Environmental Design 1
June 24, 2019
Exercises One—The Design of a Machine: From Idea to Reality

Designing influences most of our personal and professional activities. Anytime you plan before you act, you are designing. Our primary concern is designing as it relates to environmental issues, but it should be apparent that writers, engineers, teachers, doctors, and just about everyone responsible for providing services which are intended to change the state of a condition are participating in the activities of design. Designer's talk of divine guidance, but a more certain and solid beginning comes from understanding principles and concepts derived from experience**;** experience informed by the perspectives of making and its resulting evidence. This means that making provides a context for observing outcomes. Observation from this point of view is not just "seeing," it is critically evaluating concepts, principles, and values. This critical evaluation leads to understanding, which in turn leads to future exploration and hopefully another action and opportunity for further critical evaluation. This cycle: observing, exploring, understanding and acting should continue until resolution of the conditions is reached. There are several ways to approach the activity of designing. From the perspective of this class, however, designing is an argumentative process involving three critical steps 1. Identify a set of issues of concern, 2. Take a position about those selected issues, and 3. Construct an argument of the goodness or appropriates of you design actions. In doing this it is necessary to clearly identify what the design challenge is, develop a set of alternative ideas without judgment of how to address the challenge, test these ideas through an iteration process of modeling and prototyping, and finally make a final choice and implement the resolution.

This is an exercise to explore the activities of designing. In **teams of four or five** you are asked to collaboratively design and make a machine, which meets the following parameters:

1. The machine must contain three independent apparatuses or activities (distinctively different by nature).

2. Four spherical objects of no more than 1" in diameter must be moved through single or multiple apparati in exactly one minute. All four spheres must have been moved and must be at rest at the end of the one-minute time frame. All three apparatuses must have been activated. Once you have started the machine in motion, no further intervention on your part may take place.

3. The frame and apparatus can be made from some of these materials: wood, paper, cardboard, metal, glass and/or found objects. Alternative potential energy sources, springs, rubber bands, electricity, air, and water may be used to assist the movement of the spheres.

4. No joints or connections can be made with tape or other temporary fasteners, glue is acceptable. The connections must be an integral part of each apparatus

5. All of the elements used for the apparatus must be constrained to the volume of one cubic foot.

6. The machine should stimulate as many of the senses as possible, i.e. sound, sight, smell, touch, taste etc.

It is important to ask and answer numerous important questions as a means of engaging this design challenge - How does each individual apparatus work? How do these individual apparatuses relate to each other? What is the physical form of the parts and the whole? How

is it made? What is it made of? How does it meet the above parameters? What is the level of craft? Is it too simple or too complex? How will we know when to start and stop design activities? How do we develop and test the parts. Do we have the skills and resources to construct what we have designed? You may obviously add to this list.

You are to keep a record, including sketches, working models, notes, and any other information, which has helped, inform the final outcome of your machine. . In your design consider the following:

- What is your design trying to accomplish?
- How do you know whether your design is successful or not?
- What design alternatives did you consider?
- What aspects of the design are the most important, least important, and why?
- How did and on what basis did you selected a final resolution?
- What can you say about the users of the object, now and in the future, and how does that knowledge affect your design choices?

FORMAT:

In addition to demonstrating your apparatus, the team is expected to create a representation, a storyboard of the process and development of the outcome, i.e., drawings, models, diagrams, lists, statement, etc., describing your ideas, and the reasoning behind your design. This document is also to be submitted in electronic form five slides maximum.

Each team will be given 10 minutes to present their findings, including a brief verbal/process board providing the overview of the process of developing the machine and the testing of the machine in action. A digital version should also be created that includes documentation of the developmental process of the project and images of the final outcome. This document must be submitted for evaluation in electronic script no later than Sunday, July 7, at 9:00 pm sent as an attachment to an email to wmmartin@berkeley.edu

Comment:

The presentation of the design should be clear and communicate your main ideas. The emphasis of the assignment is the exploration of the object to be designed and making transparent reasoning behind the design. As such, the craft of the outcome is critical. Each of the components should be first represented in sketches, drawings, short stories, and then each component should be prototyped at least twice to test the feasibility and workability of the components. The final version should then focus on the craft of the outcome. Remember that you have limited access to tools for making so take this into consideration as you go through the developmental process.

Evaluation:

Criteria for evaluation includes:

1. Does the machine meet all of the above parameters? (20%)
2. The completeness of the documentation of the process of designing and making the machine. (20%)
3. How close to one minute is the running time of your machine? (20%)
4. The level of craft. (40%)

This assignment is worth 20% of the total evaluation for the course.

DUE: Monday, July 8, to be reviewed and tested in class