Project Deliverable H

1.0 Introduction

The final prototype has been designed based on all of the prior and present customer and peer feedback that we have received. Three-dimensional printed models of the building's most crucial subsystems, as determined by us, make up prototype 3. Workspace, office, restroom, kitchenette, boardroom, and lab are some of these subsystems.

2.0 Prototype III

Our third prototype is a collection of the 6 different subsystems which are the lab, office, workspace, kitchenette, washroom, board room. We also decided to 3D print our design for the portable workbench. To allow for a more comprehensive understanding of our project we decided to 3D print our designs. This will enhance the client's visualization of our designs as well.

2.1 Portable Workbench

While designing the portable workbench the initial design was heavily inspired by the basic design of a warehouse moveable bench. Shown in Fig 2.1.1. This design included some storage space under the form of shelves. However after showing this design to potential clients they expressed that the design is too "basic" and that it has no distinguishable factors. The feedback is shown in section 4.2. After careful deliberation we modified the shape of the design and ended up with a circular design that has more storage space. As per our clients requested the storage space in the workbench is big enough to house a dehydrator. The new design is shown in Fig 2.1.2

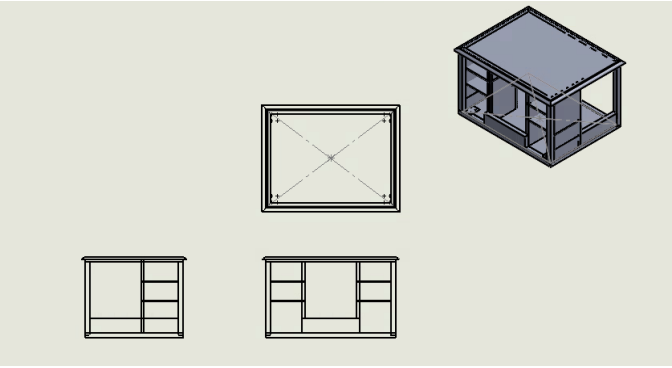

Fig 2.1.1 Our initial workbench design

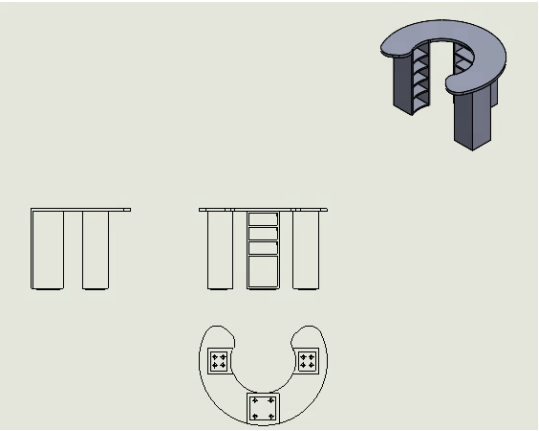

Fig 2.1.2 Our final workbench design

The circular workbench has a height of 1.2m and a radius of 1m from the center of curvature. It contains multiple storage compartments for samples, tools and a dehydrator. The storage compartments can be used as shelves or drawers depending on the users preference. The design also includes 4 holes on the bottom of each storage pillar. These holes serve as screw holes for the wheels.

A physical prototype was made for the circular workbench showcasing the final design was made using a 3D printer from the MakerSpace Lab. Shown on Fig 2.1.3

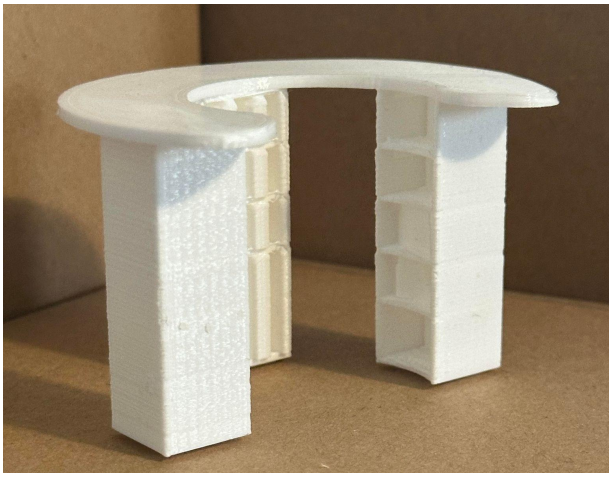

Fig 2.1.3 3D printed prototype of the final workbench design

2.2 Building

Our Prototype III also features our 3D printed designs of the main critical subsystems which are the:

- Workspace
- Office
- Washroom
- Kitchenette
- Boardroom
- Lab

These designs are from Prototype II's, which included a floor plan of the building. Using the floorplan we used OnShape and SolidWorks to make Prototype III. Picture of Prototype III are attached below.

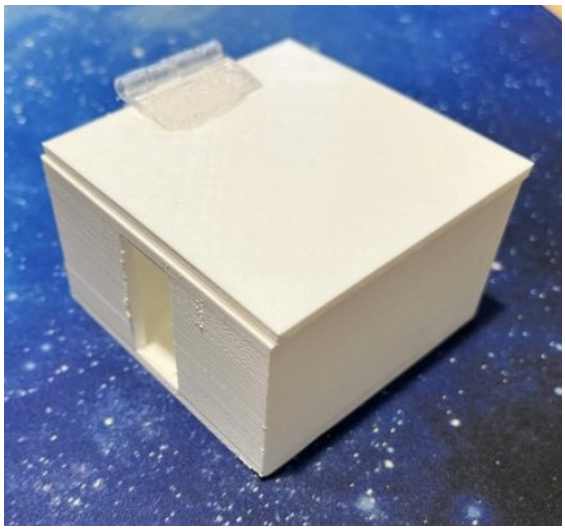

Fig 2.2.1 3D printed prototype of the closed final office design

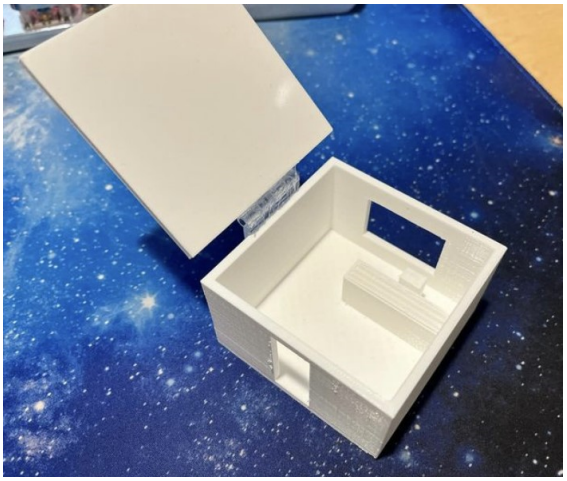

Fig 2.2.2 3D printed prototype of the open final office design

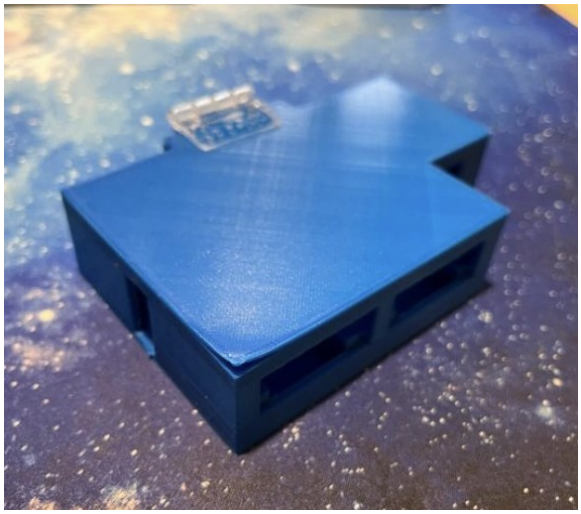

Fig 2.2.3 3D printed prototype of the closed final lab design

Fig 2.2.4 3D printed prototype of the open final lab design

Fig 2.2.5 3D printed prototype of the closed final workspace design

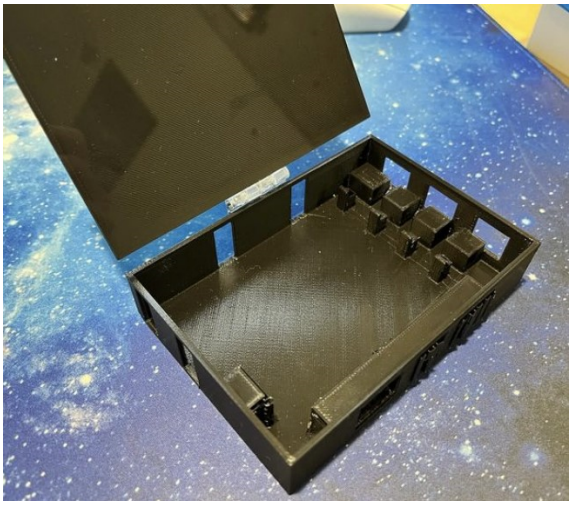

Fig 2.2.6 3D printed prototype of the open final office workspace

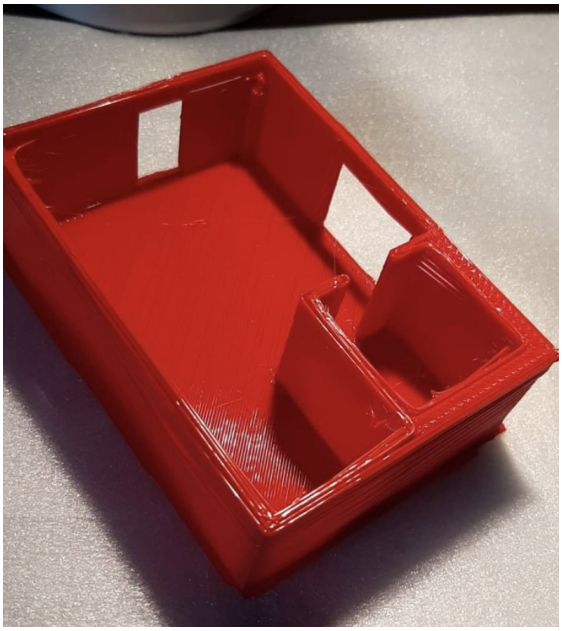

Fig 2.2.7 3D printed prototype of the final loading dock and walk-in freezer design

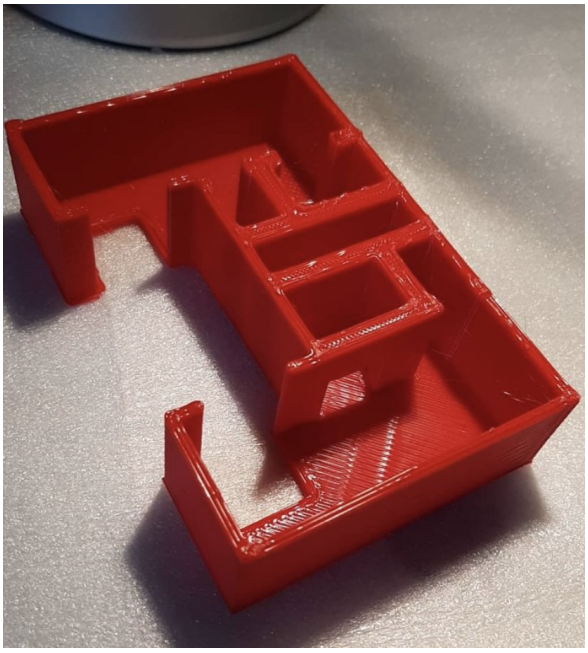

Fig 2.2.8 3D printed prototype of the final bathrooms design

Fig 2.2.9 3D printed prototype of the final boardroom design

3.0 Prototyping Test Plan

Test ID	Test Objective (Why)	Description of Prototype used and of Basic Test Method (What)	Description of Results to be Recorded and how these results will be used (How)	Estimated Test duration and planned start date (When)
1	Inspecting and analyzing the 3D printed prototype to assess the dimentional accuracy for de-risking.	We will use Prototype 3, a physical and comprehensive model, and analyze the dimentional accuracy it retains from the floor plans. Any measuring device can be used to perform this task. The print is required to be measured.	The dimensions measured will be compared to the original plans to ensure the accuracy of the model. This test is not a test for the prototype, but a step taken to ensure the production of accurate results for other tests.	The test will take up an hour. The test will depend upon the print of the 3D models. This task is a dependancy for all other tests on Protoype 3.
2	Inspecting and analyzing 3D printed models to determine overall consistency of all parts according to the design intent for de-risking.	We will use the same physical and comprehensive prototype to complete the test. We piece all the components together and inspect the assembly for an idea of the final building. From there, we analyze the model for any defects of design errors in the form of awkward placement of systems.	The data to gather will be the fidelity the model has to the design intent. The test procedure involves scanning all around the assembled prints and comparing them to the design prompts: Natural lighting, nature-like, retains cultural elements, etc.	This test is very straightfoward, as there are no hard measurements to take. The test is more of an abstract one, as in it is more subjective, and one hour should be more than enough. The depedancy for this test are all the printed components (Prototype 3), which we have at our disposal. The results from this test are required before we make any alterations to our software model because that task is dependant upon this test.
3	Analyzing the natural lighting of the building for comprehension. The physical model is a good option to use for this test because an analytical model using programs to ray-trace for the whole building is beyond our skill level.	We will use Prototype 3, a physical and comprehensive model, and analyze the level of sunlight coming in through the windows. We place the room we wish to test on a surface, shine a light source horizontally from the outside of the model's walls and analyze the level of lighting we get from different angles.	Prototype 3 will be measured for its lighting levels using a coarse scale (low, med, high), and the results will be documented. The test is important for the project because natural lighting is an important part of our design, and we must know to what amount we have it to make the necessary adjustments. The test, which involves using a lamp to shine onto the rooms, assumes that the weather is clear and the sun is as bright as the light source we use.	The test duration will be around one hour. The dependency for this test are the printed rooms (Prototype 3), which we have at our disposal. The results from this test are required before we make any alterations to our software model because that task is dependant upon this test. The analysis time also includes time to make itirations if we come across inconsistencies.
4	Analyzing the proportions of the building for comprehension. The scale and dimensions can be hard to visualize on a computer screen, and creating it in real life will make it easier to do so.	By using Prototype 3, we can observe the proportions of each room in a realistic manner. All we need is the printed prototype. The data to gather will be the proportions and dimensions of each room and evaluate if they are appropriate for their functions.	By observing the model rooms, we can imagine the tasks typically carried out in them and determine if the space allocated in the rooms are appropriate. This is another subjective tests, because there is no concrete right or wrong answer and will be based on our judgement. We are also making the assumption that the rooms are going to be used for the purposes that we imagined in order to get effective space allocation.	The allocated duration will be 1-2 hours. We can cut the time if we assigned a room for analysis to each member, but that would yield less effective results because there will not be any input from other members. The test depends on the 3D printed models to be printed. The results from this test are required before we make any alterations to our software model because that task is dependant upon this test. If the time does not allow for this test, we may choose to not perform it as we judge this test as the least impactful.
		Stopping criteria: We will run the test results and give all the members a look. If they have things to add, they are free to do so. We will repeat the process until everyone has nothing to add to the tests.		

4.0 Feedback and Comments

4.1 Client Feedback

We have been provided with a document outlining the client's feedback from the meeting on November 7th , 2023. The client meeting has provided us with critical information that played a vital role in finalizing our design. The relevant information provided was:

- Location: 473 Kokomis Inamo Pikwakanagan, ON K0J 1X0.
- Freezer Space: Walk-in freezer.
- Dehydrator or dehumidifier: Dehydrator. (This is regarding the portable workbench)
- Exterior Design: Up to the groups. Do not want it to look like an industrial building.
- TV or Projector: TV big one.

Due to time constraints we were not able to have an in-depth conversation with the client. However, they mentioned that they liked the green wall we incorporated in the lab and that the number of offices we had is satisfactory.

4.2 Feedback from surveys

4.2.1 Feedback from potential clients

Relevant Feedback from the surveys we dispatched:

“Planely putting the work bench is too basic. I think you should think of a more unique design that makes the work bench more pleasant to use. A suggestion is making it circular so the user can have their work all around them.” - Celine B.

“I like the changes you implemented to the building. It did not look impressive at all previously and felt like you just attached a bunch of rooms together. With the new design you have maintained the buildings functionality, if not, improved it, while also making it look like a art piece.”- Dean O.

“I like the center space you implemented. It gives the people that reside in this building the opportunity to get some fresh air while connecting with the land. I think that this aspect alone helps with subtly implementing the Algonquin culture.” - Gabriel O.

4.2.2 Charts that summarize survey responses.

Other than written responses, we also conducted a survey that included multiple choice questions. The survey taker would be prompted questions and they would have to answer the multiple choice based on their opinions. The opinions are mostly positive and align with clients' needs. The results will be attached below:

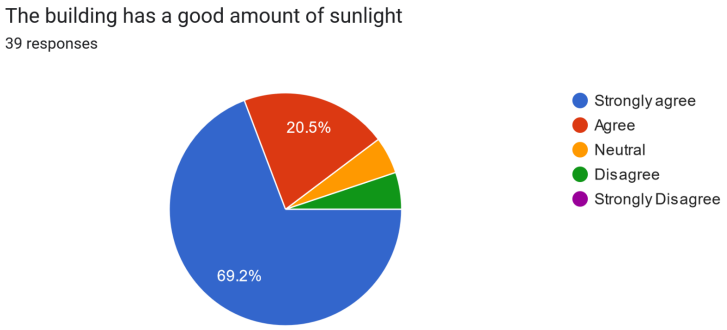

Fig 4.2.2.1 Results from 40 responses on the amount of sunlight the building has.

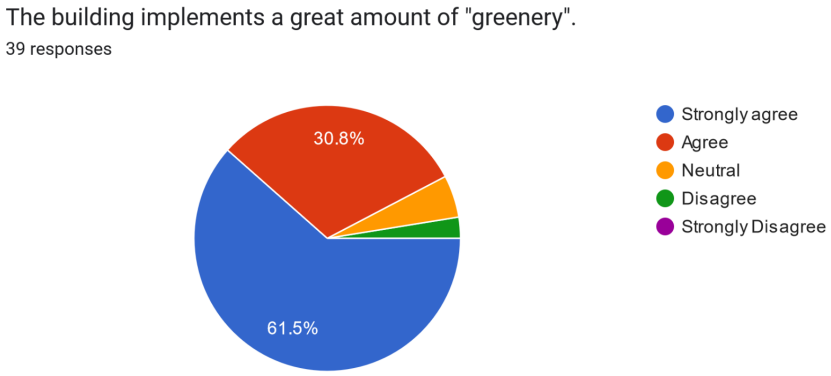

Fig 4.2.2.2 Results from 40 responses whether the building implements enough greenery.

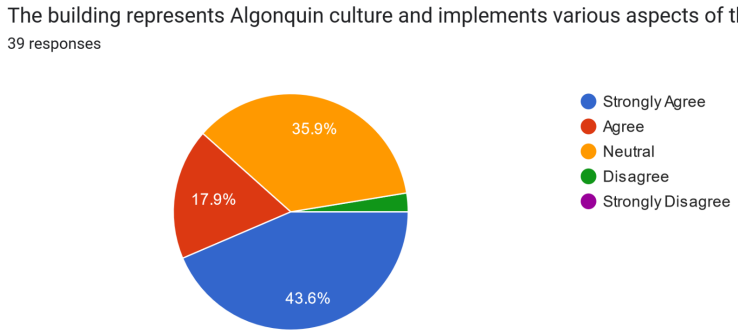

Fig 4.2.2.3 Results from 40 responses on whether the building correlates with algonquin culture.

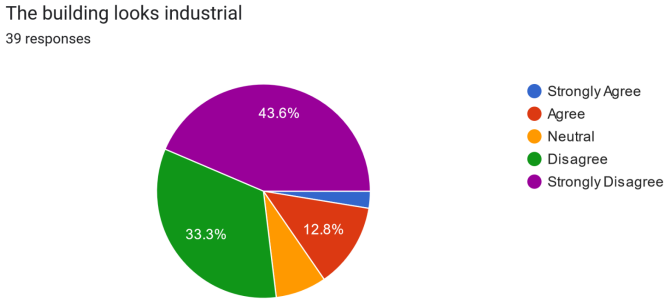

Fig 4.2.2.4 Results from 40 responses on whether the building looks industrial.

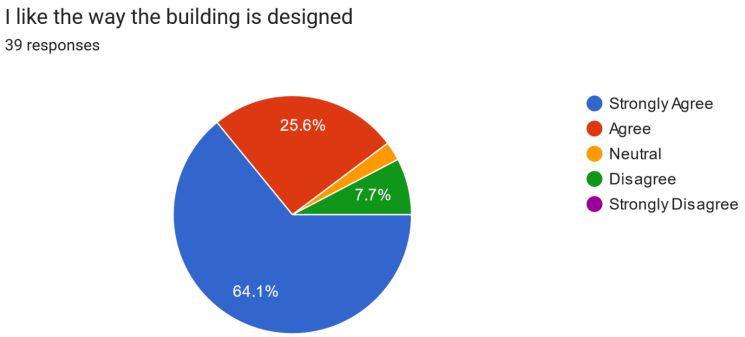

Fig 4.2.2.4 Results from 40 responses on whether the survey takers like the way the building is designed.

5.0 Conclusion

The final prototype, which is guided by a thorough prototyping test strategy, was created using input from our clients, peers, and possible clients. We have been able to steer toward a user-centered building that exceeds the client's expectations thanks to the input they have given us.

6.0 Wrike snapshot

https://www.wrike.com/workspace.htm?acc=4975842#/folder/1227809996/timeline3?viewId=216525172