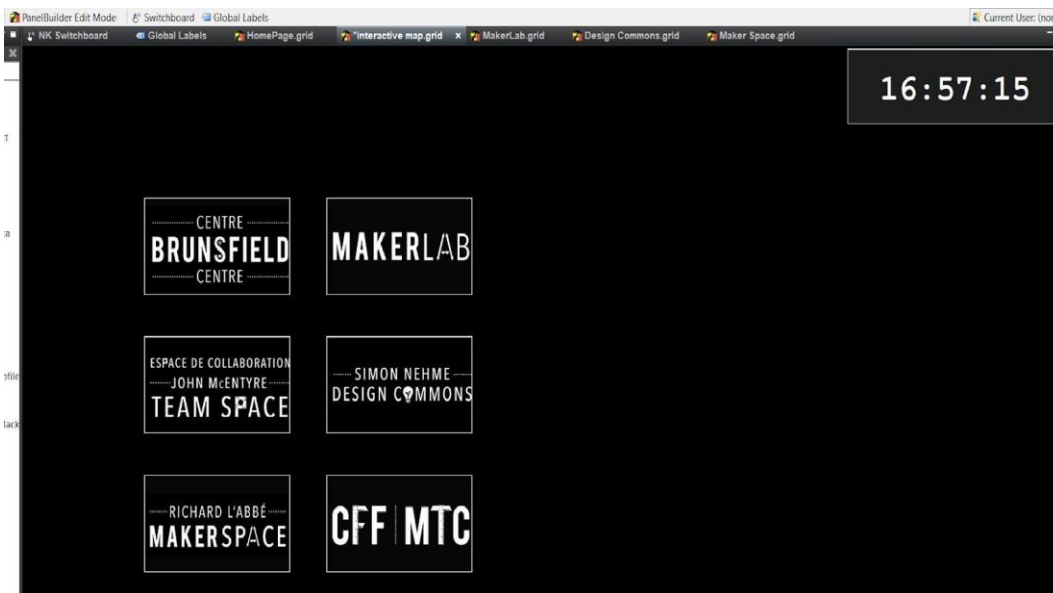


For the 3D printers, a mechanical switch will be implemented to know whether the machine has finished printing or not. This will be discussed in more detail when it has been implemented in

prototype 2. In addition to a more detailed and precise layout of Brunsfield and MakerSpace where the sign-in systems will be placed.

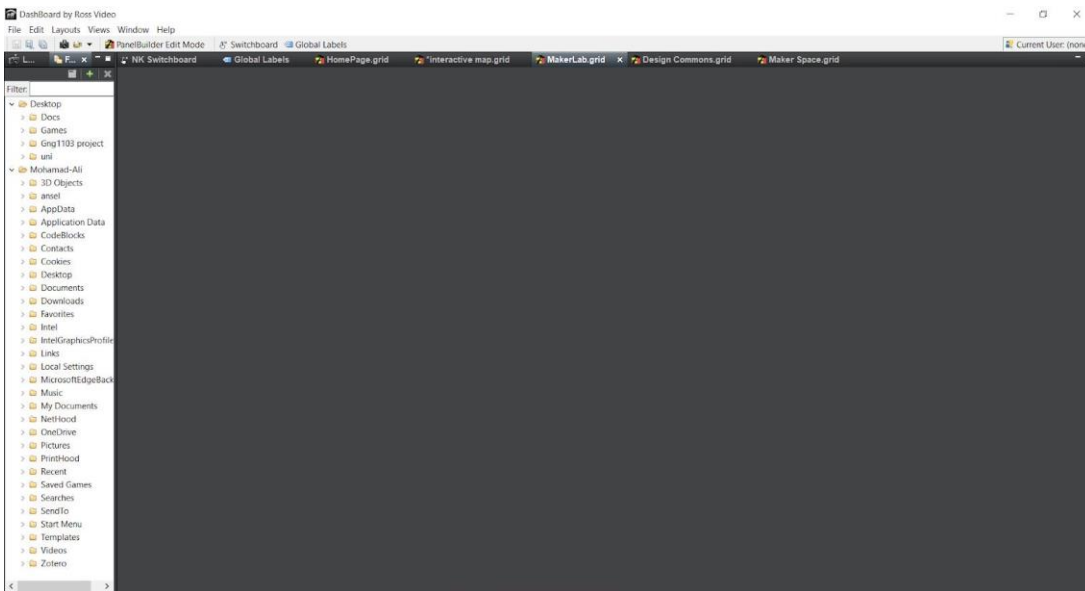
It has been discussed that two copies of the map will be present. One can be found inside the MakerSpace where you can actually sign into a machine and the other online where only the availability of machines can be previewed. That is to promote the usage of machines to users physically present in the space.

Our first prototype consisted of implementing some of our ideas into DashBoard. As a result, the following was created:





A basic outline of the buttons, the implementation of the clock, and the actual link between the buttons and the pages they are supposed to preview when pressed were tested. In elaboration, when we press any of the buttons above, a new tab, as below, opens.



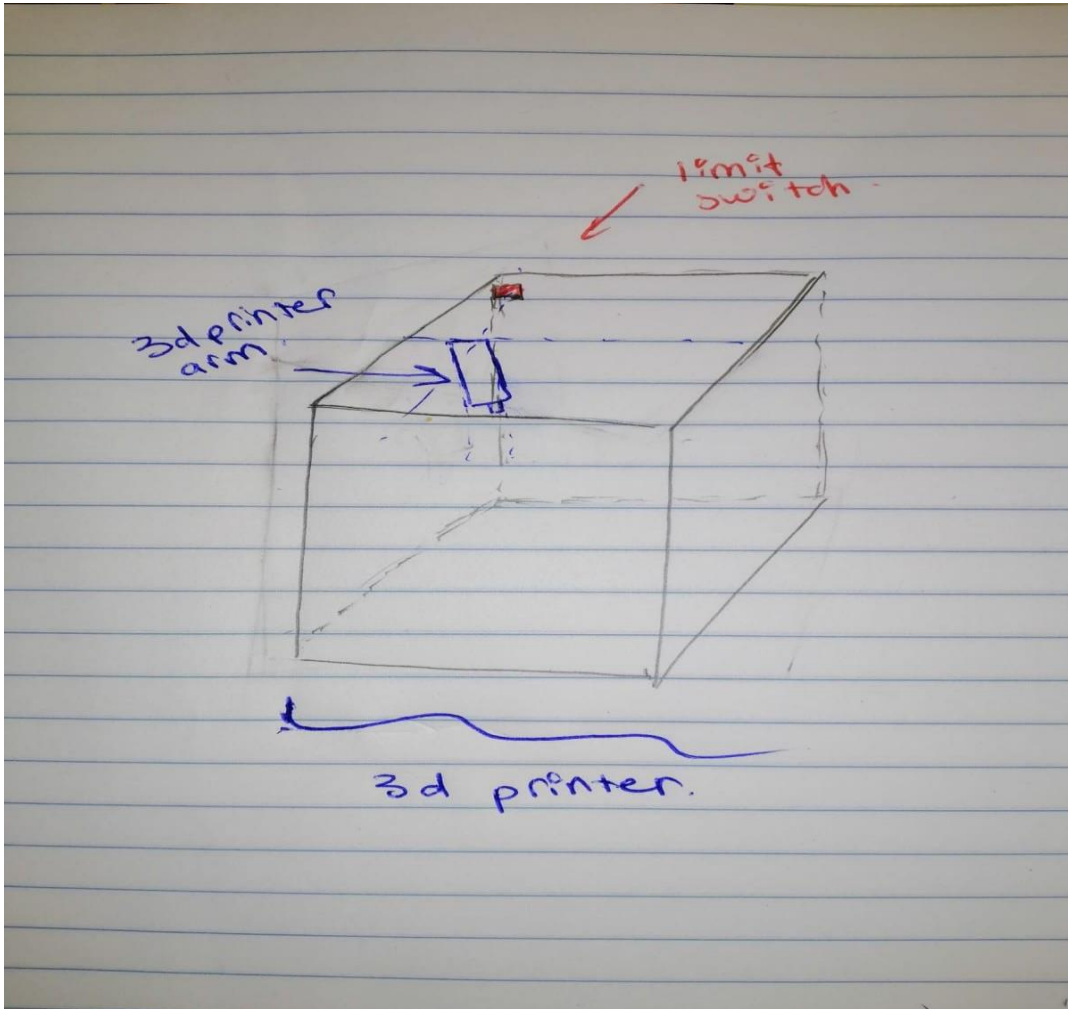
This page will then be filled with the descriptions and/or the sign-in system as explained above.

Regarding the availability of the machines that was discussed in the previous deliverables, an idea was suggested.

The team went to MakerSpace and noticed that the arm of the 3ds printer does not stay in the same corner for an extended period of time as it is continuously laying out the plastic.

We would place a limit switch on the corner of the 3D printer, and when the arm hits the switch for an extended period of time (for example 3 minutes) this would mean that the machine is not in use anymore. As a consequence, a signal would then be sent to our node mcu board.

A sketch was provided for simplification:



## 2.3 Testing

As for testing, as prototype 1 is more software-based and contains no actual hardware. The real testing would have to wait until prototype 2. Other than that, DashBoard was used to test and get an idea of whether or not our ideas could be implemented.

## 2.4 Interpreting Results

The slight testing we could do during prototype 1 was to test the functionality of the buttons and the clock. As mentioned above in 2.2, a new screen does open upon the click of the corresponding button ( i.e Makerspace opens a new tab for MakerSpace details, and Brunsfield a new tab for Brunsfield, etc.). Furthermore, connection to an open internet window was established, meaning it is feasible to continue working on the idea, however there was limited access to what we can do once connected, further testing will be needed.

## 3 Validation

As stated above, the current plan for prototype 1 is to achieve a solid foundation for our Dashboard, and from there test functionality for a couple of ideas. These include an internet connection, as well as button clicks and screen opens. It can be assumed that more detail will be added to windows, as well as any further windows, or transitions that might be needed throughout the Dashboard system. Current tests demonstrate that our methods for linking buttons to their respective screens to be very promising, so we should be able to continue moving forward with that method, testing here and there to ensure everything is working properly, as it is the base of our project. In regards to the internet connection, we were only able to achieve outputs, therefore establishing a connection, proving the concept. However, further testing and linking will be done for prototype 2 to verify just how much we can do with that, so we should be prepared to modify that idea. The main points to pull from our testing is the feasibility of the internet connection and what can be done in that domain. Moving forward we can use this knowledge of wifi connections to Dashboard for possible uses with the individual switches on the 3D printers.

Until now, the idea of hosting a local network to host the second copy on DashBoard seems the most probable. Further practice during the next meeting will prove its feasibility.

## **4 Transfer of Knowledge**

For this deliverable, we have made constant references to previous deliverables to keep us on track. Deliverable E was used along with our Gantt chart to ensure that each member knew what they were doing and when they had to complete it by. This made it easier for us as a team to keep track of all the tasks for this deliverable. Deliverable D was used to ensure that each task in making this prototype was made with the customer's needs in mind.

## **5 Conclusion**

All in all, this prototype consisted of some implementation of the features wanted in the map onto the actual Dashboard. Hence this was more to see if our technical specifications were reasonable and can be implemented within our domain of expertise, and within the time period available.

## **6 Further thoughts**

The team will have access to the equipment necessary to finish the hardware side of the project by the due date for prototype 2. So, an implementation of the hardware, required code and the layout of the pages/maps should be completed in the second prototype. That is to set a strong basis for the third prototype, which would be of high fidelity to the finished result.

In addition to that, with the submission of this deliverable, and during the second meeting, the Gantt chart will be updated to show a more intricate and precise division of tasks i.e as to include which team member is responsible for which page.

# Bibliography

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