Design Context: Supporting People – Challenge: (B)

How can products be used to support vulnerable individuals?

Synopsis of Work

This paper first starts with analysis of the context of the question by determining the meaning of the question and some examples of products that solve such problems. The paper then moved onto the categorization of vulnerable people into categories such as those affected by climate change, war, famine, etc.

After establishing a set of people that a product can be designed for, existing products in the categories previously established were analyzed and weakness/strengths were determined through a preliminary investigation.

After products were analyzed, two interviews were conducted with vulnerable people who are effected by various ailments to determine how a product can be made to perfectly meet their needs and ensure that they are supported. The first interview involved a subsistence farmer who suffered from severe crop loss due to flooding, and the other involved an elderly man who suffered from not being able to ascend stairs. A set of product requirements was drawn up after conducting the interview.

After conduction the two sets of interviews, the subsistence farmer's climate change problem was determined to be of more importance (not discounting the elderly man's problems) and thus was decided as the main avenue of development. A set of problems associated with climate change was drawn up which allowed a set of questions for a refined product analysis to take place. The refined product analysis covered in detail the problems, strengths, and areas of improvements of three main products, their associated materials, lifecycles after use, ethics, and sustainability. This allowed the formation of a design brief and therefore the formation of a detailed set of design parameters in the design specification.

Six initial designs were drawn up to tackle the various problems associated with climate change, such as a water catcher for regions with a lack of water, hexagonal float for crop flooding, mosquito traps, water purification, flood barriers, and climate shelters. These drawings were then compared against the specification to determine if the given products addressed the problem outlined in the design specification. A set of strengths, weaknesses, and areas to develop was established for each product. Peer feedback was also taken to determine the most suitable product to develop with the highest impact would be a water catcher for arid regions.

A process of development and prototyping began to determine the best method of answering the design brief and creating a viable water catching device. A mock assembly booklet was also drawn-up to ensure that the design specification was met.

These development was then compared to the peer review and weaknesses of the initial design to ensure that these problems have been solved.

A final design was made using the knowledge gained in the prototyping stage and a technical drawing was drawn up. A finalized assembly booklet was also designed and manufactured. A cutting list, bill of materials, tools required, construction process, and time planning was finalized and manufacturing work began.

Manufacturing involved the use of 3D printing, laser cutting, soldering, various wood-cutting tool usage, joint making, and acrylic bending to just name a few processes.

After a design was finalized, the evaluation process began. A user and peer testing process first took place which determine whether the needs of the interviewee were met. Next, the design was tested against the design specification to determine whether all the points were met. A lifecycle analysis then took place, and finally a strengths, weaknesses, and areas to develop table was drawn up to inform future projects and design work. A final score of 33/46 was achieved, which given the Covid-19 restrictions, material and tooling restrictions this was considered as a *relative* success.