

## Creating Value & Market Characteristics

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### Purpose

User-centered design is a strong foundation for successful and impactful engineering design. The analysis of a user experience is an ongoing process that is continually updated as new research is performed and new user feedback received. We will come back to our task many times during the semester, so while it is important to choose a task relevant to your team's interests in engineering, it can and should change over the course of this design project to best align with your evolving understanding of the user. To narrow our focus on a single opportunity, we will define one single task that aligns with common pains from our tasks identified in our previous assignment. We will then build on our understanding of our user by reflecting on the possible value of addressing the pains of that task by defining gains. Finally, we will generate the user needs required for a successful solution that will define what an invention, service, or system must satisfy for the user to successfully achieve the task. By generating and ranking these user needs we can have clear criteria on how to create value for our end user as we approach the next phase of the design process, concept development.

As you continue to develop your understanding of end users, it is also critical to extend what you are learning about individual users to understand the full potential impact related to your chosen task. This includes the total potential number of users as well as stakeholders who are not necessarily end users. It is also important to identify alternative solutions that end users are currently using. The analysis of alternative solutions leads to the identification of gaps in the user experience. These gaps are prime opportunities for new design. Together, these components comprise the market character surrounding your chosen task and is an essential piece of your justification for support and funding.

For this assignment, you are not expected to have read and analyzed all the sources you laid out in your research plan, but you are expected to have made progress and will incorporate a portion of your research results into this assignment. Ultimately, this assignment will serve as a piece of your final research results, the purpose of which is to justify your design decisions.

By completing this assignment, you will be able to:

- Carry out an established research plan to characterize the end users and market characteristics that define an opportunity to create value.
- Define a concise task with associated pains and gains
- Define and prioritize user needs utilizing the pairwise comparison method
- Identify and consider the impact that your work may have on potential stakeholders
- Identify key market characteristics including the market size and current alternatives

### Task

Before you begin writing, recall your **audience and purpose**. Your audience is someone or some group judging your work. This may be a supervisor within your company or research office, a grant committee, an incubator, or any other funding source. They are familiar with the design process, but not the details of your project.

Start by completing the following five components that focus on defining the end user. In the body of your report, in the research results - creating user value subsection, introduce each component and include any relevant discussion including a discussion of each user need in enough detail that someone unfamiliar with your work will understand them and how you came up with your results. Additionally, explain any differences between your anticipated rankings of the User Needs and the results of the Pairwise Comparison Chart. The following components should be informed

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by your research results. As such, cite at least two of your qualitative data sources in your report that relate to your user.

**Task.** Define the specific task that will be the focus of your semester-long design project. Use the pains and tasks that emerged from user interviews in PD1 as a foundation.

**Pains.** After you've defined a task, revisit your list of pains from PD1. Can you think of more pains now that a single task is defined? Iterate on this list and describe your rationale in sentence form. Include at least 3-5 pains in your list.

**Gains.** Define 3-5 gains in the form of a bulleted list with a brief discussion.

**User Needs.** Create a list of at least 6 well defined user needs, which are informed by your research, and cite all applicable sources.

**Pairwise Comparison Chart.** Using the list of user needs above, rate each of them against one another as discussed in class to systematically establish the importance of each user need. A template is provided on Carmen.

Then, complete the following three components that focus on defining the market character. In the body of your report, in the research results - market character subsection, introduce each component and include any relevant discussion, including discussion around the current alternatives and potential gaps that you identify. The following components should be informed by your research results. As such, cite at least two of your quantitative data sources in your report that relate to the market character.

**Stakeholders.** Create a list of stakeholders beyond your end user and describe potential impacts (positive or negative) that new work around your task could bring about.

**Market Size.** Identify the potential size of your market and describe any relevant secondary markets, trends within the population and identify and cite relevant statistics.

**Current Alternatives.** Define and list current alternatives that users employ to accomplish the task and cite relevant sources (qualitative or quantitative). Come up with at least 5 current alternatives and create a competitive matrix, matching the format presented in table 1.1, to identify and highlight gaps in which a new solution may focus.

**Table 1.** Example Partial Competitive Matrix

User Need	Pocket Calendar	To Do List	Outlook	Google Calendar	iPhone Calendar
Simple (Easy to use)	★	★	✗	★	★
Comprehensive (Covers most situations)	✗	★	✗	✗	✗
Long-term (Works in perpetuity)	✗	✗	★	★	★
Reliable (Does not crash)	★	★	★	★	★
Connected (to friends/family)	✗	✗	★	★	✗
Customizable	✗	✗	✗	✗	✗

*Green cells with stars indicate the need is met by the alternative and red cells with an 'x' indicate the need is unmet by the alternative.*

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### **Criteria for Success**

Grading of this assignment will be based on:

- Identification of a single task with 3-5 associated pains and 3-5 associated gains that are not simply reciprocal statements of the pains.
- Identification and clear communication of at least 6 user needs.
- Generation and clear communication of a pairwise comparison chart
- Identification of stakeholders and the impact that a potential solution may have on them
- Identification of the market size and trends supported by research
- Creation and clear communication of a competitive matrix that maps the user needs against at least 5 current alternatives.
- Adherence to technical communication guidelines, including language tailored towards the audience and purpose, clear document organization, proper formatting, and clear writing and language.

A full, detailed rubric has been provided on Carmen.