EDSGN 100 Design Project 2
Section 018; Team: Prestige Worldwide
Submitted to: Bevin Etienne

A Smart Restaurant

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Abstract:

In this report you will find all the information about Prestige Worldwide's Smart Restaurant Project for AT&T. It outlines our mission statement and our problem statement as well as our design process. We end the report with an analysis of the project and final remarks.

Introduction

This is Prestige Worldwide's Second Project for AT&T. The goal of the project is designing a product for people to stay connected with one another and their surroundings that is sustainable. We then identified the specifications and narrowed down the concepts for our final design. At this point, we examined how parts of our concepts were used in the industry today. From the benchmarking and concept selection our team was able to design a product that would not only change an industry but also provided the groundwork for a more technologically advanced and sustainable future. The result was our system, Dragonfly.

Problem Statement

Today, digital life is one of the fastest growing industries in the world. Everything we do is connected to the internet, from banking to communication, the internet connects all of us. AT&T is looking for an opportunity that could be monetized and groundbreaking as our digital lives continue to grow. The problem we identified was in the our current restaurant industry. In many countries around the world, food waste is a big problem and restaurants are taking a huge hit financially for it. Also from the customer standpoint, waiting in long lines and waiting for a waiter to arrive can also be troubling and annoying. The restaurant industry is not efficient enough and there is room to make it much better.

Mission Statement

Our Company's goal is to make to connect our digital lives to the restaurant industry and to expand our digital lives socially. Our product was created so that we can connect our digital lives with the restaurant industry in order to change the experience of going to a restaurant while modernizing and making the restaurant industry more efficient. Our companies goal is to promote the restaurant industry and encourage people to explore connect with others socially whether it be through online social networking applications or through our applications.

Design Specifications

The Smart Restaurant is a system comprised of different technological components throughout a restaurant that work synonymously in order to help a restaurant run more effectively and efficiently. It is a unique dining experience that will revolutionize dining for the consumer and dramatically increase profits for restaurant businesses.

The technological component of the system that the customer uses is a single HP Slate 7 tablet that is placed at each table. This tablet food ordering options, detailed restaurant menus, payment options and other ways to communicate between the table, waiter and kitchen, if for instance you wanted to modify an order or ask for a refill. This system is convenient for the customer because they can move through the dining experience at their own pace without the waiter having to constantly come by asking if they need anything. This saves time where the waiter aimlessly wanders around, allowing for the waiter to move in a more direct path, which would allow them to be more efficient and serve more tables at a time. The customer can move faster through the meal, and in doing so it allows for more people to come through the restaurant during the day and busy hours.

The menu on the tablet is another special feature. This menu is unique because the customer can click on each item and get a picture and detailed description of the meal. This is different and better than the conventional menu because their is more information, without cluttering the menu.

The waiter is still a key part of running the restaurant despite the fact that they are not responsible for taking orders. The waiters have their own HP Slate 7 Tablet on which they receive data from the kitchen, table and management. Their responsibility it to move the food, from the kitchen to table, which will be notified to them on their tablet. If the customer needs to pay with cash the waiter will respond immediately to them to bring change. If the customer pays by card, the waiter will not be needed because the customer can pay by this method at the table on their tablet. It is important to keep the waiter and not automate everything because this will allow for the customer to still give tips and we do not want to eliminate every job at a restaurant.

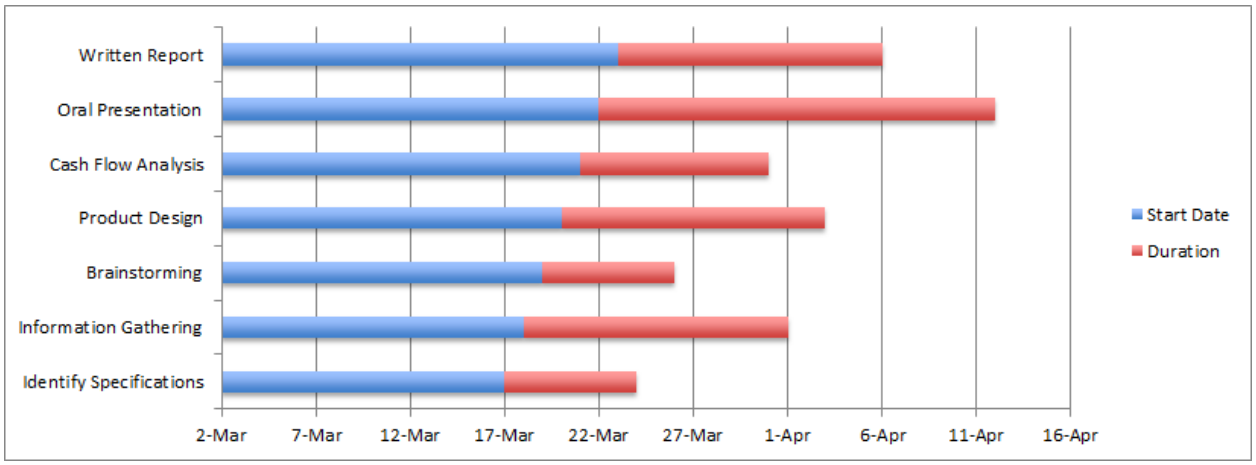
The kitchen screen is how orders get communicated to the kitchen. The chefs receive the order on a kitchen screen, and then communicate from this screen to the waiter when the order is completed.

The motherboard computer (server) in the office of every restaurant is where all of the system data and program information is kept. This is the program that runs and tracks everything on the other system components. The capabilities of this part of the system are tracking inventory, total sales, tips, trends for most ordered foods, average time for foods, trends for customer activity through day (seating, population etc.), waiter's activity (response time and amount of table and total sales). This is important so that management can go back through all of the data and determine how to better order food, manage waiters, change menu items and other restaurant features according to all of this data. This will help them increase restaurant efficiency. This tracking method makes the waiters more competitive because their actions are being recorded so they will want to perform well.

We are developing an application to allow customers to make reservations and preview the menu. This application will be a simple interface that that finds restaurants that have our

technology, and allow customers to rate the locations they have been to. The Dragonfly app that we plan to build is one that will allow users to connect through facebook and twitter as well. You can sign in using facebook and twitter and let your friends know how the experience was at a brand new technology integrated restaurant. At AT&T, we understand communication is big and this application would provide individuals to connect with each other and interact with our digital lives and continue to grow our digital profiles.

Product Management (Gantt Chart)

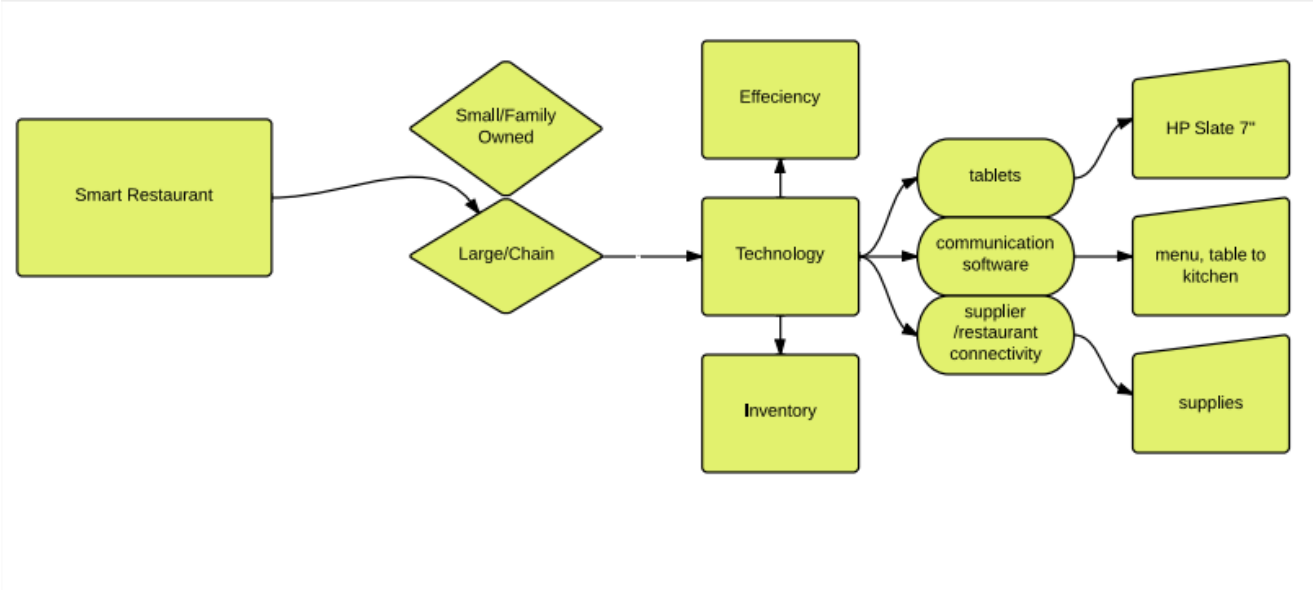


Task	Start Date	Duration	End Date
Identify Specifications	17-Mar	7	24-Mar
Information Gathering	18-Mar	14	1-Apr
Brainstorming	19-Mar	7	2-Apr
Product Design	20-Mar	14	4-Apr
Cash Flow Analysis	21-Mar	10	31-Mar
Oral Presentation	22-Mar	21	12-Apr
Written Report	23-Mar	14	6-Apr

We used this Gantt Chart to plan out our work in an efficient and effective manner. It simply worked as a basic day to day guide to help us manage our project and not get mired down on a certain step of the design process.

Concept Generation:

The flowchart is a rough representation of our thought process at the beginning of our project. After we decided that our project would be based on the idea of a smart restaurant, we then needed to find a direction in which to market our product, that is, what type of restaurant we would need to design for. We decided upon large/chain restaurants as the system would require a large initial investment that may not be the best economical option for the smaller restaurants. Furthermore, large/chain restaurants would be able to see much more increase in efficiency as they would be implementing systems on a larger scale. The efficiency of this product is a result of the technology it is based on. This software incorporates every part of the restaurant, from ordering meals to inventory in the kitchen. We decided to go with HP Slate 7" tablets for the hardware of our system, these tablets are responsible for the communication between table and kitchen. Also, this communication software connects the supplier to the restaurant, further increasing the supply efficiency and inventory.

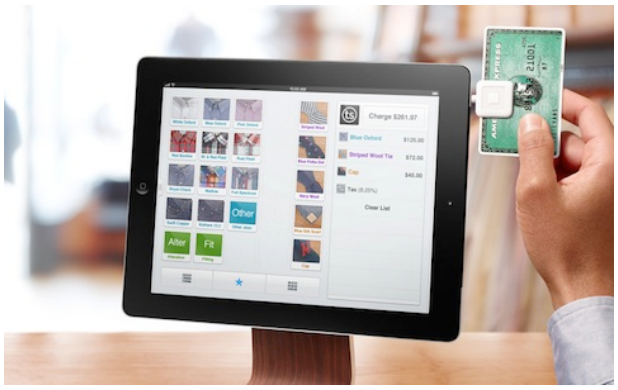


Design Matrix

Selection Criteria	Doug	Tristan	Rohan	Pete
Ease of Use **Sustainable** **Cost** **Ease of Manufacturing** **Communication**	+ + - + +	+ + 0 + +	+ + - + +	0 + - 0 +
sum of +'s **sum of -'s** **sum of 0's**	4 1 0	4 0 1	4 1 0	2 1 2
Net Score **continue?**	3 **Combine**	4 **Combine**	3 **Combine**	1 No

Our group had similar ideas across the board. Peter was the only one who had different ideas. However, our group had the same criteria. Sustainability, Cost, Ease of use, and communication were all crucial in our design choice because that is what makes our product last and thrive in the future industry.

Images of Possible Design:



Sustainability Definition:

A statement of longevity in survival through means of maximizing efficiency, while minimizing resource costs.

Our restaurant system, Dragonfly, implements sustainability in multiple ways. The system tracks use of inventory products throughout the night and can automatically order supplies at set points. Over time, this data on inventory can easily be used to track where a restaurant is wasting its resources. This can lead to more efficient use of supplies and savings for the restaurant.

Dragonfly also tracks the labor habits of employees by monitoring the number of tables an employee cycles, and their total sales for a shift. By having this data available, employers can trim the fat, cut down on labor costs and use their available labor resources much more efficiently than before.

Finally, our system improves how efficiently a restaurant cycles tables. By speeding up service, Dragonfly reduces the time it takes to serve each table and cycle them through the restaurant. Faster service means more tables in, and better time efficiency for all the servers in the restaurant.

Efficiency:

The two greatest costs to restaurants are in labor and food. Our product works to makes the restaurant much more efficient, and in doing so it would tremendously reduce these costs. We estimate that our product would raise efficiency from a standard restaurant between 8% and 10%. The next best restaurant system micros raises efficiency from 3-5%. These figures are most accurate and our efficiency is greatest when the restaurant is near or at capacity. These numbers may sound nominal or insignificant, however, for a large chain restaurant like the Cheesecake Factory, grossing over $200,000 per week, our system would be saving them over $20,000 a week or $1,000,000 per year.

Labor is reduced through waiter efficiency. Waiters have the capability to work more tables at once, they can cycle people through tables faster, they are more competitive through the tracking of their progress, and they waste no time walking around because there is always a task assigned to them through their tablet. Less waiters would be required to work, and because the system can track customer population, waiters shifts can be maximized to efficiency by always assigning the right amount of waiters for certain hours through the day.

Food is wasted less through the tracking of inventory and other trends tracked through our system. The inventory tracking works by calculating the amount of food needed per dish, how many dishes are served through the day and subtracting that number from your food stores. It can then autonomously order the necessary amount of food needed to restock when the

supplies run low. The other end of this, is the customers food buying trends, which help to calculate which foods will be cycled through more quickly and which dishes are less popular. By tracking these trends you can effectively eliminate foods that you do not need and buy more of what is required in order to use your money, products and services more efficiently.

We ran through a scenario using the Cheesecake Factory as a guide, so we could calculate the possible savings you could achieve through our system. In 2008, the average Cheesecake Factory restaurant earned $206,900 per week (according to their annual report). At this rate, if one Cheesecake Factory were to implement the Dragonfly system, they could significantly increase their average weekly income. Based off of a reasonable, conservative estimate, we calculated that they could earn an extra 3,000 to 5,000 dollars per week. This estimate was calculated by assuming that the system would increase the restaurant's efficiency 8%-10% for 4 hours a day, 3 days a week, basically during busy hours on Thursday, Friday and Saturday. As you can see, this is a very conservative estimate for extra weekly earnings, and in reality, Dragonfly would likely earn a restaurant much more since it works all the time a restaurant is open.

Rationale for Product:

We came up with this product purely by chance. We were eating in the dining commons when we envisioned a restaurant where customers would not only be served efficiently but the restaurant itself from the business end to the supplying end. We envisioned a product that could change the restaurant industry. It related to AT&T's needs because they wanted a product that could change the game and take advantage of an opportunity which is yet to be revolutionized. Our product will allow customers to communicate with one another, expand their digital life and profile as well as promote restaurants. It has the potential to improve the restaurant industry and save the millions of dollars in the long run. It also helps restaurants prevent food waste and allow suppliers to ship the precise amount of a certain goods to a restaurant.

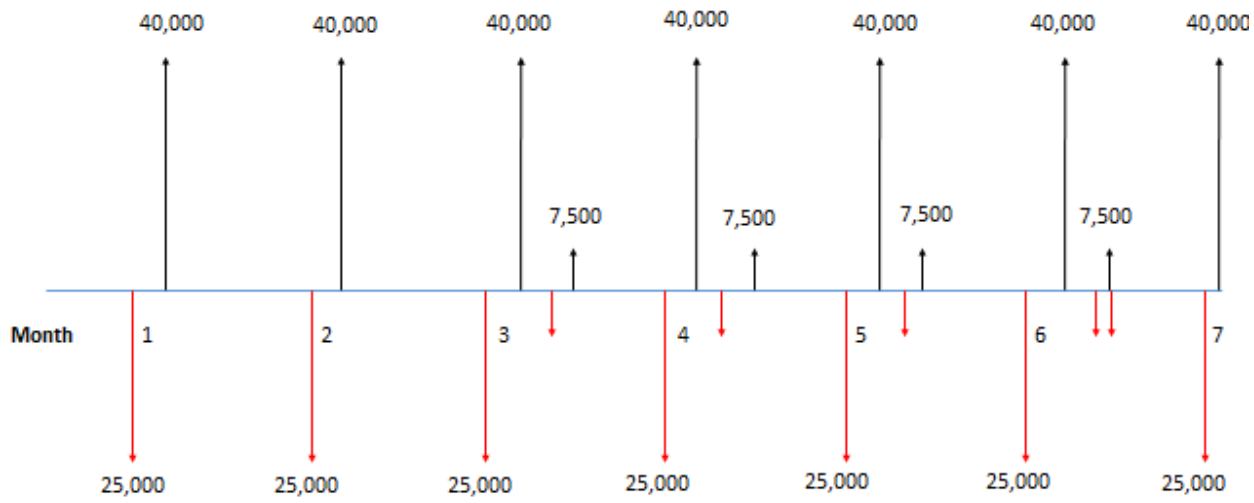
Cost Analysis:

In terms of cost, our system would be greater than almost any other Point of Sale system currently on the market. The company we benchmarked our product against, Micros, currently sells its Point of Sale systems at varying prices that average around 15,000 dollars per system. This cost includes all hardware and software for the restaurant, specifically, 2-8 Micros terminals, a centralized server and 2 computers with monitors.

After researching the cost of all the hardware and software required for Dragonfly, we found that our system, although it costs much more than Micros, is much more cost effective. We are ordering essentially ten times the hardware with a fraction of the cost. By choosing a cheaper, durable tablet, we very effectively keep cost down while still improving quality of service. In terms of other costs associated with Dragonfly, they all mirror the costs associated with a standard Micros POS system. We needed a server, a few computers and a program to

tie everything together, all of which essentially have the same cost as they would in a Micros system. Please refer to the table for specifics on the cost of the system.

The revenue we would make from the system would mainly come from sales of Dragonfly. Although we have found the cost for resources in our system is 25,500 dollars for a restaurant of around 100 tables, we would plan to sell at 30,000 to 40,000 dollars, depending on the size of the restaurant we are supplying. This means that every sale we make would bring about 15,000 dollars of revenue. In addition to sales revenue, we plan to charge for maintenance on the system that would occur once every three months. We would charge around 1,000 dollars for this service, and it would act as a supplement to our main revenue stream from sales. Our final form of revenue would come from hardware and software updates that would become available periodically. Although these are optional, customers would have to update their systems with new hardware and software to stay completely ahead of any competition they may encounter. The final form of supplemental revenue we plan to have is long term contracts. By setting up deals with larger chain companies, we can offer a reduced selling rate with the insurance that the company in question will utilize Dragonfly in any future restaurants they plan to build in an area. Refer to the cash flow chart below for more information on our planned revenue stream.



Item	Cost (dollars/unit)	Quantity	Total Cost (dollars)
HP Slate 7	100	Up to 110	11,000
Server for Restaurant	5,000	1	5,000
POS Program	4,000	1	4,000

Computers and Monitors	500	3	1,500
Labor	4,000	1	4,000

25,500

Marketing:

Using the Cheesecake Factory as an example, we calculated earlier that for each restaurant by increasing efficiency we could save each individual restaurant over $1,000,000 dollars per year. There are over 100 Cheesecake Factory restaurants throughout the entire US, so if they employed the smart restaurant concepts in all of these locations, the Cheesecake Factory could effectively save over $100,000,000 dollars per year.

We would largely market our product to large chain restaurants like the Cheesecake Factory. It takes a lot of initial capital in order to pay for our services, but it has the biggest return for restaurants that gross the most amount of money. The Cheesecake Factory would quickly earn back its investment within the first year, and then continue to enjoy larger profits through future years. A small family owned restaurant would not as quickly earn back the money, which is why our target market is large restaurants.

A company would be willing to pay a lot for the implementation of our product, because the amount they save would be so tremendous. We would charge a significant amount more than the cost of installation in order to make large profits, but nothing too substantial because of supply and demand. For the first years of our product on the market especially, we would keep costs lower in order for more people to be interested and willing to buy into our system. When the smart restaurant idea is recognized more widely and seen to save companies large profits, this is when we can increase our price because our demand curve would become more inelastic.

Conclusion

Overall, we feel that we have created a product which has a clear and legitimate use in the restaurant industry. Based off of conservative estimates and thorough research, we feel that Dragonfly can effectively reduce costs, increase efficiency and modernize restaurants around the world. Our product also clearly improves the sustainability of restaurants which use it, since it increases the efficiency with which restaurants utilize their resources, money and labor.

Power Point
http://prezi.com/g_aa6-nl0zvf/edit/#1_24309637

Links to Our Website:
Rohan Gupta: http://www.personal.psu.edu/srg5328/index
Peter Majewski: http://www.personal.psu.edu/ptm5097/
Tristan Cembrinski: http://www.personal.psu.edu/tqc5253/index
Douglas Devitt: http://www.personal.psu.edu/did5108/index.html