Design Alpha Release Requirements

Due: In Studio, week of 2022-11-16 **Weight:** 10% **Submitter:** Team

Assignment Overview

An "Alpha release" is an early review of design concepts. It allows teams to get early feedback on their initial design concepts and their design process so far. In some engineering workplaces, people have what is called a "bench review"–where a supervisor or small group will discuss progress on a project gathered in a board room, or quite literally at a work "bench." Preparation for such a review is minimal – it could literally be called on the spur of the moment (like a pop quiz). If you have been working on your project, you should not find the experience difficult.

Our Design Alpha Release focuses on the results of teams' diverging work in an informal but structured conversation. The Design Alpha will consist of a 12-minute conversation between your team and members of the Teaching Team. As a team, your focus should be on knowing what you have done, how you have done it, and what your next steps need to be. It will involve dynamic, semi-structured conversation with members of the Teaching Team. The conversation will focus on understanding and critiquing both design concepts and your process. During the conversation the Teaching Team will direct questions at specific team members.

Assignment Stakeholders

- Your team, who must demonstrate having engaged in credible engineering design activities and having developed a range of design concepts worthy of testing.
- You, individually, as an aspiring engineering designer who must develop both individual and team engineering design skills, and who needs to begin to differentiate themselves from their peers through their unique perspectives.
- Your teaching team, who is responsible for helping you to refine and respond to your opportunity with credible engineering design, and for guiding you.
- The stakeholders from your Design Brief, who by definition have an interest in both the eventual design concept and the process of its development.

Structure of the Alpha

At this stage, students are expected to show four main aspects of their design work:

1. Refining, Reframing, and/or Re-scoping —one of the first things a team will have had to do with the Design Brief is decide how to approach it. Whether you wrote the brief yourselves or are choosing another one, you may need to re-scope or reframe, and you will certainly need to refine the work you do. This likely will involve research to enable you to:
   - revise the stakeholders, defining them more precisely,
   - narrow the scope to a subset of the earlier scope,
   - focus and refine the requirements, perhaps by adding/dropping an objective, making the criteria and constraints more precise, etc.
   - define metrics so that you can actually test your possible design alternatives (once you have them).

2. Process—in studio during the week of 2022-10-26, you will be guided through an initial cycle of idea generation and divergence. This will likely be done rapidly and without research. By Alpha, you should be able to show multiple iterations of diverging with research in order to demonstrate that you have approached the opportunity from multiple angles.

   You should also be prepared to demonstrate your team's strategy for working and decision making. There is no "right" answer here, but you should be able to show and explain how your team develops ideas, makes decisions, and ensures equitable contributions from all members.

3. Design Concepts—at this stage, we expect you to have at least n+1 concepts that you are considering, where n represents the number of members on your team. Good concepts are those that are legitimately worth your consideration, and that appear at least for now, to meet the key requirements. The representations of these concepts can be very sketchy (literally, they can be sketches) but you need to begin rough prototyping to show or test particular features of a design.

4. Next Steps—at this stage, you should be able to tell the teaching team, the kind of information you want to know now. You might be able to identify what will be critical metrics—the metrics that will really tell whether your idea will work. You might even be able to say how you could "proxy" a test for that metric given your available time and equipment.

The Teaching Team will ask questions (to the team or specific individuals) related to the four aspects above. **Do not plan to deliver a presentation on any of these aspects - the Alpha Release is Q+A only.** Discussing these four aspects of your design work should allow each person to share in the conversation and demonstrate their understanding of the team's work.

Teams will need to work collaboratively on the project so that knowledge of different aspects is shared, thus ensuring each team member is able to discuss all aspects of the design work.

Requirements

Requirements language in this and following sections are to be interpreted as described in RFC 2119.

Objectives

1. Thoughtful refining, reframing, or rescoping
   - Explain and justify major changes to how your team is approaching the opportunity
2. Intentional process in divergence
   - Demonstrate individual and shared knowledge of the design process across its aspects
   - Show insights gained through initial prototyping, such as sketches, or simple models (i.e. cardboard and tape type)
   - Demonstrate the use of, and learning from, formal engineering tools in support of your design activities to allow divergence and convergence.
3. Quality and diversity of concepts
   - Show n+1 credible[1] design concepts that address the opportunity, where n is the number of members on your team.
   - Represent and communicate design concepts such that audiences can recognize and understand the key features of each design concept, and the design decision(s) associated with those features.

[1] A "credible" design concept at this stage is one that you anticipate is verifiable

4. Utility of team and individual contribution to the discussion
    - Demonstrate effective teamwork that shows how individual skills and abilities were integrated to develop your team's results
    - Communicate clearly using a collection of relatively unstructured oral, visual, physical, and written representations.

Constraints

For your Alpha Release, your team:

1. **Must** demonstrate that you have diverged such that you have at least $n+1$ credible design concepts for further development and consideration
2. **Must** demonstrate that your process has made use of divergence tools (e.g. SCAMPER, functional decomposition, Brainwriting 6-3-5, etc.) to overcome cognitive biases
3. **Must** have prototypes for all design concepts being discussed, including at least **one** (≥ 1) **physical** prototype.

Characteristics for Evaluation

The characteristics reflect the goals of the overall conversation. No individual is responsible for all of these, but each is responsible for the ones relevant to their part of the discussion. For all of the characteristics, the criteria prefer "more," "higher," or "greater":

1. Quality of engineering argument, with emphasis on justifying claims through credible use of engineering-appropriate sources.
2. Usefulness of the engineering requirements to support decision making about design concepts.
3. Quality of the learning generated by applying engineering tools for diverging and representing (e.g. prototyping) candidate design concepts.
4. Quality of the concepts under consideration, as demonstrated by the representations, preliminary assessment against requirements, diversity of approaches, and plans for development.
5. Effectiveness of teamwork during the discussion that demonstrates both integrated and mutually supportive contributions.
6. Clarity and integration of oral, visual, physical, and written communication.
7. Ability to participate in meaningful, professional-style conversation with key stakeholders.