

Technological Connection: Improving Resource Access through Technology

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Emily Buerk

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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

Advisor

Daniel Graham, Department of Computer Science

Technical Report

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E. Buerk

Computer Science

The University of Virginia

School of Engineering and Applied Science

Charlottesville, Virginia USA

egbuerk@gmail.com

ABSTRACT

In the city of Charlottesville, Virginia, there is a disconnect between available non-profit resources and people in need of these resources. The greater Charlottesville area has an abundance of nonprofit organizations; yet there are still citizens below the poverty line. A team of five UVA colleagues and I devised a simplistic solution using problem identification techniques, compiled data, and software development technologies. Utilizing WordPress, we developed and refined a prototype website and matching tool. Ultimately, we found that resources and people in need could be linked easily through technology. We also discovered that technology is easily integrated into many people's lives in the Charlottesville area, whether or not they have direct access to a personal device. Future work will include further development into similar regions in the United States. We will gather additional data to refine the resource eligibility matching quiz with web scraping paired with human volunteers to maximize efficiency and accuracy.

1. INTRODUCTION

Poverty is a sensitive issue, and it greatly affects our community in Charlottesville. The community is largely shaped by the University of Virginia, yet still has many non-profit organizations in the area. The team further explores these discrepancies in the population of Charlottesville and the factors that contribute to the poverty rates in the community.

The citizens of Charlottesville face a variety of struggles that are analyzed in this report. Difficulties experienced by non-profit organizations in the city are also explored and optimized.

2. BACKGROUND

The ambitious research team and I arrived in Charlottesville in the fall of 2019 and immediately noticed the wealth discrepancies between the University of Virginia and the greater Charlottesville community. We recognized the abundance of resources available to University students and the abundance of other resources available to the community. However, there are differences in the way these resources are gathered and distributed that show noticeable discrepancies between the populations.

3. RELATED WORKS

Many researchers continue to study the root causes of poverty in the United States as well as the methods of gathering and distributing resources to those in need. Massa (2004) explores the connection between religion and charitable donations, determining that religion is one of the most effective methods of gathering time and monetary donations for charity. This relates to the work that our team has conducted in the area optimizing and promoting the giving and receiving of donations.

Rosenthal (n.d.) notes that social media is a useful tool to expand volunteering and resources. He outlines particular ways to engage with social

media to increase the impact of volunteers and micro-volunteering to benefit charitable organizations. This brings in methods for utilizing technology to gather and distribute resources, the process our team is working to streamline.

Greenfield, et. al. (2013) explore the important components of web development for nonprofit organizations. The authors identify key goals that will increase the effectiveness of websites designed to gather donations for charity and maintain donor relationships.

4. PROJECT DESIGN

The team first created design requirements that were used to envision a final product and determine the system architecture for our product.

4.1 Design Requirements

In order to lay out and incorporate the project goals, we created a table of design requirements. Table 1 highlights specific requirements, metrics, and target values for the team to use in designing the final project.

Table 1: Design Requirements

	Design Requirements	Metric; Units (if applicable)	Target Value (Marginal-Ideal)
1	Idea is unique to the Charlottesville community	Number of organizations with similar methods of accomplishing mission	3-10
2	Increases outreach to individuals in poverty demographic	Number of individuals reached	50-150
3	Increases outreach to families	Number of families	20-30
4	Identifies individuals in	Percentage of yearly salary	80-100%

	poverty demographic	matches identified salary in poverty range	
5	Provides sufficient amount of at least one of identified necessary resources	Number of resources distributed	1-2
6	Provides continued support to identified individuals	Time that programs are in contact with individuals/families; Months	6-12
7	Enables individuals to become self-sustaining	Increase in annual income; U.S. Dollars	5,000-10,000
8	Maintains individual privacy and integrity	Individuals interested versus individuals that are comfortable in participating	80-100%
9	Reduces time spent without necessary resource(s)	Time prior to solution versus time after solution decrease; Days	30-7
10	Environmental Impact	Environmental variables; CO ₂ emissions, reusability of product, reusability of intermediate byproducts	Carbon Neutral-Helping the Environment
11	Time until implementation is feasible for the scope of the project	Time; Months	3-1
12	Reduces effort needed to access necessary resources	Distance away from suppliers	<1 mile-0

13	Redistributes existing necessary resources to identified individuals	Binary; Yes or No	Binary; Yes or No
14	Reduces portion of income spent on necessary resources	Percentage of income measured in U.S. Dollars	30-10%
15	Increases general health	Health statistics; Physical check-up results, stress levels as reported by individuals	Varies by statistic
16	Instills Pride in Charlottesville Community	Based on survey where consumers in market rank experience; Scalar Scale 1-10	8-10
17	Focuses on Charlottesville Area	Percentage of people impacted in the Charlottesville community versus other communities	75-100%
18	Novel	Number of existing similar patents/organizations	1-0

4.2 System Architecture

We utilized the specified design requirements to create a website that would compile all of the resources available in the Charlottesville area and the eligibility to receive the resources. To design this website mockup, we used NinjaMock, a website-drafting platform, to develop multiple iterations of non-functional websites. We then used the mockups in testing to adjust the final iteration produced by the technical team members.

The technical team members decided to use WordPress, an open-source content management service, to develop the working website. We configured the website with

Google Cloud DNS services with the WordPress client installed on the remote server. The technical team used the WordPress configuration setup to create and modify the content pages, then link these pages to the WordPress GUI that allows non-technical workers to make quick changes to the site with admin privileges.

4.3 Challenges

We ran into both technical and non-technical challenges while creating the final WordPress website. The non-technical team members had trouble contributing to the initial website design, so the team decided to split up the work into data collectors and content managers. The data collectors focused primarily on collecting and formatting research so that it could be easily uploaded by the website administrators.

On the technical side, we ran into trouble integrating the resource matching questionnaire into the website using pre-existing WordPress questionnaire-formatting tools. In order to integrate a questionnaire into the website, we first embedded a Google Form that would produce matching results to the page which later shifted back to the WordPress free software for enabling quizzes. We customized this feature by working with the underlying JavaScript code beneath the WordPress GUI.

5. RESULTS

The team presented the final prototype of the website and questionnaire to the United Way of Charlottesville. We then partnered with United Way to update their existing platform by adding the research gathered by our team to the United Way site, reimagineCVA.org. We were able to double the amount of nonprofit organizations listed on the website from roughly 150 organizations to over 300 organizations.

The newly-designed site allowed for easy navigation with a search feature and a donate feature. Additionally, nonprofit organizations

could be sorted by category to narrow down the results. This portion of the site is designed for donors to determine how to use their time and resources to provide assistance to nonprofit organizations.

Within the past two years, the site has expanded to include resources to provide resources for eligible users. This portion of the site, intended for people struggling with their life situations, improves visibility so people in need can easily compile the resources available to them.

6. CONCLUSION

The goal of my team's research is to maximize the impact of nonprofits by compiling resources and information to make these nonprofits successful and accessible. The site created by the team holds details about most of the nonprofits in the Charlottesville area and provides users with ways to donate in addition to showing users their eligibility to receive aid. This product can be applied to other towns that struggle with poverty to improve nonprofit aid from volunteers and nonprofit aid to citizens.

7. FUTURE WORK

In the future, this site will be applied to other cities in the US on a larger scale. In order to complete this quickly, the current site can be improved using web scraping to collect data and volunteers to scan the collected data. Additionally, web scraping should be used to gather more data to improve the matching quiz results for users. This resource collection concept can be applied to many different areas including but not limited to hospital and insurance information, crisis resources, and clothing drives.

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