Project Deliverable H: **Prototype III and Customer Feedback**

Group 10

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Abstract

The purpose of this deliverable is to continue to improve our prototype by building off of feedback from the client and from peers. Furthermore, the way the prototype has improved is that we have decided to move away from 3D printing to laser cutting to cut down on time and avoid unnecessary trial and error. Group 10 members have all been contributing to the design and improvement of this project together. This report will present a summary of all the components contributed to this deliverable, notably the work leading towards the third of the Guardian building.

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1. Introduction

In this deliverable, group 10 continues to improve design with the prototype III. The design has moved away from 3D printing to cutting because it will mitigate mistakes and be more accurate than 3D printing each room individually. Furthermore, this document also will provide an analysis of the systems we plan to include. Feedback from the client has been received.

2. Feedback

Based on the feedback from the third client meeting, we did not see any changes that needed to be made to the design. The client confirmed their liking of many concepts of our design and the only suggested changes were concepts that we had already included, but were not fully clarified in the timeframe of the third client meeting presentation. During our construction of the final prototype, we were able to visually notice things that needed to be slightly modified (i.e. wall dimensions, door sizes, etc) as well as parts we still needed to add to make the prototype into a more detailed representation of our design. We were also able to reflect and decide to exclude the roof we were originally going to laser cut, because the roof is already included in the AutoCAD model, and we wanted to focus our time on adding details.

The peer feedback we got confirmed that we are on the right track with our physical prototype as each peer liked the design.

3. Prototype III

To continue the development of our prototypes, we created prototype III. Although our original plan was to create a 3D printed model, we reflected on this plan and decided it would be

a better idea to laser cut our third prototype instead. This decision was made surrounding the following considerations about laser cutting:

- It is less time consuming
- It is much cheaper (more within prototype budget)
- It is easier and faster to correct mistakes
- We already know how to laser cut, not 3D print
- Generally, it is just more reasonable within the scope of this project, our responsibilities, and our timeframe

Once the decision to switch was made, we created a plan to generate the necessary drawings for the walls, floor and roof of our building, including windows and doors. Using the Inkscape software, we were able to create these designs to our liking and cut out each component on MDF material. We then assembled every piece in the correct location, to create a physical prototype.

4. Component analysis

Selected preliminary concepts:

Functional requirements

- Building is accessible
- Large, open, outdoor space
- Easy to modify/fix

Non-functional requirements

- Aesthetics
- Natural light

- Building durability

Constraints

- Building square footage
- Building budget

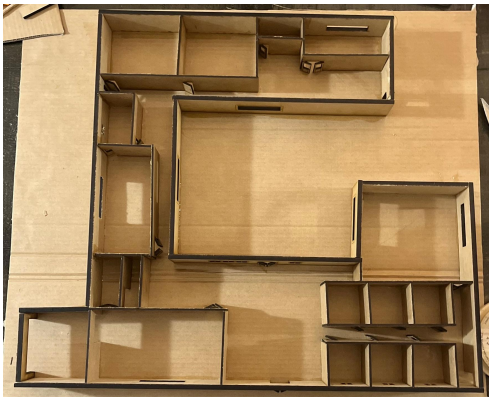
Component or subsystems selected:

- Open area in the centre (Natural light/Building durability/Building budget)
- Modified the locations of rooms (Building square footage/Building budget)
- Colouring on the prototype (Aesthetics)
- A laser-cut prototype (Easy to fix/modify)
- Physical prototype (Aesthetics/Building budget/Easy to modify/fix)

Not selected:

- 3D Printed prototype (Building budget/Durability/Easy to fix/modify)

5. Prototyping Test Plan Prototype III

Images: Prototype III, Physical Model (Laser Cut)

Test ID	Results

1. Sanity & Safety Check	Fire exits were added in different parts of the building to meet safety standards and provide easy exit in case of an emergency.
2 Peer Feedback	During peer feedback testing, five people were surveyed on their opinion of our final layout and design, their feedback was a positive confirmation that the building's design makes sense and is logically designed.
3 Client feedback	We received the feedback from client meeting 3, in which they stated the following: ● Lean to and the lab should have a big loading door if not already ○ We already have a large garage door ● More office spaces would be beneficial if possible. The reason they requested more office spaces is due to some misunderstanding and confusion about the design of our big main office room, which is designed for 15+ office spaces (including 8 cubicles and additional table workspaces). Since our first prototype (which is what they saw) only showed the outside walls, they interpreted the big main office as for one person, which is not the case. They liked: ● The lean to off the lab and their location ● The storage rooms ● The outside green areas ● The solar lamps
4 Cost Estimate	After receiving all final client & peer feedback on our prototype, we updated the BOM and cost estimate as needed. Deliverable H Project Cost

Based on the client feedback, there was not much we needed to change or improve. During peer feedback, we only received positive confirmation that our design looks good and appears to functionally serve its purpose. The cost estimate for our building has been finalised and will be published in our project folder in MakerRepo (see link above).

6. Conclusion

Many great design changes and improvements were made during the progress of our third and final prototype. The decision to laser cut was very effective, and allowed us to efficiently generate the parts of our 3D model and assemble it all within the time frame for this deliverable. We believe we will be able to put together an effective presentation for design day, including our 3D physical prototype, as well as our 3D computer model in AutoCAD, and our video ‘walkthrough’ of our building to add to the visual appeal of our presentation for whoever walks by. The decision to omit the removable roof of our 3D physical model was simply due to time concerns, and the fact that we wanted to add other additional details to our model that weren't already displayed in the AutoCAD design.

To further the design of our 3D model for design day presentation, we will be adding furniture, colour and other decor as we see fit. We want our design to be as detailed as possible within our time frame and with the resources we have.

For the next deliverable, we will elaborate off of this prototype in order to create the user manual.