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JMU dining to go

Austin R. Ford
James Madison University

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JMU Dining to Go

An Honors Program Project Presented to

the Faculty of the Undergraduate College of Arts and Letters
James Madison University

by Austin Robert Ford

May 2015

Accepted by the faculty of the Department of Writing, Rhetoric, and Technical Communication, James Madison University, in partial fulfillment of the requirements for the Honors Program.

FACULTY COMMITTEE:

Project Advisor: Mark D. Hawthorne, Ph.D., Professor, Writing, Rhetoric, and Technical Communication

Reader: H. Michael Gelfand, Ph.D., Associate Professor, History

Reader: Morgan C. Benton, Ph.D., Associate Professor, Integrated Science and Technology

HONORS PROGRAM APPROVAL:

Philip Frana, Ph.D., Interim Director, Honors Program

PUBLIC PRESENTATION

This work is accepted for presentation, in part or in full, at Madison Union Ballroom on April 24, 2015.
Austin Ford

Reflective/Contextual Essay

Senior Honors Project

April 8, 2015

Business plans can vary greatly across a wide array of disciplines. This gave me the freedom to be able to create a business plan, web application, and mobile application that incorporated the skills I gained from my major and minor courses of study, as well as allowed me to divulge into and research a field of great interest to me – business analytics. A business plan has very black and white areas, such as an activity diagram, which clearly shows how a system is operating or will be operating. These aspects pertain to my minor – Computer Information Systems (CIS). A business plan also has areas that are very grey, such as the business proposal used to convince an external party to accept and support the project. These aspects pertain to my major – Writing, Rhetoric, and Technical Communication (WRTC).

As a major in the College of Arts and Letters and not the College of Business, I wanted to take advantage of the Creative Senior Honors Project and use this opportunity to test my abilities and expand my knowledge. I knew going in to this project that there would be many aspects with which I’d be unfamiliar, but that just makes for a more rewarding experience when I can accomplish a task I had to push myself through. As Henry Ford said, “whether you think you can, or you think you can’t--you’re right.” I kept a confident attitude throughout the entirety of this project, and I am more than satisfied with the results of my project, the knowledge I gained, and the practice experience I now have under my belt.

In starting this business plan, I needed a business proposal, a formal document to introduce the
project concept to the potential project sponsor. As I stated in my Journal of Progress, I have never before written a business proposal. I have written business memos, but these were merely to voice my opinion and suggestions regarding one aspect of a project that has already been initiated. My major has greatly helped me in creating this proposal because I was able to use means of persuasion taught throughout my courses. These are ethos, or credibility, and logos, or logic. I see these two rhetorical strategies as very useful in the business industry. As a student at James Madison University, I have the credibility to recognize the problem at hand and create a solution. In detailing other points of my business plan and deeply explaining the business process, I made use of the rhetorical strategy, logos.

Through researching components of a successful business proposal, I have learned that a business proposal should include the problem, the solution, and the price. The problem is that students may be too busy to find time to eat on campus, the solution is a web and mobile application that allows students to order food and have it delivered to their location at their specified time, and the price is minimal because I am designing this project free of charge.

The system request is the next piece of documentation in my business plan, and while this is a business document pertaining to CIS, I was again able to use logos in the business need section of the request. The system request outlines the project sponsor, the business need, the business requirements, the business value, and any special issues or constraints.

After exploring JMU Dining’s website, I have determined that the sponsor for this project would be Stephanie Vetter, the District Controller for JMU Dining. The project sponsor is an employee of the client company and is responsible for financially supporting the project. Essentially, the project sponsor is the client representative responsible for the successful completion of the project.

The business need explains the problem and the solution. Because the business need is outlined in paragraph form and not as a bulleted list, I was able to give myself credibility by explaining that I have
experienced the problem first-hand as a student, and I recognize the solution to be put in place. I also explain the solution from a business standpoint, explaining increased revenue and customer satisfaction, which is a logical standpoint.

The business requirements contain a list of what functionality the system must include and the business value is a list of aspects that demonstrate the importance of the new system for the client itself. Special issues and constraints are pretty self-explanatory, but this is a list of any problems the project team should make note of or that could occur in the foreseeable future. These last three items, the business requirements, business value, and special issues or constraints, are all bulleted lists that represent in a black and white way, points that explain the system.

As I mentioned in my Journal of Progress, the **activity diagram** for this system took a number of attempts. Looking back on all my efforts for this element of the business plan, I am glad I kept creating new, improved models. Again, the activity diagram is important for depicting how the system will operate, so it is clearly crucial to get this diagram as detailed and accurate as possible.

The activity diagram lists the actors on the top of the page. The actors are those who interact with the system. An actor can be a person, a department, another system, etc. The actors for this particular activity diagram are the customer, the web system, the dining hall, and the Credit Card Bureau. In short, the customer places the order, the dining hall fulfills the order, the Credit Card Bureau validates the user's credit card if this is the chosen method of payment, and the system makes all of this possible. Further details can be found on the activity diagram itself.

The start node is represented by a black circle, and this initiates the activity diagram. There can only be one start node in an activity diagram. The end node is represented by a black circle with a circle surrounding it, and this represents the completion of a process. There can be one or more end nodes in
an activity diagram. For example, the activity diagram for this system has two end nodes, one for the successful submission of an order and one if the order is cancelled.

Between the nodes, there are activity symbols, which are ovals containing 3-4 words of instruction. These must be displayed in chronological order and be placed in the swim lane of the actor who completes that activity. Connectors are arrows that connect the activity symbols. If two connectors are going to a single activity symbol, they must be converted to one connector using a merge node. Similarly, if two connectors break off from a single activity symbol, these must be separated using a split node. After careful research and consideration, I have concluded that this system contains only merge nodes.

One other symbol that can be seen in the activity diagram for this system is a decision node. A decision node is used when more than one activity symbol can result. For example, there is a decision node for this activity diagram in the event that the form is or is not valid. The decision node asks the question, “Form Complete/Correct?” and connects to one activity symbol if the form is correct and valid and connects to a different activity symbol if the form is incorrect or invalid. I am happy with the turnout of my final activity diagram, and it has thus far led to the successful development of two prototypes – one web application and one mobile application.

The network diagram shows at a low-level the architecture of the system as a campus area network (CAN). As shown in the network diagram, an internet service provider (ISP) provides internet access to a router between internal and external firewalls. Because payment options are credit and debit cards, it is good to have both firewalls in order to protect students’ sensitive information. This then connects to a switch, which connects to the three servers needed: a web server, an application server, and a database server. The application server hosts the application, the web server allows the application to be accessed via the internet, and the database server is necessary for the future
Application Program Interface (API). With this, dining halls can update the menu and receive orders through the system, and not via email or the back-end of the system. From here, the connection goes to a Wireless Access Point (WAP), which allows PCs, mobile phones, and tablets to access the internet wirelessly.

Reflecting on the network diagram, I am confident with the architecture for this system. I feel that it will provide a secure and productive means to running the system. There were a few problems I ran into, such as the inclusion of a database server, but for the reasons previously listed, I included one and am glad to have done so, for the sake of future implementations of the system.

Because of the inclusion of a database server in the activity diagram, a database must be built and implemented. This database would be for the use of an API, and so it is not needed for the two prototypes built. As the business analyst for this project though, I designed a class diagram. A class diagram is used to model the construction of the database. Initially, I had constructed an entity-relationship diagram (ERD), but this forces the construction of a relational database. While this is more than likely going to be the case in future system implementations, I decided it was best to construct a class diagram.

A class diagram serves the same purpose as an ERD, designing the construction of the database, however because of its syntax, it does not require the construction of a relational database. The type of database is left up to the discretion of the future database administrator. The class diagram is a structural model that shows the relationships between different entities, and for this system, those entities are customer, dining hall, order, and menu. Different attributes, or details, of each entity are listed, one of which being the primary key, as to uniquely identify that entity. The primary key is indicated by <<pk>>.
Once the entities and attributes are drawn, the relationships must then be diagramed. These are the lines that connect different entities. With regard to this system, customer connects to order, order connects to dining hall, and dining hall connects to menu. A verb phrase is listed with each relationship. For instance, a customer places an order that comes from a dining hall that contains a menu. These relationships can be one to one, one to many, or many to many. In this class diagram, customer and order have a one to many relationship because one customer can place one or many orders. Therefore, the customer contains a 1 and the order contains a 1..*., which illustrates one to many.

The feasibility analysis is a series of steps to determine the potential success or failure of a project. First is the technical feasibility. This is the test to determine whether or not the new system will be able to be easily constructed by the project team and controlled by the project users. There are four components of a technical feasibility: familiarity with functional area, familiarity with technology, project size, and compatibility. Familiarity with functional area has medium risk because JMU Dining does not already have an as-is system and therefore has no prior experience with one. Familiarity with technology has low risk because some or all of the construction of future versions can be done using Platform as a Service (PaaS) or Software as a Service (SaaS), and the prototypes that are made are user-friendly. Project size has low risk because smaller projects, as this one is, have lower risk in general, and JMU Dining sets the requirements – there is no other external third party adding requirements and increasing scope creep. Compatibility has medium risk because the new system must be integrated with pre-existing JMU information systems in order to validate JACard numbers and passwords. Overall, the technical feasibility has low-medium risk because two of the subtests showed low risk, while the other two showed medium risk.

The next part of the feasibility analysis is the organizational feasibility. The organizational feasibility charts the major stakeholders and their views on the system. The four major stakeholders I
determined were the project champion, organizational management, external system users, and miscellaneous other stakeholders. The project champion, also known as the project sponsor, is Stephanie Vetter. Stephanie should support the project due to an increase in revenue and customer satisfaction. Organizational management consists of dining hall managers and employees. These stakeholders will probably be opposed to the system because the system will bring organizational changes to their work processes. The external system users are the JMU students using the applications. Students support the project because it will enable them to more easily access JMU Dining services. Additional stakeholders for this project would be JMU Dining as a whole as well as James Madison University. These two stakeholders should support the project for the same reasons listed for the project champion – increased revenue and customer satisfaction.

As much as I would like all stakeholders to fully support this project as the project designer, as I reflect on the organizational feasibility, I am glad I kept a realistic mindset and I know that it is important to understand that not all parties will always support a project. It is important to understand why certain stakeholders oppose a project and try to determine solutions in order to assist these stakeholders.

Other organizational issues that need to be considered as part of the organizational feasibility are those of time and legality. With regard to time, the applications should be launched prior to the start of the designated semester. Additionally, downtime for system maintenance should be during non-business hours and any time from July-August when school is not in session. Concerning legalities, credit and debit cards must be securely charged and verified through the Credit Card Bureau. In considering these factors and the viewpoints of major stakeholders, the overall organizational feasibility has low risk because it is a business process improvement (BPI), which only makes moderate changes to the way an organization operates in order to take advantage of technological opportunities. This system does not
require business process reengineering (BPR), which entirely changes the ways in which a business operates.

Before an application is developed, it must be designed. The previous components of the business plan analytically designed the applications, but they still need to be graphically designed. To do this, I made use of interface mockups, which represent how the applications should appear to the user. I have never before made an interface mockup, but looking back on it, they made development of the prototypes much easier. The mockups give the developer a template of what the interface should look like. This way, the programmer can focus on coding rather than design.

In this business plan, there are four interface mockups. One for the web application home page, one for the web application order page, one for the mobile application home page, and one for the mobile application order page. These templates match the format of the interfaces, but lack the functionality – they merely show the design. Although I have briefly used Microsoft Visio in the past, I have never before done so to construct an interface diagram. I am glad to have completed multiple at this point because I find it a great tool to be able to use.

All of the other aspects of the business plan led to the prototype development of the applications. I started with the web application. Throughout my courses at JMU, I have only built one other website, so I knew this could be a challenge, especially considering that this project has very different functionality. In the web application, a student selects form the home page the dining hall from which they would like to order. The student is directed to a page with a form for the specified dining hall. On this page, the student enters his/her information, and then selects food, delivery, and payment options.

One of the bigger things I took away from the completion of this prototype is form validation. When the student does not input required information into the form or does so in an incorrect format,
the application will notify the user of the error and ask for the field to be filled in correctly. I find this as a very important skill to know because this prevents spam orders.

Once the web application was developed, it needed to be transformed into a mobile application as well. I have never developed a mobile application, but I was willing to accept the challenge. I researched the different ways to go about creating a mobile application, and I decided that using a Platform as a Service (PaaS) was the best way to go about creating a project with this type of scope. By using a platform, I was able to follow the design represented by the interface mockups to create a cross-platform application. Keeping in mind that JMU students have smart phones with different operating systems, it is important to have a cross-platform application. Reflecting on my development of the mobile application, I am very happy with my decision to use a platform because with the graphical user interface (GUI), I was able to create a prototype that matches the needs of this project, as outlined in the preceding components of the business plan.

As I said from the beginning, I knew this would be a challenging yet rewarding experience. I have faced many difficulties, but conducted the research to find solutions and overcome them, and I now have that experience under my belt, which is a great feeling. This project has given me the confidence to take projects head on, and I plan to carry this mentality over into the business world. A JMU Honors alumnus gave me the advice to use my Senior Honors Project to dive into a new, unfamiliar field of interest to me. Business analytics was a field of which I have great interest and wanted to learn more about, and I am proud to say that I have made that happen.

Enclosures (1) – Evidence of Creative Work
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April 8, 2015

Stephanie Vetter
JMU Dining, District Controller
James Madison University Dining Services
800 South Main Street
Harrisonburg, VA 22807
Dining Services Administration Office: Gibbons Hall, Entrance 7

Dear Ms. Vetter:

I am writing to you in order to propose the development of a web application as well as a mobile application for James Madison University Dining Services. As a student at JMU, I have personally experienced an issue faced by many other JMU students: the time in which it takes to punch for a meal and then proceed to get to class on time, board the Harrisonburg Department of Transportation buses prior to their departure, etc. The development of a web and mobile application could mitigate this problem, as well as accrue greater revenue for JMU Dining Services by receiving the business of customers who would not typically consume food provided by JMU Dining because they lack the time needed to do so.

The root cause of the problem at hand is not in any way the result of JMU Dining Services, but rather it is caused by the schedule of the customer. The web and mobile application will allow customers to incorporate food provided by JMU Dining into their busy schedules. In short, students will access the web or mobile app, fill out the form provided regarding meal options and payment methods, and an employee of the customer’s selected dining hall will deliver the meal by the time and to the location specified by the customer. Times available for delivery will be every fifteen minutes from 12P.M. to 6P.M. Locations available for delivery will be Lakeside, Skyline, Village, Ridge, Hillside, and Bluestone. Please note that these details are those contained in the prototypes, and I suggest we meet in order to make changes to these options. We should also discuss menu options in future meetings, as my web and mobile application prototypes contain items as fillers, and are in no way permanent. The detailed functionality of the application is discussed below.

Via the web and mobile app, customers can select the dining hall from which they wish to order, and complete the form selecting available food options. Please note that the dining halls available for selection in my prototypes are D-Hall, E-Hall, Festival, Lakeside Express, Let’s Go Local, Market One, Mrs. Green’s, PC Dukes, and Top Dog. The
customer will supply his or her full name, JACard number, password, phone number, entrée, side dish 1, side dish 2, dessert, drink, location, time, and payment method. From this point, the customer will submit the form to be received and fulfilled by the desired dining hall. Please also note that my prototypes are not using an application program interface (API), and therefore the orders are being sent via email. In the event that you wish to continue with this project, an API should be developed to update menus and receive orders through the system and not via email. From here, it is the responsibility of the selected dining hall to prepare and deliver the order.

Pricing for this project is minimal, if even existent. As the business analyst and prototype programmer for this project, I will be designing this new system free of charge. Seeing as JMU Dining is a JMU facility, this system should be able to run off of JMU’s pre-existing servers, and therefore the purchase of new servers is unnecessary. The fees that may result from this project could be the hiring of new staff members to deliver the food, but this will be at the discretion of each dining hall. However, all planning, analysis, design, and implementation charges will be waived. One other purchase that may be necessary is mobile JAC, credit, and debit card readers for the purchasing of orders on site. This purchase is only necessary if JMU does not already have these items or is not willing to lend them out. Additionally, depending on your choice of implementation, further costs may be needed for development and for an application program interface, but this is to your discretion and as you see fit.

In moving forward, I suggest that we meet next week to discuss the content of this proposal and answer any questions you may have. Please call me at (267) 981-4579 or email me at fordar@dukes.jmu.edu by Monday, April 13th, 2015 at 5P.M. in order to set up a time and location to meet later in the week. Please feel free to reach out to me at any time via the contact information above with any outstanding questions or concerns.

Best regards,

Austin Ford
Business Analyst
**System Request – JMU Dining to Go**

**Project Sponsor:** Stephanie Vetter, JMU Dining District Controller

**Business Need:** JMU Dining is losing the business of students who do not have the time necessary to eat on-campus. JMU Dining needs a web application as well as a mobile application in order to increase revenue and customer satisfaction by expanding sales to a larger populace of JMU students.

**Business Requirements:**
- Provide online access to dining halls
- Integrate with other JMU information systems to authenticate users’ JACard numbers and passwords
- Connect to API and database in order for dining halls to receive orders and update menus via the system

**Business Value:**
- Increase revenue by expanding sales to a larger population
- Increase customer satisfaction by providing a more easily accessible service

**Special Issues or Constraints:**
- Rolling out the finalized system prior to the start of the designated semester
- Accepting different forms of currency varying upon the user’s payment method
JMU Dining to Go Class Diagram To-Be

Customer
- searchNumber
- firstName
- lastName
- phoneNumber
- password

Order
- orderNumber
- location
- time
- paymentMethod

Menu
- date
- diningHallID
- entree
- sideDish1
- sideDish2
- dessert
- drink

Dining Hall
- diningHallID
- name
- location
- hours

places 1..*
comes from 1..*
contains 1

## Technical Feasibility – JMU Dining to Go

### Familiarity with Functional Area:
- JMU Dining does not have an as-is system and therefore has no prior experience with an online system
- JMU Dining already provides security to students’ sensitive information from credit and debit cards

**Risk Assessment:** Medium risk because although the future system will create a new business process, JMU Dining is already competent in providing security to students’ financial information

### Familiarity with Technology:
- JMU Dining does not have an information systems staff, but may have access to JMU’s information technology services
- Using Platform as a Service (PaaS) will assist with the construction of the system; Software as a Service (SaaS) is also an option, as it is likely there is a similar pre-existing software package

**Risk Assessment:** Low risk because of the use of PaaS or SaaS and that JMU already has an IT service

### Project Size:
- Small project
- Distinct features of the system are to the discretion of JMU Dining and not an additional external client

**Risk Assessment:** Low risk because smaller projects have lower risk in general, and all requirements are set by JMU Dining

### Compatibility:
- The new system must integrate with other JMU information systems in order to authenticate the users of the system
- Attempts should be made to use JMU’s pre-existing computers to receive orders in order to reduce costs

**Risk Assessment:** Medium risk because the to-be system must integrate with other JMU information systems and using SaaS would make this more difficult than using PaaS; utilizing JMU’s computers should be easily manageable

### Overall Technical Feasibility:
Low-Medium Risk
### Organizational Feasibility – JMU Dining to Go

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Primary Actor(s)</th>
<th>Support/Oppose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Champion</td>
<td>Stephanie Vetter, JMU Dining District Controller</td>
<td>Supports project because of increased revenue and customer satisfaction</td>
</tr>
<tr>
<td>Organizational Management</td>
<td>Dining Hall Managers, Dining Hall Employees</td>
<td>Opposed to system because of organizational changes to work processes</td>
</tr>
<tr>
<td>External System Users</td>
<td>JMU Students</td>
<td>Support project because of being able to more easily access JMU Dining services</td>
</tr>
<tr>
<td>Other Stakeholders</td>
<td>JMU Dining, JMU</td>
<td>Support project because of increased revenue and customer satisfaction</td>
</tr>
</tbody>
</table>

**Other Organizational Issues:**

**Time:**
- Needs to be completed prior to the start of the designated semester
- Downtime during non-business hours and any time from July-August when school is not in session

**Legal:**
- Credit and debit cards must be securely charged and verified through the Credit Card Bureau

**Overall Organizational Feasibility:**

Low Risk – the implementation of this system is a Business Process Improvement (BPI), which makes moderate changes to the way an organization operates in order to take advantage of technological opportunities; this system does not require Business Process Reengineering (BPR), which ultimately changes the way the organization operates and eliminates the as-is system
Title

Dining Hall Name

Instructions

Form to submit Personal Info, Meal Info, Delivery Info, and Payment Method

Submit button
JMU Dining to Go

D-Hall  E-Hall  Festival
Lakeside Express  Let's Go Local  Market One
Mrs. Green's  PC Dukes  Top Dog
You have received the below request from

Full Name: Austin Ford
JACard #: 1123456789
Password: password
Phone #: 5405555555

Entree: Pasta
Side Dish 1: Salad
Side Dish 2: Mozzarella Sticks
Dessert: Ice Cream
Drink: Water
Location: Lakeside
Time from 12-6PM: 1:30 PM
Payment Method: Punch