NONPROFITS AND SPECIFIC NEEDS: USING PERSONALIZED TECHNOLOGY TO IMPROVE OPERATIONS IN A NONPROFIT ENTITY

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By

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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ABSTRACT

Zippy Meals, a small family run software company based in Charlottesville, Virginia, has helped improve IT and operations in Meals on Wheels. During my internship at Zippy Meals, I helped to design a personalized Android App that used Kotlin, Android Studio, and an agile development approach to optimize routing and provide easy data management through a simple interface. Zippy Meals has saved Meals on Wheels employees and volunteers hours of time each week, reduced overtime, increased efficiency, and provided more time to work on other meaningful tasks. While the product has had some success and spread into more Meals on Wheels programs, future upgrades should include further optimization of routes and cyber security testing to avoid any HIPAA violations.

1. INTRODUCTION

Imagine your local grocery store is three miles away. Would you ever consider not using an automobile to get there? Personalized software for repeated tasks is no different. The technology exists to drastically reduce time spent on necessary tasks, so it would be irrational not to use it. My research focuses on this core problem.

Meals on Wheels is a nationwide nonprofit organization with the goal of providing nutritious meals and meaningful social interaction to hungry, isolated seniors in a dignified manner. For many years, the nonprofit was run with minimal digitalization, with many hours of photocopying, mapping, and data entry done manually by the volunteers and employees. Zippy Meals was designed to reduce the amount of time spent on daily tasks to allow for Meals on Wheels to focus more time on its mission and clients.

2. RELATED WORK

Amazon Web Services actually had a very similar story of creation to that of Zippy Meals. At first it was designed to be used in house by Amazon to help with their own operations. However, Amazon quickly realized that many other companies were in need of similar cloud infrastructure. As a result, Amazon realized its potential to allow any organization to use AWS as a technological infrastructure that can be built upon. What began as a solution to an internal problem has become the most successful and widely adopted cloud infrastructure company in the world. Zippy Meals began as a solution to help the Charlottesville operation, but has grown into a system that can be used by any Meals on Wheels in the world (Miller, 2016).

Google Maps can also be examined in a similar way to AWS. It was originally designed to allow users to find certain locations, obtain directions, and explore the world map. However, the overall function is fairly limited in scope. With the release of Google Maps API, developers of map- or location-based applications can utilize the technology to specialize it for their desired outcomes. Whether it be Uber Eats, All

Trails (a hiking trail app), or Zippy Meals, Google Maps API can be used as the basis for the navigational functions. It also provides the ability to create unique features for entities like Zippy Meals that utilize the API to find the optimal order of deliveries and provide routes to drivers (Google, 2023).

3. PROJECT DESIGN

In the design process for the Android app, it was very important to understand and implement solutions that fit the needs of our client and to acknowledge any limitations that our design may have.

3.1 Requirements

The primary goal of Zippy Meals was to reduce time spent on everyday tasks by Meals on Wheels operations. These tasks include data entry, determination and distribution of delivery routes, and general office management.

3.1.1 Client Needs

The client requires a solution that will have a smooth transition from the current system, straightforward user interface and experience, and minimal cost. There needs to be a clear benefit to use Zippy Meals over the current manual system.

3.1.2 System Limitations

The system will not be entirely automated, as there will be some input required from the staff and drivers. The staff will need to input dropoff locations with some delivery instructions, manage volunteers, and bill clients. Drivers will report their deliveries and any changes to their schedule.

3.2 Key Components

Through an agile development process, weekly check-ins made it easy to communicate across teams and find solutions to any challenges faced during the project implementation.

3.2.1 Specifications

The IOS version of Zippy Meals was already built prior to the start of my June 2021 internship, so the project was specifically designed for Android devices. All coding was to be done using Kotlin, the most popular programming language for Android applications. The software development team was led by CEO and founder John Cleveland with two existing employees and about 10 UVA interns. The interns were divided into teams of 2-3 to build out specific pieces of the application. My role was to work on the front end for the portion of the app that the volunteer drivers would use. This involved building various objects used in route determination, displaying route information in a user-friendly manner, and taking output from the database.

3.2.2 Challenges

The biggest challenge I faced throughout the project was that the intern teams had tasks of varying length. I had finished most of my work before the database was fully built, so I ran out of

things to do because the rest of my portion relied on the database.

Another challenge was that it was most of the interns' first time programming in Kotlin, but we only had eight weeks to finish the project.

3.2.3 Solutions

The solution I came up with for the database issue was to manually code test objects. I knew what the database output would look like, so instead of waiting for the database team to finish, I went ahead and made placeholder data to test my solution. As a result, I was able to avoid wasting time and once the database was ready, it would be as simple as replacing my test data with the real data.

As for the issue of having a team of mostly Kotlin beginners, the solution was to learn as we went. Instead of learning everything about Kotlin before starting to code, each team would target only the knowledge needed for their specific task. For example, I spent no time learning how to create and fill the database because I did not need to for my role. In addition, having a small team allowed John to give more attention to everyone's code, providing feedback as well as tips for future work.

4. Results

Zippy Meals was built on the premise that saving people even just a few hours every week can add up to immense amounts of time saved over many years. With optimized routes, drivers can save dozens of miles every week and thousands every year. With the single database, staff can track all clients and manage all volunteers in a single place and never worry about missing anybody. With the shift to cloud computing, Meals on Wheels can reduce expensive hardware upkeep and offer more flexible work options such as remote work to improve work-life balance. Zippy Meals is also designed with a simple interface that can be learned in a few hours, which is why they offer free training and data transfer to eliminate any concern over a transitional period. Cindy W. of Fluvanna Meals on Wheels has given feedback that the Zippy Meals saves her time every week and has not only eliminated overtime, but also given her more time to complete projects on her Director's "wish list" (ZippyZen, 2017).

5. CONCLUSION

Saving time in the workplace on everyday tasks adds up over time and can vastly improve overall efficiency and productivity. Saving time on normal operations allows the opportunity to expand or improve existing operations. Through the creation of the Zippy Meals application, Meals on Wheels organizations can save hours every single day due to the sophisticated and personalized nature of the design. Every organization has ways they can utilize modern, personalized technology to increase efficiency within their operations, so I view this experience as a case study for the benefits of such technologies, especially in nonprofit organizations. Through this experience, I gained familiarity with the Kotlin language and Android programming environment. I also learned a lot more about what it takes to run the Meals on Wheels organization.

6. FUTURE WORK

While the existing solution has already shown tremendous improvement to operational efficiency in Meals on Wheels organizations, there do exist plans to further improve the application. The next big feature that Zippy Meals is working on is one-click route optimization, which would save even more time for the drivers and get meals to clients even faster (ZippyZen, 2017). In addition, as more feedback from users comes in, any needed changes will become more apparent. This is a personalized technology, so the users' preferences play a massive role in the ongoing maintenance and improvement process. Lastly, cybersecurity in nonprofit organizations, which is the focus of my STS Thesis, has been a major problem in recent years. Security of Zippy Meals must be continually tested and upgraded as needed in order to protect the clients' private data. Apart from improved functionality, the next big step would be implementing Zippy Meals in even more Meals on Wheels offices across the country.

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