Team Edeka

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1 Executive Summary

From bartering to perusing general stores to online shopping, the process of purchasing food has evolved, but the surrounding problems have carried through the generations. Shoppers frequently forget the items they need, cannot locate the items they want, or browse endlessly, not knowing what to buy. Additionally, though grocery shopping is a universal task, the experience can vastly differ among shoppers and cultures. To some shoppers, a trip to the grocery store could be a mundane chore, but to others, the trip could be a fun diversion. In the end, all shoppers want to accomplish their goal of buying food.

Edeka is the largest supermarket corporation in Germany, with approximately 4500 grocery stores located across the country, ranging from small corner stores to large hypermarkets [1]. Edeka challenged the Stanford-HPI design team to improve the grocery shopping experience in a fast, convenient, and structured manner without losing selling opportunities. The end goal is to create a solution that redefines the shopping experience and ultimately benefits both Edeka and its customers.

In accordance with our increasingly digital world, grocery stores tend to gravitate towards technological solutions, such as personalized mobile phone applications and electronic item scanners, when attempting to improve their shoppers’ experiences. Through our benchmarking and critical experience prototyping, we have found that these digital advances actually take away from the overall experience, distracting from or replacing the human element that is at the heart of traditional grocery shopping. We want to restore and maintain the relationships developed between the local butcher and the customer, the cashier and the buyer in line, and the couple shopping together in the store. We want to inspire trust and confidence in customers when they shop at Edeka.

Figure 1.1 At Whole Foods, customers can talk with the chefs who prepare the food being sold; this gives the customer inspiration for meal ideas and generates trust between the customer and the supermarket.
To understand our problem space, we benchmarked several different grocery stores as well as markets, online platforms, and delivery services. We found that customers are happiest when their experience feels less like a chore and more like an event, accompanied by some interaction with another person, whether that means talking to a store employee or a market producer, or shopping with a companion. We also found that customers enjoy personalized experiences and being able to customize their shopping options. However, some customers only see grocery shopping as an inevitable task and want an efficient shopping trip to fit into their busy schedules. We want to create a solution that synthesizes these two viewpoints and allows both shoppers to have their preferred experience.

For our critical function prototype, we designed a vending machine selling ready-to-cook meal kit packages with all necessary ingredients and recipes included. Customers can browse and contemplate meal kits from the vending machine windows, and once they purchase a meal, they can easily customize the meal to their liking, excluding ingredients as they please. Rushed customers can easily grab a meal kit to go and quickly prepare dinner in a microwave. The vending machine catered to both types of shoppers, offering a convenient yet personalized meal.

Figure 1.2 A customer retrieving his meal kit from the vending machine.

From the feedback we have received for the critical function prototype, we would like to continue exploring opportunities for our vending machine. We will position the machine in different locations like office buildings and apartment complexes and customize the meal kits to its location. We also want to return to the concept of maintaining human interactions in the shopping experience and integrate this point with the vending machine.
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1.1 Glossary

CEP - Critical experience prototype: prototype that explores how a user interacts with a product

CFP - Critical function prototype: prototype that explores how a product would function in real life

EXPE- Final presentation of ME310 design

Expert- Grocery store employee who can answer questions related to the store

Gamification – the use of video game elements in external situations to improve the user interface

Heatmap- The diagram showing the exact path a customer took throughout the store

Impulse buy- Purchase made by a consumer on-the-spot. The customer didn’t have intentions of buying anything before walking up to the product

Meal kit- Package containing recipe and ingredients necessary to make a meal. Sold inside of the CFP vending machine

Online reservation- For the CFP, a reservation guaranteed that the meal would be available in the vending machine the next day, labeled with your name

Persona- An imaginary, ideal user for whom we design

PreBuying/PreShopping – the process of a grocery store employee retrieving items on a customer’s premeditated shopping list and preparing the cart before the customer arrives at the store


Square- iPad application that the customer interacted with when paying for a meal. Read credit cards.

Vending Machine- Stanford’s CFP, located in the d.school. Sold meals for $5.

Wireless Scanner- Scans barcodes of products and records them for faster checkout
2 Background and Context

2.1 Problem Statement

The goal of grocery shopping is straightforward: find and buy all goods you need for a certain period of time or certain events. Reaching that goal, however, is not that simple. People forget to include important items on their shopping lists, are unable to locate them within the store, or might not even know what they really needed in the first place. The design challenge is to create means that support customers in their shopping experience and help them to reach their initial target (getting all goods they need) in a convenient, structured, and fast manner without feeling patronized or externally controlled. In addition to improving the shopping experience for the customer, a solution should also provide possibilities for the grocery store to supply the customers with shopping suggestions and special orders that are in line with their initial shopping intention.

2.2 Need Statement

Grocery shopping is an essential part of our lives. The way people do grocery shopping varies with their needs. They go to farmers markets to try sample food and enjoy the freshness; they go to the supermarket because there is more access to a large variety of products; they use online ordering systems if they have limited time to shop in the grocery stores. During our investigation, we found out that the key needs of our customer changes from trip to trip. One day, that need could be to find the most efficient way through a store in order to head home sooner, whereas on another day our customer might want to get advice by an expert to help him to prepare an outstanding and special meal.

A lack of confidence and trust in the supermarket can also affect people’s shopping experiences to a large extent when they don’t know enough information about the product (how fresh the fruit is), when there is a need for comparing a large variety of goods under the same category (which one has the best cost performance), or when someone is not familiar with the brands of products available. They have to ask for help from store assistance, call their families, or check the online reviews with their smartphones. People sometimes cannot make a decent grocery-shopping plan that fits into their schedule (how often should they go to grocery store and how much food should they purchase each time?) because they are too busy to go to grocery stores, and the grocery stores could be far away from their homes and offices.

Our fundamental need is to provide a shopping experience to our customer that adopts to his current state and mood.
2.3 Corporate Partner: Edeka

The Edeka Group is the largest German supermarket cooperation with over 300,000 employees and revenue of more than 45 billion Euro in 2011 [1].

Edeka originates from the abbreviation “Edk” meaning „Einkaufsgenossenschaft der Kolonialwarenhändler” (Purchasing Cooperation of German colonial produce retailers). Small retailers formed the alliance because they wanted to leverage synergy effects of sharing logistics like ships, trains and cars to get their goods from the German colonies to the cities.

Today, a large portion of all stores are owned by independent businessmen that buy their goods from the Edeka corporation. Edeka is responsible for logistics as well as advertising. Weekly offers are the same in each store.

Edeka stores vary heavily in size. There are very small markets called “Nah und gut”, which translates to “good and well” (400 m² shop area) to regionally managed E-Centers that are comparable with a full Wal-Mart store in the US (up to 5000 m² shop area). The latter stores are usually owned by the Edeka corporation itself and not franchised to independent businessmen. After trying to set foot in other European countries like Denmark, Austria or Czech Republic, Edeka is now focusing solely on the German market.

Figure 2.2 on the next page summarizes Edeka’s business canvas.
### Edeka - Business Canvas

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>SOLUTION</th>
<th>UNIQUE VALUE PROPOSITION</th>
<th>UNFAIR ADVANTAGE</th>
<th>CUSTOMER SEGMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>People need to buy groceries, because it is a cheap way to supply yourself with food. Also, retailers that want to open a new grocery store but don't have the supply chain and logistics.</td>
<td>People will go to a store where they can buy groceries using self-service, while at the same time getting fresh products like meat and cheese at the counter.</td>
<td>Edeka stands for fresh and high-quality groceries. People who do not want to buy the cheap, packaged junk food go here.</td>
<td>Edeka is the market leader in Germany. They have a huge network of stores and bought pretty much all smaller supermarket owners. Edeka is a brand name that stands for quality and freshness.</td>
<td>All people that are able to walk through a supermarket. Retailers that want to open a grocery store. EARLY ADOPTERS Back in the days, people in cities. Retailers for colonial products.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXISTING ALTERNATIVES</th>
<th>KEY METRICS</th>
<th>HIGH-LEVEL CONCEPT</th>
<th>CHANNELS</th>
<th>REVENUE STREAMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restaurants</td>
<td>Number of stores per square km</td>
<td>Like a real burger restaurant is to McDonald's, Edeka offers better taste and fresher products than cheap supermarkets like ALDI.</td>
<td>Radio</td>
<td>Product Purchases</td>
</tr>
<tr>
<td>Other grocery stores</td>
<td>Number of stores</td>
<td></td>
<td>Television</td>
<td></td>
</tr>
<tr>
<td>Self-contained economy</td>
<td>Market share</td>
<td></td>
<td>Buzz Marketing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Revenue</td>
<td></td>
<td>Physical Presence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Margin per product</td>
<td></td>
<td>Newspapers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Customers per day</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COST STRUCTURE</th>
<th>REVENUE STREAMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable: Products, Logistics</td>
<td>Product Purchases</td>
</tr>
<tr>
<td>Fixed: Employees, Warehouses, Stores, Advertisement</td>
<td>Rent from the retailers</td>
</tr>
</tbody>
</table>

---

Lean Canvas is adapted from The Business Model Canvas (BusinessModelGeneration.com) and is licensed under the Creative Commons Attribution-Share Alike 3.0 Unported License.
2.4 The Design Team

The design team consists of three graduate students from Stanford and four graduate students from Hasso Plattner Institut.

Figure 2.3 The Stanford-HPI design team.

Jo-Ann Deasis
Jo-Ann is from Slidell, Louisiana and received her Bachelor’s degree in Materials Science from Stanford University. She is a first year Masters student in Mechanical Engineering. She plays mellophone in the Stanford band.
Contact: jedeasis@gmail.com

Carolyn Estrada
A first year Masters student, Carolyn grew up in Miami, Florida and received her Bachelor’s degree in Mechanical Engineering from Texas A&M University. She is training to obtain her private pilot’s license.
Contact: carolynestrada12@gmail.com
Chuan Xu
Chuan grew up in Beijing and completed his undergrad at Penn State. He is a first year Masters student in Mechanical Engineering and likes the field of dynamics and control
Contact: xcc@stanford.edu

Felix Leupold
Felix interned at SAP in Palo Alto for six months. He enjoys sailing in his free time.

Gerardo Navarro-Suarez
Gerardo interned at SAP in Australia for one year. He is impulsive, but very motivated.

Jannik Streek
Jannik interned at SAP in Germany. He is very calm, but a diligent worker.

Oliver Xylander
Olli interned at SAP in Palo Alto. He enjoys back-end programming.
2.5 Coaches and Teaching Team

The corporate contact for the design team is Holger Kainz. The Stanford team is coached by Mark Bianco.

For the HPI team, the personal teaching contact is Cornelius Illi, a ME310 alumni and passionate design thinker at the d.school in Potsdam. Cornelius brings a calm but professional design thinking spirit into our team and gives valuable input on how to use design thinking methods and frameworks accordingly. He is always helpful and available to us. We maintain a close communication through a team lunch meeting during the week and a personal feedback session every Thursday after class. Further advice is given by Thomas Kowark and Franziska Hger, responsible for the ME310 program on HPI site and official supervisors of our project.

3 Design Requirements

Our design requirements are divided into sponsor-given and discovered requirements. Though the Stanford-HPI design team was given considerable freedom to choose the direction of its project, Edeka has provided baseline functional requirements to guide the design process. No physical requirements were given.

In addition to Edeka’s requirements, we have developed a more detailed set of functional and physical requirements based on our benchmarking and early stage prototypes. Because we are still exploring our possible solution spaces, these requirements will serve as guidelines for ongoing and future design development.

Table 3.1 Given requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Metrics</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allow for a fast, convenient and structured shopping experience</td>
<td>At least eighty percent of customers surveyed were able to find the items they wanted and feel that their Edeka experience was satisfactory.</td>
<td>Customers should be able to find and purchase all items on their shopping list without feeling frustrated or having wasted time.</td>
</tr>
<tr>
<td>Increase selling opportunities</td>
<td>At least twenty-five percent of surveyed customers purchased items or deals that were not on their original shopping list.</td>
<td>Edeka needs a sustainable business plan in addition to pleasing its customers. Customers should be exposed to new products, deals, etc., such that they could potentially purchase additional items in line with their initial shopping intentions.</td>
</tr>
<tr>
<td>Help customers without letting them feel patronized or</td>
<td>At least eighty percent of surveyed customers who made purchases influenced</td>
<td>The solution should not feel intrusive or overwhelming. It should complement customers’ current shopping habits.</td>
</tr>
</tbody>
</table>
externally controlled by store offers feel satisfied with their purchases. Customers will respond more positively to selling opportunities when they do not feel it is forced upon them.

### 3.1 Functional Requirements

Table 3.2. Discovered functional requirements

<table>
<thead>
<tr>
<th>Functional Requirement</th>
<th>Metrics</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspire brand trust and confidence in customers</td>
<td>At least eighty percent of new Edeka customers surveyed would return to Edeka and make purchases knowing the products are of high quality.</td>
<td>Customers are more willing to purchase from and return to stores which they trust and associate with high quality.</td>
</tr>
<tr>
<td>Offer a simple, intuitive user interface</td>
<td>Any demographic of Edeka’s customer base can interact with the solution with no help from external sources. A customer can learn and utilize the basic functions of the device in less than thirty seconds.</td>
<td>Customers will be more receptive of the solution if it is non-intimidating and easy to use.</td>
</tr>
<tr>
<td>Maintain social connectivity</td>
<td>One hundred percent of customers who want one-on-one interactions are able to communicate with store employees, friends, or other persons.</td>
<td>A customer should have access to one-on-one human interactions during the shopping experience. Our benchmarking has shown that human interactions contribute to a satisfying shopping experience.</td>
</tr>
<tr>
<td>Offer an efficient shopping experience</td>
<td>Customers are able to quickly complete their grocery shopping trips without the trip significantly disrupting their daily schedule (&lt; 1 hour at grocery store).</td>
<td>For customers who prefer quick grocery trips, the solution should cut out excess time in the shopping process.</td>
</tr>
<tr>
<td>Offer a personalized shopping experience</td>
<td>At least eighty percent of customers surveyed received grocery recommendations that were relevant to their preferences and past purchases.</td>
<td>The solution should take into account a customer’s product preferences, shopping style, or past purchases. Customers want to feel valued and that an experience was tailored specially for them.</td>
</tr>
</tbody>
</table>

**Functional Constraints**

- Solution must appeal to Edeka’s shopper demographics
Functional Assumptions

- The needs of German grocery shoppers are similar to that of American shoppers
- Edeka’s main shopper demographic is middle class shoppers
- Edeka’s typical customers are over the age of 18
- Edeka’s user base includes people who may have difficulty with technology-based solutions

Functional Opportunities

- Online shopping and delivery may appeal to customers with busy schedules and no time to shop at a physical store.
- A system with online grocery reservation and in-store pick-up may appeal to customers who would like a third party to take items from the shelves and package them such that the customer only needs to stop by the store to pick them up.
- Collaborative shopping with your social network encourages peer product recommendations.
- Personalized shopping via mobile applications or store customer reward cards can provide relevant recommendations and deals.
- Including restaurants, gyms, or other diversions inside the store can create a more entertaining or dual shopping experience.

3.2 Physical Requirements

We have discovered several physical requirements specific to the types of benchmarking and prototyping performed in the fall quarter, but because a wide range of functional opportunities exist for our project, these physical requirements do not necessarily inform the final direction of the project and are not imposed at this stage of development.

Table 3.3 Discovered physical requirements for an electronic shopping aid

<table>
<thead>
<tr>
<th>Physical Requirement</th>
<th>Metrics</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device is handheld</td>
<td>The product comfortably fits in all customers’ hands and does not strain the customer’s hand for the duration of the shopping trip (&lt;1 hour).</td>
<td>The product should be easily held in one hand, so that the other hand is free to reach for products or push the cart.</td>
</tr>
<tr>
<td>Device is independent of the shopping cart</td>
<td>The product retains all three degrees of freedom.</td>
<td>The customer should be able to move freely around the store without being constrained by a shopping cart.</td>
</tr>
</tbody>
</table>
Table 3.4 Discovered physical requirements for the store

<table>
<thead>
<tr>
<th>Physical Requirement</th>
<th>Metrics</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>The store layout should not feel crowded</td>
<td>Shelving units are no taller than 180cm, and aisles are at least 200cm wide.</td>
<td>Our benchmarking has shown that customers are more at ease when there is ample space to browse aisles and when aisles do not tower over customers.</td>
</tr>
</tbody>
</table>

Table 3.5 discovered physical requirements for a grocery dispensing machine

<table>
<thead>
<tr>
<th>Physical Requirement</th>
<th>Metrics</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accepts different forms of payment</td>
<td>The machine accepts coins, 1, 5, and 10-dollar denominations, and at least 3 brands of credit cards.</td>
<td>Users will usually carry at least one of these options at any given time.</td>
</tr>
<tr>
<td>Customers should be able to see the physical food they are buying</td>
<td>Customers can identify the food from at least 30cm away.</td>
<td>Customer feedback shows that people would like to view products closely before making a purchase.</td>
</tr>
</tbody>
</table>

Physical Constraints

- Each device should contain a security mechanism such that the device is not stolen.
- Each device should comply with current transaction security protocols for payment processing

Physical Opportunities

- The solution could be integrated into existing Edeka stores or could extend beyond the physical store.
- A professional appearance will ensure customers that they are receiving a quality product. Brand recognition on the machine will also aid in sales.
- Placing the vending machines in multiple locations will allow us to target certain demographics and customize meals to those locations.
- Play areas for children can entertain them while parents shop.
- Handicap accessible shopping is another problem space to explore.
3.3 Business Requirements

At the time of documentation, no business requirements had been recognized.

4 Design Development

4.1 Brainstorming for benchmarking

Benchmarking proved to be the primary source of data-gathering for the team throughout the design process thus far. In order to give the Stanford-HPI team a complete, robust foundation from which to build ideas upon, the team benchmarked outside of the problem space of the design and explored so non-grocery store shopping experiences. These non-grocery store experiences provided us insight into non-traditional (in the grocery store sense) approaches for selling products. The figure below shows some of the places we intended to benchmark.

Figure 4.1. Brainstorm of potential benchmarking experiences
4.2 Persona

The team's persona was based off of a fictional couple Sarah and Lars. They are a nice couple from Berlin that likes to spend time together - even when grocery shopping. However, each one of them is a different type of shopper. On the one hand, Sarah enjoys her shopping trips to the grocery store because she likes to get inspired by new food and recipes. She doesn't mind that the trip takes longer than planned. On the other hand, Lars considers grocery shopping as a waste of time and simply wants to buy the stuff they need as quickly as possible. When they go shopping together, the two different shopping attitudes are clashing together. While Sarah is trying to slow Lars down and shop without any stress, Lars is trying to push her a little bit in order to make this trip very efficient. The team wants to improve the shopping experience of this couple without compromising on / sacrificing their individual needs.
4.3 Benchmarking

4.3.1 Farmer’s market

Figure 4.3. Jo-Ann is trying the sample food and talking to the seller.

The farmer’s market provides customers a platform to interact with the sellers and their products so that the consumers can gain more information about the food they are purchasing. The customers can understand the product better by trying the sample food and can learn about its source by talking to the sellers, who are the producers as well. In addition, the environment of the farmer’s market attracts people to come spend an afternoon there; the slow-paced atmosphere, combined with live music and attractions for children, makes for a fun family outing. The entire summary of the benchmarking experience can be found in the appendix, along with the interviews that were conducted at the market and the extended benchmarking reflections of each place that was visited.

As a follow up, the team could perform interviews at Safeway or another chain grocery store to gather a sense of how shoppers feel in that environment. We could act out farmer’s market scenarios within a chain grocery store. For example, we found that farmer’s market sellers were very warm and engaging with their customers and provided background and information on their products; we could engage with Safeway employees on a friendly, neighborly level. We could also observe how customers react to product samples or how they engage with Safeway employees, such as the cashiers or the people behind seafood and meat counters.
4.3.2 Benchmarking at Safeway

The goals of the benchmarking trip to Safeway were to observe people in checkout lines and to simulate different situations, such as a mom with kids, an elderly person shopping with the electric cart and a graduate student shopping for groceries, as shown in the figure below.

![Well-organized fruit in Safeway.](image)

From this experience, the team learned that the checkout process was less efficient at late hours due to the shortage of employees. Also, the shopping carts for older people were difficult to use—it was hard to reach things on high shelves and it making some turns proved to be troublesome. Additionally, the layout of the store was somewhat confusing. It was difficult to locate certain products, and some products were located in not very intuitive places (e.g. there was Coors Light by the fruit). People enjoyed the wide range of products that Safeway had to offer. Younger people tended to use the self check-out aisles--was this because older people were unfamiliar with the technology? Our design must not overwhelm anyone who is not technologically savvy; the interface must be easy to use and intuitive.

4.3.3 Ikea

Like the farmer’s market, IKEA provided products that people could try before they purchased anything. Customers also had easy access to assistance by asking employees near the furniture. Additionally, there were computer stations throughout the store that provided a simple step-by-
step approach to designing a space. The customer could customize the virtual room according to the specifications of their own room and then see how all of the furniture would fit inside. These interactions help people increase their confidence in their shopping experience.

Figure 4.5. The customer is using the software to get inspired for the furniture

More information, such as the designers and their individual styles, was introduced so customers could gain trust and confidence in IKEA’s brand and products. IKEA presents their products in showrooms so that people can be inspired by the space as a whole, not by products on shelves. They can envision how it would fit inside their homes. It is a good idea to inspire customers to create their own spaces.

4.3.4 QVC

QVC relies on the interactions between sellers and hosts to help their sales. The hosts of the shows have been on the air for some time and have built a reputation with the consumers. The trust that the customers have in the hosts is something that we would like to somehow mirror in our design. Oftentimes, a special seller will come and sell the product alongside the host. These sellers serve as experts on the product and help convince potential buyers that the product is of good value. Another medium for building confidence is through user testimonials. People who purchased the product can call in and voice their opinions, giving other people that are watching another credible source. The people watching can decide whether or not to buy the product from what the host has told them (a trusted and familiar source), the information the seller has provided (an expert), or from the testimonials (someone “just like you”; however, this person is
unknown).

Can we somehow place a seller or host into supermarkets to help our customers make decisions? Could we electronically do this to make the experience less invasive? Maybe a screen on the cart or screens on the grocery shelves? Would people find it tiresome to have someone inside their shopping experience? Could we have demonstrations similar to QVC segments within the store? Can we condense these segments into shorter bits so that the shopper doesn't have to waste time listening to an entire segment?

### 4.3.5 Kochhaus

![Fresh ingredients delivered by Kochhaus.](http://omchef.blogspot.com/2010/12/kochhaus-brilliant-concept-from-berlin.html)

Kochhaus is a good example of how combining customization, convenience and quality of product (freshness) can come together smoothly: this service allows customers to shop online for meals and choose the serving size. A package of ingredients is then delivered to your house and you prepare the food yourself. The team views this as a good benchmark for an effective combination of customization and convenience.
4.3.6 Whole Foods

The team’s first impression of Whole Foods was how the food was presented to customers. The lighting and detailed presentation made the food seem incredibly appealing. This in turn encourages the customers to purchase the food. Interaction with the chefs at the counters and seeing the cooking process increases the shopper’s confidence in themselves and in the Whole Foods brand. Moreover, the products sold at Whole Foods are more expensive than those at Safeway or a regular grocery store. The team concluded that some people would be willing to pay more for higher quality items. Lastly, Whole Foods combines the concept of farmer’s market and supermarket by blending the personality of the sellers of the farmer’s market with the variety of products at an average supermarket.
4.3.7 Trader Joe's

![Trader Joe's shopping environment](http://www.timesunion.com/local/article/Trader-Joe-s-opens-to-cheers-high-fives-3759603.php)

Figure 4.8. Trader Joe’s shopping environment.


Trader Joe’s was a small market with higher density of people than some of the other grocery stores we checked out. This store had good service, and offered to replace any damaged product during checkout. The classical style decoration and other characteristics like paper bags, give a feeling of old-fashioned markets. The employees were also incredibly friendly, especially the cashiers who tended to be very conversational.

4.3.8 Toys R Us

A staple of the Stanford team’s childhoods, we were really excited to take a trip to our favorite toy store. However, we were met with bad decorations, organization, and lighting conditions. High shelves with narrow walking areas made people feel like they’re shopping in a warehouse. The amount of toys and their close packing on the shelves felt overwhelming, and customers felt overstimulated from all the colors and pictures crowding them. The figure below shows one of the aisles at Toys R Us.
There was a non-personal feeling during shopping. Employees were scarce and not helpful and generally seemed detached from their job. Demos for some products are helpful, but more interactions were needed. Toys were on display for children to play with, but the toys were usually behind glass or were broken, offering a very limited try-before-you-buy experience.
4.3.9 Fresh Direct

Fresh Direct is a popular grocery store based in New York that released refrigerated vending machines in office buildings and apartment complexes in 2010. The machine sells 4-minute microwaveable meals from established restaurants as a way for busy office employees to skip traffic-ridden trips to the grocery store after work, to avoid unhealthy, pricey take-out options, and to remove taxes and takeout waits and fees. Restaurants make meals that are mostly cooked (except for a few minutes of cooking in the microwave), and these meals are placed in the machine the next day. Unpurchased meals are left in the machine for 1-3 days, and thus, your meal may not be incredibly fresh, possibly being 4 days old. We like the idea of convenience, of picking up a quick meal for lunch if you don't have time to leave the office. However, we also felt that this was a somewhat impersonal experience and is similar to bringing a microwaveable frozen dinner like Lean Cuisine to the office.
4.3.10 Japanese vending machine

![Japanese vending machine](http://acouplevagabonds.com/where-are-all-the-amazing-japanese-vending-machines)

Figure 4.11. Japanese vending machine selling fast food.

While brainstorming for CFP and CEP ideas, we thought of having a grocery vending machine conveniently located on university campuses, office buildings, apartments, etc. in case you need a gallon of milk or loaf of bread on your way home but don't have time to swing by the grocery store. We later found that this idea is already implemented in different parts of the world, and groceries aren't the oddest things to be sold from vending machines. One of the most distinguishing characteristics of the Japanese vending machines is that more broad types of goods are available in the machines, from groceries to toys. The team is interested in how the stores manage the vending machines. How often do they stock the machine? How do they keep the fruits and vegetables as fresh as possible?
4.3.11 Grocery Apps

The Safeway grocery app has the functions of locating nearby stores, providing coupons, and personalizing deals. Under the personalized deals section, the app offers deals based on the customers’ shopping history. Customers are able to create a shopping list on their mobile devices and sync their devices with loyalty cards. This app combines the concepts of customization and convenience. It will increase the selling opportunities by attracting customers with deals, which makes customers satisfied in return.

4.4 Online Benchmarking

In order to understand the domain of grocery stores and the corresponding problem, we started to do some research on how the shopping experience of the future has been addressed in related projects.

We found that there is a Metro Future Store in Dusseldorf that has integrated a lot of upcoming technology trends in their store [2]. The user can prepare a shopping list at home which will be available for him in store. Digital price tags can show a different price for each customer, therewith enabling personalized offers. By showing projections on the floor and playing music in the background the designers of the store try to improve the shopping experience and keep the shopper in the store longer. The customer does not need cash or a credit card, he can simply pay using his fingerprint. In a recent video about that store most of the features, like locating goods and scanning prices, are provided by the personal smartphone of the customer. However, we found out that people tend to be more conservative when it comes to grocery shopping and feel uncomfortable carrying a smartphone around all the time while looking for product.

At the end of another video [2] the Metro Future Store shop owner emphasizes that the future of shopping is to master the task of improving the fun for 'shopping savorer' and at the same time allow very efficient shopping for stressed people.

IBM has also been focusing on introducing RFID technology into grocery shopping [3]. The main idea is that every product should be tagged with an RFID transmitter. IBM suggests a smart refrigerator that is able to tell you what items are missing and what items are available at your house while you are shopping. Also, in store it is not necessary to see a cashier at checkout. The customer can just walk through the checkout and the amount will be deducted from his bank account paperless.

SAP is also working on the shopping experience of the future [4]. In their SAP Co-Innovation Lab in Regensdorf, Switzerland they established a Future Retail Center, which is a joint effort between SAP Next Business and Technology and industrial and academic partner organizations to foster research and development in retail, trade, and logistics. SAP is focusing on sensor based supply chain management and automation as well as customized marketing.
4.5 Internship at Edeka

During benchmarking, we had a look and other stores and thought about the differences from Edeka stores. However, to create a solution for Edeka, you have to know Edeka stores first in detail. This is the reason why two of the team members had work experience at our local Edeka.

We tried to help the employees as much as we could with placing the products at the right spots, to print missing labels for the products and to make new orders if products were sold out. We had the opportunity to have a look behind the scenes: How is an Edeka store organized? What happens in the morning before the customers enter the store? What are the tasks of the store owner and his employees?

The store owner, along with the team, arrived at 5:30 a.m. at the store. This was actually the time the a first truck, filled with new goods, arrived. The main task of the employees was to put the groceries into the store. This tasks accounts for roughly 4 hours of the day. Here, we noticed that there was almost no storage space in the store. The goods were delivered on trolleys, which were parked in the hallway temporarily. After all goods were placed in the shelves, the employees had to place the order for the next day. To do so, a handheld device was used that could scan the barcodes of the goods that needed to be reordered. After all goods were scanned the device transmitted the order to the Edeka logistic center. Dairy products are ordered daily except Saturday, other products are delivered twice a week. All orders have to be placed by 12 the day before delivery.

A big issue for the store owner is demand planning. It is critical for his turnover as well as for customer satisfaction that all goods are in stock. We noticed that in the morning the shelves are really packed, giving the customers a hard time to pull out a single item. By the time the shelves empty, it is sometimes hard for the customer to reach the last item left in the shelf. The lack of storage space makes demand planning an even bigger issue. Special items, such as Christmas and Easter chocolate have to be preordered in August, making the demand planning particularly hard. The store owner relies on experience and claims that this knowledge is his competitive advantage. Every Edeka has to be equipped differently depending on the location and addressed target group.

The store owner also complained about the German can deposit system. For each bottle he accepts from the customer he has to spend roughly 2 cents for logistics and material, such as the special plastic bags for the cans. The most frequent question by customers were 'Where can I find product x?' and 'Is this article on sale? What is the final price?'

We also had a look at the checkout area. There were three possible checkout stations available, but at least one checkout station was occupied with personnel. The other checkout stations were occupied spontaneously, if too many customers reached the checkout area. Because of this, there was one employee responsible for occupying another checkout counter in case of a sudden customer rush, which happened approx. every 8 minutes. The employee at the checkout area told us that the only thing they really dislike are customers in a bad mood. In addition during rush hours, some kids tend to be quite annoying if their parents don't care/watch after the kids actions. The store owner told us that he tries to make the checkout process as smooth and fast as possible, because it is the last memory of the shopping trip. It is therefore highly desired to leave a good last impression.
4.6 CEP/CFP

4.6.1 The collaborative shopping experience

For a miniature CEP exercise, the Stanford team partnered with another team in ME310 to design a social shopping experience that complemented customers’ busy lives. The team came up with several potential solutions to this problem. One idea that the team latched on to was that of tailoring deals and offers to each customer. In the CEP, the grocery store would recommend samples to customers based on their previous purchases and based on friends’ opinions of what the customer would enjoy. Personalization is an important touch, and it is something that the team wants to focus on. We have found that people respond well to products with a personal touch.

4.6.2 Couple shopping at Target with an electronic scanner

We visited Target and created an imaginary wedding registry in order to use the electronic scanner for a normal shopping trip. We had our shopping couple create a list before the trip, then asked them to scan each item as it was placed into the cart, so they could purchase the complete list of scanned items when finished. This idea was inspired by the English grocery store Waitrose. Waitrose has electronic scanners in their shopping carts so that customers can scan items as they put them in their bags [5]. The checkout process is then circumvented, and customers leave the store faster. We wanted to see how our couple interacted with electronic equipment when shopping and how the act of scanning would affect their purchases, if at all. We also decided to have them shop together as a couple to see how this affected their shopping behaviors, since they usually shop independently.
After debriefing the couple, we discovered that using the scanner made purchases seem less real. The customers tended to scan, and in theory, buy many more items than originally planned. Also, the scanner interface quickly became difficult and frustrating. No running total means the customers can't visualize what they are buying, which could again, cause them to scan and buy more. The scanner also lost connectivity to the store’s server about three quarters of the way through our trip, and it lost signal near the electronics and food sections, where customers could potentially spend a lot of money.

The team noticed that items at the very end of the aisle or near the end can catch customers’ attention and can push them to impulse-buy items. We found shopping with a partner can cause customers to buy more. The partner may see items that the customer overlooks or wouldn’t care to normally buy. Shopping with a partner is also much more enjoyable than going alone and makes the trip seem like less of a chore.

4.6.3 Shopping with a Safeway Expert

In the UK, the grocery chain Sainsbury’s has placed iPad docks and speakers onto their shopping carts, so that customers can mount their personal iPads onto the cart and watch sports matches and sports-related news while shopping[6]. The dock has a sensor that will beep and alert the
distracted customer if another customer is approaching and carts are about to collide. From this article, we generated the idea of using this iPad to aid in the shopping experience rather than distract from it.

![iPad attached to a dock on a shopping cart at Sainsbury’s.](http://www.engadget.com/2011/08/31/ipad-dock-shopping-cart-keeps-footie-fans-and-their-other-halves/)

In this CEP, we had an iPad mounted on a shopping cart in order to simulate the experience of a customer communicating with an expert on hand to offer recipe suggestions, product reviews, and item locations when asked. After talking to the customer who tried out our system, we discovered many issues with the iPad—there were technical difficulties with the connection when he tried to video chat with the expert, he didn’t like that the device was mounted to the cart and couldn’t pick it up, and he felt that he was in the way of other people whenever he stopped to chat with the expert. We switched the device to an iPhone, which gave the user mobility to walk around and use the camera to show the products in question to the expert.
Figure 4.14. Our customer asking the Safeway Expert for recommendations via video chat on an iPhone while reviewing his shopping list.

The customer contacted the expert about reviewing different brands of pizza and about dinner suggestions. Interestingly, since he knew the “expert” was just one of the Stanford teammates and not an actual Safeway expert, he was forgiving when she did not know the exact answer to the questions he asked. He also felt more comfortable asking the teammate for suggestions, since he knew and trusted her. After the experience was over, he stated that he wouldn’t have been as comfortable talking to a stranger. The customer said he would be more willing to consult a butcher or some other kind of specialty expert with questions but would be concerned as to how much the “Safeway expert” actually knew.

Moving forward from this CEP, we are interested in enhancing the shopping experience by having people shop with a friend or some other trusted source. A companion allows the shopper to bounce product or recipe ideas off someone. A high-tech device might not be the best solution—as with the farmer’s market, people were in need of a relationship with a trusted source. One idea is to have the expert at the front of the store to introduce him/herself to build a relationship with the customers. Also, different demographics might prefer different experts (e.g. young vs. old experts). It could also be helpful for the expert to know something about the customer’s preferences in order to make effective suggestions.
4.6.4 Vending machine

For the team’s CFP and CEP, the Stanford team built a vending machine that sold cooking kits so that people could purchase all the ingredients necessary to create a single serving of a meal at home or at work. The idea first stemmed from reading about Fresh Direct. We also found several start-ups and businesses that deliver meal kits to your home, such as Turntable Kitchen, Culture Kitchen and Kochhaus, though the first two provide only the more expensive ingredients with a recipe and you must buy the more common ingredients. In the latter, ingredients are delivered to your house and measured for the serving size you request, though our German teammates found that the ingredients weren't necessarily the freshest and basic ingredients like olive oil, sugar, salt and pepper were not included. We wanted to combine the convenience of the Fresh Direct vending machines with the do-it-yourself attitude of the meal kit start-ups.

While still in the brainstorming phase, we wanted to set up an online reservation system so people could buy ahead of time then pick up their meal the next day, and then also have meals for purchase so people could pass by and purchase something on the spot. However we had technical issues setting up the online reservation system, and we had to set aside this idea temporarily. We constructed the vending machine over the weekend and launched on a Monday.
Figure 4.15. First iteration of the vending machine.

The day we launched our prototype, we packaged items in opaque blue bags because we had originally thought that the plastic containers holding the ingredients were not visually appealing. However, people wanted to see what they were purchasing. Many people couldn’t tell that there was real food inside the vending machine.

These observations touched upon some of the questions we had wanted to answer by testing the vending machine-- What would actually sell in a vending machine? Is it better to show the food? Do people want quick meals? What do people trust?

In this experience, every time an item would sell out, we had to run upstairs, grab a new package from the refrigerator and place it on the shelf, and from this process, we considered the logistics of creating a grocery vending machine and keeping it stocked with fresh food.

To create the meal kits, we looked up different recipes, scaled them to single servings and packaged the foods inside a kit. We had assumed people would purchase them then go home to prepare the meals, but most people took the kit, cooked the meal in the microwave in the design school and went back to work. The meals have an advantage over regular microwave meals because they include fresh ingredients. People also experience the joy and satisfaction of cooking their meal. The recipes are also customizable, since the ingredients are compartmentalized.
From the first day, we learned we had to present clear instructions on the machine. No one was able to operate the payment menu without our intervention. Real vending machines do not require external help to direct customers, and we wanted to revise the buying process for the second iteration of our design. We observed that when a person successfully purchased and obtained a meal, several people would stop to watch how the person interacted with the machine.

Figure 4.16. First iteration of the vending machine with added notes to guide a customer through the steps of the purchasing process and a sign to indicate the purpose of the machine.

For our second iteration of the design, we used clear bags so people could look at the kit contents more closely, and as a result, more people paused by the machine to take a look. The containers inside the bags were also now labeled to let customers know where each ingredient was located. One issue we came across was getting strangers and passers-by to buy our food because most of our sales came from our classmates or friends, and we wanted to investigate how to convert to sales once the vending machine caught a person’s attention.
Figure 4.17. Containers labeled for second iteration after receiving customer feedback.
Figure 4.18. Switching opaque blue bags for clear wrapping for the second iteration.
Figure 4.19. Vending machine for the second iteration.
In addition to clear bags and labeled containers, we also added digital instructions for purchasing kits and photos of the finished, cooked meals on a laptop screen on top of the machine to attract customers’ attention.

Some customers returned to make a purchase at the vending machine because they were so pleased with the food they had bought the day before. However, some people wanted different options for food, not the same choices from the day before. People also wanted to be able to pay in cash, though we only took credit card. Most people wanted quick and easy meals; we sold out of the paninis and quesadillas first, which were our easiest recipes. We also set up a reservation system where people could text a number so they could reserve the meal they wanted, though we received no responses. The meals that required a tool the kitchen did not have (i.e. a pot and stove to cook noodles), did not have any sales. There is an opportunity to customize the meals based on the time of day, such as selling easy meals for lunch and more involved meals for dinner when people are heading home.

A few days later, we provided a live cooking demonstration of one of our recipes next to our vending machine. Some meals were difficult to sell in the machine because people felt they didn’t have the proper tools to cook, but the purpose of our demo was to show that it was possible to make one of the more difficult meals with only a microwave. Once people tasted our finished product, they were much more inclined to try cooking the more difficult meals. Additionally, customers enjoyed interacting with the chefs at the vending machine and having them encourage the customers to try new recipes.

Our next steps include getting people to trust the machine and the source of the food. When we asked people why they chose not to purchase food, they said that they did not know that it was a real service. We could also recycle the plastic containers to save money and promote a more environmentally friendly service. Advertisements on campus could also help our sales. We want to test different locations such as apartment complexes, grocery stores and office buildings.

4.6.5 Miniature Grocery Store

The team wanted a way to test potential solutions and to observe behavior without invading people’s privacy at a grocery store. That is why the HPI team started to build our own small Edeka in the basement of our university. During our brainstorming sessions, we tried to come up with wild ideas. However, we noticed that we can’t really test most of these ideas in a real Edeka. Even during the testing phase of smaller CEPs employees and customers started to get angry. We also asked a local Edeka owner and learned that we had to prototype these ideas somewhere else.

We used approx. 120 cardboard boxes to build all the shelves. Moreover we bought products from a nearby Edeka to fill the shelves. In addition we ordered a toy checkout system, fake fruits, fake meat and a toy weighing machine from amazon. Furthermore we recorded typical sounds in different grocery stores and replayed them during our tests, when people walked through the store.

We also handed out shopping lists for the test customers, to ensure that the products could be found inside the store. One of us was serving people at the meat counter, one person was doing
the checkout and the other two were observing the test customers. We also borrowed two shopping carts from an Edeka, so that customers could walk with a shopping cart through the store.

Figure 4.20. Checkout at our own little grocery store

The HPI team did not test any potential solution ideas this quarter after the store was set up. That will be done in the coming months.

4.6.6 Tracking Customers within Edeka

Solutions for grocery stores might influence the behavior of customers in the way they walk through the store and even where they look. But how can one track these changes in behavior? During our observations we learned that customers of grocery stores don’t always take the shortest path. If it is the first time in a grocery store, they might spend time wandering around looking for a certain product. This even happens to experienced customers who know the grocery store, because they might have missed something. In addition, especially in front of shelves, customers get confused because of the wide product variety: Which product to choose? Is this product better than the other one? Which is the cheapest product? Maybe I should choose a different product type?

Because our solutions might depend on these patterns, it is necessary to evaluate the paths through the grocery stores and also the time spent on certain spots. To get detailed information of the view of the customers and not to spend too much money, we decided to mount a GoPro on the head of a customer. With this technique we were able to capture a 12 minute long shopping trip. Afterwards we used that video and a rough sketch of the grocery store outline to re-draw the way the customer took. For every few seconds the person was spending on a certain spot, we used 5% opacity of a red marker tool. After watching the video and sticking to that process, we
gained a rough image with directions the customer took during the shopping trip. With the created heatmap it is easily possible to see where the customer spent most of her/his time in the supermarket. In the picture you can see that test customer 1 spent a lot of her time selecting the right bakery products. In the video, it becomes clear that the variety of products leads to confusion. In addition a lot of time was used to select a couple of eggs, because in some packages some eggs were already broken. In addition it is now easy to see that test customer 1 chose an non direct route through the supermarket. Multiple ways were taken twice.

Figure 4.21. Picture of the heatmap, which was created after a shopping trip.

4.6.7 PreShopping

PreBuying is the concept of having a grocery store employee put aside items on a customer’s shopping list inside a cart before the customer arrives at the grocery store, such that the customer simply pays and picks up the pre-selected items from the store. PreBuying can be described as a cross between online delivery and the typical shopping trip. During an interview with Mr. Franeck, owner of several Edekas in the Potsdam and Berlin area, we learned that PreBuying is already used today, especially by older customers who call the Edeka to simplify their shopping trip.

From our observations, we learned that a lot of people make shopping lists, and the search for these products can be time-consuming and tiresome, especially in unfamiliar grocery stores. Online delivery service is a potential solution to this problem, but we found several disadvantages to this system. Delivery usually takes 1-2 days. This may seem like a short amount of time, but a lot of our interviewees said they actually are quite spontaneous when it comes to shopping. Interviewees also told us that they want to see and feel the items before they buy it, especially for items like fruits, vegetables and meat. Additionally, online delivery seems to be not widely accepted in society according to some interviewees. People tend to be very conservative when it comes to shopping for groceries.

Based on these insights we created a CEP: We asked a couple to send us their shopping list. With a head start of about 30 minutes we tried to retrieve all the items on the shopping list. When the
couple arrived, nearly all the items were already waiting inside a shopping cart. The couple bought some additional items, which were not listed prior to the shopping trip.

![Image](image.png)

**Figure 4.22. PreShopping with a young couple: Time saver and motivator!**

We observed and asked the couple about their feelings and opinions:

- **PreBuying** allows the customers to save valuable time. The couple estimated that they saved around 20 minutes of time. The actual shopping trip took 20 minutes, so their trip took half as long.
- **PreBuying** allows the customer to set the focus on discovering new products and also allows certain customers to shop faster. To optimize time efficiency, we were told that it would be a good idea to combine PreBuying with the vending machine idea: Order your food and get it from a vending machine at the grocery store.
- The items placed on the PreBuying shopping list are standard purchases such as bread or milk that do not require a selection process, unlike fruit or meat. An exception is open items, e.g. a meal for the afternoon.
- The couple said that they would even pay for this service. Around 20% in addition to the final sum for smaller shopping trips should be ok, according to the couple.
- It’s more fun: As they heard about this idea they were quite excited. They were not initially in the mood to go shopping, but the idea motivated them.

To conclude, with this CEP we were able to save the customer’s valuable time and also enable customers to focus on more interesting items. Also, the customers had more fun and were more motivated because the boring part was no longer present during the shopping trip.
4.6.8 Gamification

Gamification refers to the use of video game elements in external situations to make normal or mundane tasks seem more interesting. We wanted to use gamification to make the shopping experience more interesting for people who find shopping exceptionally tiresome.

As mentioned earlier there are different kinds of grocery store customers, e.g. the busy businessman who wants to complete his shopping trip as fast as possible, or the old woman who enjoys her shopping trips and wants to get inspired by the variety of products. However, there are also mixtures of these stereotypes like our persona: Lars dislikes shopping and wants to spend as less time as possible the grocery store while Sarah wants to get inspired. Interestingly, they want to spend time together, so leaving Lars at home is not really an option. They should both enter and leave the supermarket together. We want to improve the experience for Lars, while inspiring Sarah with products.

We prepared a shopping list, with ingredients for cooking a meal (in this case burgers) and invited two male example customers to an Edeka in Berlin. Their task was to shop as quickly as possible during their trip, while keeping the price at a minimum. We introduced a time penalty of one euro per minute for each minute that the competitor fell behind. To make the challenge even more interesting we announced that the winner would get a box of beer. In the end it was a close match and the winner won by only 1 cent.

The test customers were quite motivated with this challenge and seemed really eager to win. Both said that the challenge was fun but also stressful, and they would not do it without an incentive. Our gamification was helpful to see exactly where customers spend most of their time and which areas led to confusion due to bad placement of products.

5 Design Description

5.1 Vision

From the interviews and observations that were conducted, the Stanford-HPI team has started to understand the real needs of the grocery shopper. The opportunity to talk with so many people and listen to their experiences helped develop the problem space of this project, but in order to progress, it is vital to converge on key design aspects. These design aspects will tackle the most important and promising user needs that were determined from benchmarking and prototyping.

The task of creating a persona aided in the refinement of the team’s vision. The two shopping habits personified by Sarah and Lars (inspired and efficient shoppers) served as the basis for the kinds of customers that were kept in mind throughout the design process. In order to satisfy these consumers, the Stanford-HPI team envisions that our final design will be personalized. We want to create a shopping experience that caters to customers with various shopping styles. This will be done in a manner that maximizes the satisfaction of one kind of consumer with minimal
sacrifices done to the experience of the other consumer. Specifically, the team wants to focus on making the grocery shopping experience more convenient without losing contact with the little things that make the trip enjoyable- contact with employees and other customers and the opportunity to inspire people to create meals, to name a few.

The team will also focus on methods for the customer to leave Edeka feeling fulfilled with his or her purchases. The customer will not leave anything he needs behind and he will be satisfied with the products he bought. This means that the Stanford-HPI team will focus on establishing trust between Edeka and its customers. The consumers must believe that the product they are buying is of good value and be confident in their purchases.

Finally, the Stanford-HPI team wants to inspire Edeka’s customers to try new meals and prepare food at home. It should not be necessary that the customer have any prior experience in cooking; we want to provide a means for which people could get ideas to try new recipes without feeling overwhelmed. Through this, we will also be achieving Edeka’s requirement of not reducing sales.

5.2 Vending Machine CFP

The Stanford team’s CFP design was a vending machine that sold meal kits with the ingredients required to make a certain recipe inside the kit. The team purchased and assembled two shelving units from IKEA, shown below in the figure.

![Image of two shelving units with vending machine doors assembled.](image)

Figure 5.1: Windows cut out from shelf door (left). Shelving units assembled with vending machine doors (right).

Two units were necessary to have enough shelves for different types of meal kits. The doors are
partially cut and replaced by acrylic boards so that customers could see the meal kits in the shelves. The units were constructed in accordance with the instructions provided by IKEA.

Small, mountable lights were added to improve the visual impression. These lights were mounted on each shelf to illuminate the contents inside. Utensils were available for customers to use; these were placed in the lowest shelf. The cabinets were then decorated with Edeka banners. The prototype was also outfitted to accept credit cards in order for customers to pay for their meals. This was accomplished using the app Square on an iPad.

Five meal kits of five different recipes (25 kits total) were available for purchase. Each kit included the ingredients required to make the meal. These ingredients were packaged in separate containers so that the customer could personalize his or her meal. The recipe for each meal also came inside the kit. The figure below shows one of the meal kits.

![Meal Kit](image)

**Figure 5.2.** Complete meal kit with recipe and ingredients.

Customers decide which meal kit they want by watching a slideshow of all the different options on a laptop on top of the machine. Then, they use the Square interface to select their meal and they swipe their card to pay. The customer can then take the meal from the machine.
6 Planning

6.1 Future Work

Since the start of the project, we spent most of our time understanding the domain of grocery stores, observing people’s behavior, searching for their needs, and eventually synthesizing our findings in order to define a point of view. We began to ideate possible solutions, create prototypes that test some critical aspects of our solutions and validate those prototypes with customers.

In the next two quarters, we are going to repeat the cycle of ideation, prototyping and testing several times in order to refine the solution designs and to ensure that we design a solution that is needed and appreciated by the customer. In the short-term future, the Stanford-HPI team will continue to work on our initial prototypes by refining the design based on the feedback on the prototypes that was received.

The vending machine prototype will be tested in different locations (i.e. apartment complexes, bus stops, possibly office buildings) in order to evaluate its robustness as a potential solution to the problem statement. Selling meal kits at various places will give the team insight into what kind of purchases are made in locations closer to a customer’s home where he or she has the proper tools to cook meals, versus an office where there might only be a microwave available. Will people opt for a meal they can cook in the office or buy a kit so they can make it later at home?

As an extension to the ‘PreBuying’ prototype, we would also like to set up an online ordering system so that people can select a kit to pick up the next day. This will provide valuable information on consumer behavior in terms of planning ahead and personalizing meals. Does the online system provide enough incentive to motivate people to plan ahead if it gives users the guarantee that their meal will be at the machine the next day?
New ideas will be tested in the mini-Edeka as well. Some that have been brainstormed were having some kind of tracking system on customers in the store so that the store could track their patterns and organize products more efficiently.

Activities planned for the future are:

- Early January - meetup of the Stanford-HPI team at the HPI in Potsdam
- Early January - refine our Edeka Store mockup to make it more authentic
- Mid February - visit several innovation centers for grocery shopping (Edeka Future Store in Hamburg, Real Future Store in Düsseldorf, etc.) in Germany to learn more about existing solutions and good customer-focused design of a grocery store
- Mid May - meetup of the Stanford-HPI team in Stanford to finish the final design and prepare for EXPE

Deliverables planned for the future are:

- Mid January - ‘Dark Horse Prototype’, another CFP that probes the edge of the design space and encourages to realize the wildest even unrealistic ideas
- Early February - ‘Funky Prototype’, another CFP that where a potential avenue for the final product is developed
- Mid February - Functional System Review, a report that outlines the final design concept in June
- Early March - Spring report, a report similar to this one focusing on the prototypes and learning of the next three month
6.2 Milestones

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<th>Reference*</th>
<th>Date</th>
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<th>Shipping &amp; Handling (if any)</th>
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<td>Edeka</td>
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Total: $995.64

Fall Allocation: $1,000.00
Available Balance: $50.36

6.3 Budget

Table 6.1. Stanford fall budget

Figure 6.2. Fall milestones
HPI Team

We have been very careful about spending our budget, because we are planning to make a trip to SAP Zurich and visit their Grocery Future Store. We also want to tour through Germany and visit a couple of German future grocery stores.

For our CFP we built supermarket shelves made out of 130 white paper boxes that were donated by the HPI d.school. The only expenses we had so far are a few incentives for our prototype testers as well as the products and supply we needed for our CFP Edeka store.

Table 6.2. HPI fall budget

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6.4 Project timeline
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6.5 Distributed team management

The Stanford team assigned roles to the group members in order to have an efficient team structure throughout the quarter. Chuan was the financial liaison and met with Manny Hundal on a regular basis to submit receipts and ensure that everything regarding the budget was in order. He also helped organize our trip to Germany. Carolyn was the documentation officer and was in charge of keeping the blog updated. In the end though, everyone was contributing to the blog, not just Carolyn. Jo-Ann was the team’s communications liaison. She helped get in contact with our corporate liaison, Holger Kainz, and she also helped organize meetings between the Stanford and HPI teams.

As for communication between the two teams, the polycom system was used to hold meetings. The team met on a weekly basis to update each other on progress made. Facebook and Skype were also used to communicate between teams. A shared Dropbox folder kept all of the files in a single place.

6.6 Reflections

Chuan

ME 310 in fall quarter helped me further develop my design skills in the following aspects. First of all, always try out the idea by making mockups because this will test the effectiveness of the idea and explore more findings that could not be seen from the benchmarking. What made the team more excited is that most of the new findings further supported the original ideas. Secondly, do not limit the benchmarking merely at the main focus of the project. Interesting things could be discovered from out field benchmarking contributing to our design improvement and future brainstorming. For example, benchmarking at IKEA inspired us the idea of personalizing customer’s shopping experience. Moreover, benchmarking a company gives the team a better view of the project that leads the design thinking through the whole process. One of the most useful lessons is to identify the company’s customers. Sharing the information among teammates is critical to make progress, especially for a global project. In addition, although the concepts of functional requirement and physical requirement are difficult to understand at the beginning, as the discussion goes on I start having better understanding for the concepts and clear pictures of our project. SUDS is a good way to improve the interactions with my teammates and people from other teams, which benefits our communications for the project. I’m more willing to speak out my ideas to them. As the treasurer of team Edeka, I gained the experience of budget management and reimbursement. I think this is valuable for my future job and even startup. Edeka is my first global project and I will visit Germany to do the benchmarking and need finding. This is the experience of different culture and could be very challenging for me who did not even get used to American culture yet. However, I view this as precious experience because I will probably face more culture difference in the future. I’m looking forward to starting my rest journey of ME 310.
Carolyn

I have learned so much in this past quarter of ME 310! I have really enjoyed the ability to work on a project that’s out of my realm of expertise. Understanding consumer behavior and appealing to potential customers is something I have never really thought about and it’s been fun developing the skills necessary to appeal to people. As an undergrad, I learned so much about how to make a product from a technical point of view and I never had to consider the aesthetics of a product or how a consumer would interact with it.

I found the process of starting with a problem statement and arriving at a prototype to be very rewarding. I didn’t really see the value in benchmarking so much throughout the quarter but then when we prototyping, all these things I had unknowingly internalized from those exercises really helped make our prototype great and benchmarking suddenly seemed so valuable!

I’ve also enjoyed getting to know my Stanford and HPI teammates! I’m looking forward to going to Germany in January and working with everyone in the coming months.

Jo-Ann

As our team wraps up the fall quarter of ME 310, I’m incredibly excited to move ahead and continue working with our German partners on this project. Now, after all of our benchmarking and prototyping, I can’t step into a store without observing customers’ behaviors and even my own shopping habits and looking for ways to improve the store. ME 310 has helped me to reframe the way I see events and people around me and to really notice how people act, what they do, and why.

This quarter, the teaching team really encouraged our team to continually push our thinking outside of the norm. This proved to be difficult for a set of textbook engineers, but we challenged ourselves and ended up with a vending machine prototype none of us would have ever expected before taking this class. I felt that this prototype was a true synthesis of our ideas and efforts, and the process of brainstorming, building and running the vending machine really tied us together as a group. We also learned a great deal about the prototyping process from this CFP. Even when the prototype didn’t run as smoothly as we would have hoped, we still gained nuggets of information from failure and used these for iterations of our prototype.

I also learned about the nature of working across long distances. Collaborating with a global team through weekly video meetings and shared online documents can be difficult and confusing at times, but strong communication from both ends can alleviate misunderstandings. Looking onward to winter quarter, I’m excited to refine and improve our designs and to visit Germany to continue benchmarking and needfinding.

Felix

I am super happy with my time and can’t wait for us to meet in Germany in the first week of January. Before ME310, I did not have the best experiences with global teams. I noticed that due to local stereotypes the teams tend to blame failure and problems on the other group instead of
trying to fix miscommunication problems. Not so in this project. Due to the amazing kick off week we got to know each other in a relaxed and social atmosphere that now gives us the potential and trust to work well together also in stressful situations.

I also learned how to organize a day that would require 30 hours to fit all the tasks in. The high pace of ME310 helped me to decide what tasks are important and what tasks may be shortened or omitted.

The project topic is thrilling as well. As shopping is subject to all of our everyday lives I find it thrilling to analyze shopping behaviour of myself, friends and also random people. I think the outcome we have so far, lays the foundation for a thrilling second and third term of the project. I am already looking forward to the final EXPE presentation in June 2013.

Jannik

ME310 is by far the best part in my schedule this year. It is super fun to gain more knowledge, build interesting prototypes and present these ideas. I am really happy with the team and can’t wait to meet the others in Berlin in January 2013. I’m learning already a lot about project management in international teams, design thinking and presentations. I really like the spirit, creativity and the motivation, which is surrounding this team. The project requires a large time effort, but it is so much fun that I often have to remind myself that I have to work also for other seminars and projects. An interesting skill we acquired is, how to have fun and being highly productive at the same time. I think this will be very important for further projects, to keep myself motivated and productive at the same time.

I’m really excited and interested in our final solution. I don’t know what it will be, but I am sure that we build something unique and creative.

7 Resources

7.1 Resources Consulted

Teaching Team

• Mark Cutkosky
• Larry Leifer
• George Toye
• Tyler Bushnell
• Annika Matta
• Scott Steber
• Mark Schar
7.2 Vendors

**IKEA**
1700 E Bayshore Rd, East Palo Alto, CA 94303
650-321-5008

**Stanford Bookstore**
519 Lasuen Mall, Stanford, CA 94305
650-462-6800

**Target**
555 Showers Drive, Mountain View, CA 94040
650-965-7764

**Safeway**
639 South Bernardo Ave., Sunnyvale, CA 94087
408-732-5900

**Zipcar**
Santa Teresa St., Stanford, CA 94305
866-494-7227

**Amazon**
1516 2nd Ave., Seattle, WA 98101
206-346-2992

**Party City**
1289 Veterans Boulevard, Redwood City, CA 94063
650-363-8824

**Wheelz**
151 10th St., San Francisco, CA 94103
855-494-3359
8 Bibliography


Appendix

Farmer’s market

At the farmer’s market, the salesperson, who is also the producer, usually offers information about the products in signs next to the product, along with recommendations of how to prepare them. The salespeople were generally very friendly and warm and had aprons and dirty hands, giving the impression that these products were the result of their own hard work. Some types of exotic vegetables attracted our and other customers’ attentions. These odd vegetables are a specialty of farmer's markets and wouldn't be found in an average grocery store. When interviewing shoppers, we found that this was a big reason people came to the farmer's market. Free samples are available in most of the booths in the farmer's market, which is possibly what drives people to try new things; it is a selling opportunity. One vendor had a salesperson walking
out into the crowds with a sample platter and offering a taste to passersby. The music and magic shows were good outlets to entertain kids while their parents were occupied with shopping. It also adds to the fun atmosphere that our interviewees seemed to enjoy. There were a number of booths that sold lunch items to take a break from shopping, making the farmer's market a full Sunday afternoon experience.

We saw an elderly woman shopping for produce and noticed she was wearing a Prop 37 button. Prop 37 was on California's ballot for this year's election and aimed to have any genetically modified food labeled as such. The idea behind this proposition is to know what you and your family are eating and to feel confident that you are making good nutritional choices. This idea is in line with that of the farmer's market. People come to the market because they know that the food sold there is local, natural and fresh, and they trust the producers.

**Interviews at the Farmer’s Market**

**Goal:** We wanted to interview shoppers at the farmer’s market to understand why people come to the market specifically, rather than a normal grocery store.

**Selection Requirements:** We randomly picked shoppers leaving the market who had clearly purchased something and carried full shopping bags.

**Findings:** We interviewed a diverse set of shoppers, including a young man in his 20s, a man in his 40s with his daughter, a woman in her 60s, and a couple in their 70s.

The young man was visiting the market for the first time and enjoyed the fresh produce and reasonable prices. Although he does most of his shopping at Safeway or Whole Foods, he would be willing to return to the market.

The father with his daughter is a more frequent shopper at the market, attending most Sundays and doing half of his total grocery shopping at the market, though he primarily buys only fruits and vegetables. His main reason for buying market produce is the variety and the better taste. He enjoys the specific seasonal selections offered at the market.

The older shoppers also enjoyed the fruits and vegetables but the main draw for them was the atmosphere and feel of the market. They enjoyed the live music and the sense of community.

From these interviews, we found that the quality of farmer’s market produce is a large attraction, though the atmosphere is perhaps the main differentiator from Safeway. We want to take the relaxed Sunday afternoon feel and somehow transplant that to an indoor grocery shopping experience.

We also noticed that the atmosphere of the market mattered more to elderly customers. The couple in their 70s mentioned another farmer’s market in Palo Alto that they slightly preferred due to its more compact size, though it still had the features they enjoyed in this market, such as live music. We get the sense that older customers may become one of our main users to keep in
mind when designing a solution.

We could perform interviews at Safeway or another chain grocery store to gather a sense of how shoppers feel in that environment. We could act out farmer’s market scenarios within a chain grocery store. For example, we found that farmer’s market sellers were very warm and engaging with their customers and provided background and information on their products; we could engage with Safeway employees on a friendly, neighborly level. We could also observe how customers react to product samples or how they engage with Safeway employees, such as the cashiers or the people behind seafood and meat counters.

**Safeway**

Findings, lessons learned

- Shopping for groceries (specifically the checkout process) is less efficient at later hours, due to the shortage of employees
- The people that were there didn’t seem to have a better time for shopping (they were in work clothes- mostly blue collar, but some business-looking people as well)

- Most people were not buying large amounts of food
- Shopping carts for older people (the electric ones) are difficult to use. They are difficult to turn and it is hard to grab things on high shelves
- The layout of the store was somewhat confusing. It was difficult to locate certain products, and some products were located in not very intuitive places (e.g. there was Coors by the fruit, Corona by the fish)

- There is a wide range of products (which is why people shop there), but Safeway doesn’t have niche products like the farmer’s market

- Younger people tended to use the self check-out lane, older people would rather wait in line than use the new machines—if our solution is electronic-based, it has to have an easy to use interface for people of all skill level

Follow up action items

- Hold a focus group with German students at Stanford (Stanford German Students’ Association) to ask them about their experiences at Edeka and how it differed from Safeway

- Visit stores that have similar functions to the grocery store, but with different layouts (e.g. IKEA, Best Buy)
- Investigate other international supermarkets (Waitrose, has a scanner built into their shopping carts (UK); real-Future, can scan barcodes with smart phone and checkout faster (Ger))

- Experiment with the capabilities of the Edeka smart phone app

- Test online shopping at Amazon, Ebay, QVC

**Ikea**

The team visited Ikea to benchmark a shopping experience outside of the food/grocery industry. One characteristic of the store that the team liked was the presentation of the goods Ikea was selling. Entire outfitted rooms were presented, instead of single items. This served as a great selling opportunity because people could see how different items meshed within a cohesive unit, empowering people without interior design experience. People were more inclined to purchase items that they wouldn’t have thought of previously because they saw how it looked in a home, instead of a shelf.

Ikea also helped people that didn’t know much about interior design by having employees around the floor to answer questions and having desks where people could plan their spaces. Computers around the showroom had programs where people could easily replicate a room in their house and virtually place a particular item inside the room to see how it would fit.

Ikea also encouraged a try before you buy attitude. People could come and sit on chairs and sofas and see how they liked it. There were also glass cases with mechanisms that continuously loaded and unloaded chairs, cabinets and other items. These cases increased the buyer’s confidence because it showcased that Ikea’s products were built to last—they could withstand thousands of cycles without failing. Another detail that appealed to customers was the designer biographies placed throughout the store. These banners contained information about the designer who created a particular item and his or her design philosophy. This resulted in the customer knowing more about the product he or she was buying, similar to the feeling one felt while at the farmer’s market. Most people at Ikea were young couples, or couples with young children. Around the store, Ikea had plenty of items to keep children busy while their parents were shopping. These included play stations and stuffed animals.

When customers saw a particular item they liked, they wrote it down on a piece of paper and picked it up at the warehouse on the way out of the store. This allowed people to shop at their leisure and not have to push around a cart. This also made the showroom seem less cluttered—there was one of each item and people could pick up that item later in the warehouse.

**QVC**

QVC is a shopping television network that allows you to purchase items without leaving your
couch. There are segments about 10 minutes long within an hour long show which feature a
QVC host and the product seller giving a demonstration of products. An item description and
price appear on the side of the screen, and the phone number for ordering is always located at the
bottom of the screen. QVC has become a widely successful distribution channel for companies,
and we found that there are several key components to the success of this selling method.

The Host: The hosts are incredibly important to QVC. Some hosts have been on air with the
network for over 20 years and are the faces that customers have come to trust and welcome into
their homes. The hosts are very charismatic and energetic and tell their personal stories, forming
a one-way relationship with the customers that allows them to feel like the host is their friend
and shopping buddy, and in this way, QVC recreates the experience of shopping with your
girlfriends. The hosts are categorized, some with their own signature shows, so you'll see the
same person for your favorite kinds of shows, again building the camaraderie and bond between
the host and customer.

The Seller: The seller and host make a lovable team on your TV screen. The seller serves as an
expert of the product and will walk you through all the features and possible uses of the product.
The host will chime in to tell personal stories or to suggest other ways to use the product or how
it will fit into your lifestyle, i.e. "you could use this at your next dinner party." Sometimes the
seller is the actual creator of the product, and some recurring sellers are popular designers or
famous personalities, like Heidi Klum, Isaac Mizrahi, or Rachael Ray. The seller increases buyer
confidence, and in the case of the seller being the actual designer, the customer feels like he/she
is buying from the source, similar to the feeling experienced at the farmer's market. The seller
informs the customers of what they're getting, and the host is like your shopping buddy, giving
you advice and letting you know what he or she likes about the product.

Caller Testimonials: In case the customer is still on the fence about the product, the caller
testimonials give an extra sales push and vote of confidence. Customers who have ordered the
item in the past will call in and exclaim their love for the product (usually after telling the
host/hostess how much she has loved watching her for the past 5 years). Sometimes the host and
seller may not connect with every customer on the same friendly, personal level, and the callers
can feel like a real, every day person who has tried the product and will honestly tell you how
they feel, similar to an Amazon review.

Selling Tactics: The demonstrations help the customers to see how certain products work or how
clothes fit on the models. The easy-pay-plan allows you to split up a price into a number of
smaller payments. QVC only accepts electronic payments, and research has shown that people
will tend to buy more when using electronic payments because purchases seem less real. A
product recap at the end of the segment reminds you of all products shown that hour in case you
missed the item code. The host will sometimes cross-sell related products, for example, a
cookbook along with a pots and pans set.

Kochhaus
Kochhaus (eng. House of Cooking) is a small German store that sells groceries and recipes. Having the motto "The cookbook you can walk in to", they offer exact portions of groceries that are needed for one of their roughly 20 recipes. You select the recipe, the amount of people and shop for the exact quantities needed for the dish. E.g. you can buy a single bouillon cube.

We decided to benchmark the Kochhaus for HPI’s SUDS last Thursday and tried their online delivery service. If ordered before 4pm, they will deliver on the same day between 6 and 8pm, given you live in the center of Berlin or Hamburg. Felix ordered the food to his house on Wednesday and brought it to school the following day. We agreed on a mushroom risotto with barberries. The dish is supposed to be "easy" and should take only 25 minutes to prepare. We ordered two 6 person packages and one 2-person package (14 total).

The food was nicely packaged in paper bags and had the printed recipe as well as some other flyers attached. The mushrooms and barberries were dried. The package included 100g of Risotto Rice per person, 1 onion, a 50gram pack of butter, a small pack of parmesan, one bouillon cube, a small bag of fresh estragon, dried mushrooms and barberries for each 2 people.

Also, additional ingredients, which they call "basic ingredients", are needed for the recipe. In our case that was 100ml of white wine and 60ml of olive oil for each 2 persons as well as salt, pepper and sugar.

The next day, the fresh estragon was already kind of sloppy. We started cooking at around 7:30pm and were done at 8. The dinner was easy to prepare. Chop the onions, herbs and grate the Parmesan. Make broth from the cubes and stir the rice, white wine and everything else in a pot until all liquid is gone. Finally add butter, Parmesan and the berries, et voila! Really fast and easy.

Overall, it was a good dinner. It was convenient to shop, easy to cook and the recipe added some nice flavor to the rather standard risotto. The size of the portions could be increased, and we do not understand how wine and oil counts as a "basic ingredient" whereas butter is provided. The dinner should be prepared the same day. Also with 3.90€ per person, this dinner is a lot cheaper than a restaurant but about 50% more expensive than if we would have bought the ingredients at a normal supermarket. However, small groups may leverage the exact portioning, which will prevent them from buying too much of a product they are not going to use in the future.

Whole Foods

Whole Foods had superior market decoration over other markets we've benchmarked. The team believes one of the purposes of the decoration is to make customers feel like they're shopping at home. The employees behind the counter are friendly and passionate. The soft lights in the store are important for drawing customers' attention. The service of live cooking is very attractive to customers, not only for the better taste and smell,
but for the environment as well. The food bar is very attractive for organic goods. In addition, people can sit down and enjoy the food in the food court right after they purchase a meal.

Not only does the food look good, but they are organized so well, and shelves are filled up so fast that people are inclined to grab something from the shelves. Products are classified in well-defined catalogs. Each catalog has many options and this gives people the impression that Whole Foods is very professional. That in return makes people feel self-valued. Whole Foods supports local farmers, which attracts people who want to buy local, organic food products. To a certain extent, Whole Foods functions similarly to farmer's markets. One of the common characteristics could be seen from the passion of cookers.

The social environment is one of the important factors that make Whole Foods so successful. They offer events such as wine tasting and classes to improve customers' experiences and sale opportunities. They also make use of Twitter to further develop a customer base and spread its core values, such as selling the highest quality, natural and organic products available.

The willingness of the store to hand out samples was also a great selling opportunity. Almost every major section of the store offered delicious samples that enabled you to try something new you may not have bought otherwise. These samples also had associated recipes and serving suggestions.