

Computer Engineering Applications, Fall 2017

Homework 2: Customer Needs Identification and Product Specifications Due

Friday, 9/29/2017

Customer needs identification questions:

1. Translate the following customer needs about student book bag to proper needs statement:
 - a) See how the leather on the bottom of the bag is all scratched; it's ugly"
 - i The material that the bag is made from should be durable, especially the material on the bottom of the bag.
 - b) This bag is my life; if I lose it I'm in big trouble.
 - i The owner of the bag should be able to remotely track the location of the bag.
2. Choose a product that continually annoys you and identify needs the developers of this product missed. Why do you think these needs were not met?
 - a) My iPhone 7 annoys me at times. One need that was missed was the ability to listen to music with wired headphones and charge the device at the same time. I believe that this need was not met due to the advent of wireless headphones. I think that the developers of the iPhone at Apple went on the assumption that its customers would purchase wireless headphones so that they could listen to music and charge it. Therefore, they eliminated the headphone jack on the phone and made proprietary, wired headphones that use the charging port. However, the current market price for wireless headphones is much more expensive than the current market price for the proprietary, wired headphones. As a result, many customers, myself included, prefer the wired headphones, but we are unable to use the headphones and charge the phone at the same time since both utilize the same port on the phone.

Another issue is that many unnecessary applications run in the background and drain the battery life. It would be ideal if some of these apps would automatically close after a certain period. Therefore, the OS should automatically terminate applications that are inactive. I imagine that this need was not met because it can be difficult to determine when an app is inactive and the user now longer needs it. This would especially be the case in the event that the user is continuously opening and revisiting apps.
3. Can the process of identifying customer needs lead to the creation of an innovative product concepts? In what ways? Could a structured process of identifying customer needs lead to a fundamentally new product concept?
 - a) The process of identifying customer needs can lead to the creation of an innovative product. In the lecture, it was mentioned that camera phones came about because of a customer need. I imagine that there was probably a group of customers that did not want to carry around both a digital camera and a cell phone. The design team then took this need and integrated a camera into a cell phone. Later, another customer

likely mentioned that they want to easily take pictures of themselves. Which leads us to today's standard, where cell phones come equipped with not just one, but two cameras.

This is a great example of how one customer's need can turn into an innovative product. A need may be satisfied by blending two existing products together in a way that was not conceived previously. Customer needs may challenge the design team. To satisfy some of these needs, the design team may be required to think outside of the box. This is where many novel, innovative ideas originate, such as the integration of a camera and a phone. So, a structured process of identifying customer needs could lead to a fundamentally new product concept. If the needs are carefully identified, a team could figure out the ways in which the needs are related. If many of the needs are related, the solution may be a new product concept altogether.

Product specification questions:

4. List a set of metrics corresponding to the need that a pen write smoothly.
 - a) Stiffness of pen tip
 - b) Ink flow rate
 - c) Size of pen tip
5. Devise a metric and a corresponding test for the need that a roofing material last many years.
 - a) Metric: Average Lifespan of Material
 - b) Test: Create a simulated environment where the material in question is subjected to the different conditions that it may be exposed to. For a roofing material, this may include different weather conditions such as snow, rain, and heat. The material can then be tested by exposing it to simulated weather conditions and it can be observed when the material begins to break. Ideally, this would be tested many times, which can yield an average lifespan of the given material.
6. How might you establish precise and measurable specifications for an intangible need such as "the front suspension looks great"?
 - a) I would collect data and get facts from experts to identify which traits make a front suspension look good. I would also measure different angles and distances to determine which combination of measurements results in a great-looking front suspension. To evaluate the design choices, I could return to the same group of experts and ask that they rate the design on a scale of one to five.

Measurable requirements could be made based on the different measurements and evaluation. For example, one requirement could be "the front suspension must keep the bumper of the car at least 6 inches off the ground". Another measurable requirement would be "at least 8 out of 10 experts must rate the design 4 or higher". These are measurable specifications that can be used to evaluate the cosmetic design of a product.