



Smartphone App Developed By Students to Help Community Members in Crisis

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Abstract

On campus, faculty and staff are given a document called the “Red Folder”- a paper folder that contains resources to help identify students that may be in crisis and get them connected to mental health resources on campus. This folder, while useful does have its drawbacks. Most importantly is the fact that it can be easily lost or damaged since it is just paper. Additionally, many faculty store this in their office or in a bag which they may not always have on them limiting their access to this information. On top of all this, only faculty and staff were given the Red Folder so students did not have the same level of access to this information. To solve this problem, students under faculty guidance worked to create an app called LionHELP. LionHELP had two main goals; the first was to create a tool that would give students access to the same mental health resources as the faculty. The second was to create a replacement for the Red Folder that could live as a native app on each person’s smartphone to facilitate access at a moment’s notice.

To develop this app, three students were selected to work with a faculty mentor. The students were majoring in either Computer Science or Software Engineering. To assist with the development and help steer the project, two outside experts were also enlisted. The first was a faculty member from the English department at the school who specializes in English composition and in creating inclusive content that can be understood by a variety of levels of English fluency. The second was a member of the campus counseling center and a certified case manager. The students worked as a team with one student leading the charge on iOS development and the other on Android development with the third serving as a go between and aiding both projects as needed. Each week the students met with the faculty mentor as well as the outside experts to review progress and plan next steps.

Prior to the start of the Fall 2021 semester, the app was deployed to both the Google Play Store and the Apple App Store as free downloads for students. The app has been welcomed by faculty, staff, and students with other campuses in the school system being interested in adapting this app for their own uses. Students have been interested in the app as well prompting an article from the student run newspaper to be written and published. The successful development of this app opens the door to future development efforts that include adding in resources to help students get connected to resources on campus related to learning disabilities and other situations that can make a difference in student success on campus.

1.0. Introduction

Poor mental health in post-secondary students can cause a host of issues including (but not limited to) unsatisfactory academic performance [1]. This issue only becomes exacerbated by the current COVID-19 pandemic. Students faced a whole host of additional stress factors during this time because of the confusion and chaos caused by the pandemic [2]. Now more than ever, students need to be aware of the mental health and student support services on campus. The problem is not all students are aware of these services [3]. Prior to the pandemic our campus chose to implement the “Red Folder”, a folder shaped piece of paper containing resources and information to guide faculty and staff as to how to help students who might be experiencing a mental health emergency. While the “Red Folder” can be useful, there are several shortcomings to the current setup:

1. The “Red Folder” is only distributed to faculty and staff on campus meaning students, the intended audience, do not have the same level of access and awareness of these resources.
2. The “Red Folder” is a piece of paper meaning it can easily be lost or damaged. This also introduces a scalability issue since there would be an increased cost to distribute the paper folder to all students on campus.
3. The “Red Folder” is not convenient. Since the “Red Folder” is a piece of paper unless the faculty or staff member has it on them, it is not useable.

The app discussed in this paper seeks to address these issues. Additionally, this paper will also discuss some of the implementation decisions made as part of the development process.

2.0. Background

Initial investigation focused on two key areas; the Red Folder Initiative and smartphone / web apps in the space. This background research influenced design decisions.

2.1. Red Folder Initiative

The “Red Folder” got its start in 2012 at the University of California. It’s goal was to create a resource for faculty to help them respond when a student may be in crisis [4]. While the contents will vary from school to school, the folder typically contains some contact information as well as some information as to who to contact depending on the scenario.

2.2. Other Apps in This Space

Apps in this space include “YOU at College”, “B Well UAB”, and “Unmasked” [5]. “YOU at College” is a web application customized to the purchasing school. This web app helps students do self-checks, set goals, read articles from an extensive knowledge base, and learn about campus resources [6]. This app’s shortcoming though is the fact that it is web based and relies on a student remembering a web URL which is not guaranteed. Moreover, there is also a reliance on the user having network access which may not always be the case.

“B Well UAB” is an app created and published by students at the University of Alabama Birmingham [7]. This app is a smartphone and tablet-based app and looks to provide students with tools and information to help manage stress and information about resources on campus through links to the school website. While this app is a step up from “YOU at College” given it lives on the smartphone, the app still relies on the student having an internet connection. The app relies heavily on content served on the school website to make it work. In addition, the interface has numerous levels before the student gets to information which in the time of a crisis is not good. The information needs to be quickly accessible.

“Unmasked” is an app designed to help students find support amongst their peers in an anonymous way. While anonymous, the app does monitor what is being said and if a user says something that indicates they are a danger to themselves or others Unmasked will report it to campus authorities [8]. This app while beneficial is not what we envision our app being. We see our app as being a source of information for students on campus to connect to professional help.

3.0. Materials and Methods

3.1. Development Team

The app was developed by three students working as a team. Two students studying Computer Science and one student studying Software Engineering were selected by a member of the Computer Science and Software Engineering faculty to serve on this team. The faculty member's role was to serve as a guide in the development process and to help with any technical issues the team faced. Given the nature of the project, two additional people were asked to serve as outside experts. The first was a member of the school's Counseling Center staff. He was charged with helping the students understand the mental health aspects of the problem domain and help ensure the app design would in fact be beneficial to people experiencing a mental health crisis. The other outside expert was a member of the English faculty who specialized in composition. His objective was to help the team with ensuring the language used in the app was inclusive and was as clear as possible.

3.2. Native App vs. Web App Determination

Given the background research from section two, the team first determined they would like to make a native application as compared to a web application. The justification for this being the application could potentially be used when people within the campus community (students, faculty, etc.) are in a mental health crisis and remembering a web URL in that moment could be difficult. Another reason for selecting a native app over a web app is given the latency of Wi-Fi and cellular data networks this could cause unacceptable load times in critical situations. Since the amount of data that needs to be stored is small, the data can be stored on a device and the latency issue becomes trivial as the modem is no longer a factor. Additionally, the processors found in most modern smartphones are more than powerful enough to render a page of text instantaneously.

3.3. Development Platform Selection

The team investigated three possible options for develop the app. The first was native development using Swift (iOS's native programming language) and Java (Android's native program programming language). The team also looked at Xamarin, a cross platform development tool that allows for cross platform development for iOS and Android applications in Visual Studio. Lastly, the use of various JavaScript libraries was investigated that can be used to generate iOS and Android apps. Upon investigation, Xamarin was found to be too cumbersome by the team and the JavaScript frameworks created the potential of slow load times as these are run inside a browser frame. For these reasons the team elected to create two native apps. While this created an issue of the team now having to write two apps, the benefit of doing this was that team could take full advantage of the features and functionality in the operating systems for this version of the app and any potential versions that would come later.

3.4. Considerations for Students with Disabilities

Another part of the development the team had to take into consideration was accessibility by users who had disabilities. Because the team selected the native development tools, they could take full advantage of built-in assistive features in the respective operating systems making this a minor issue in terms of the overall development effort. One student was tasked with ensuring the apps conformed to the needed requirements of the assistive technologies for both platforms.

3.5. Development Challenges

The team faced challenges in developing this app. The first challenge was that none of them had developed a native iOS or Android app in the past. Additionally, the team had to also learn about app design and create a design that was intuitive and approachable. This meant having to learn how to use tools such as Photoshop to create their initial compositional drawings which they had not been exposed to in the past. The team also had to create a proposal for their app to get funding from the school to pay them for their work. All of this had to be done in the midst of a global pandemic where they could not meet in person to work per the school's COVID guidelines.

4.0. Results

4.1 App Design Discussion

The app, named LionHELP, is an app that serves as a distillation of the contents of the Red Folder. The section headings are pulled directly from the app itself; Recognize, Respond, Refer, and Resources. Figure 1 shows the homepage the user sees when the app is launched, please note all images shown here are from the iOS app and the Android app functionality is the same. Each section is presented with its own icon and also a brief description of the resources found in that section. To select a section, the user taps the icon of the section they wish to view.



Figure 1: LionHELP Home Screen

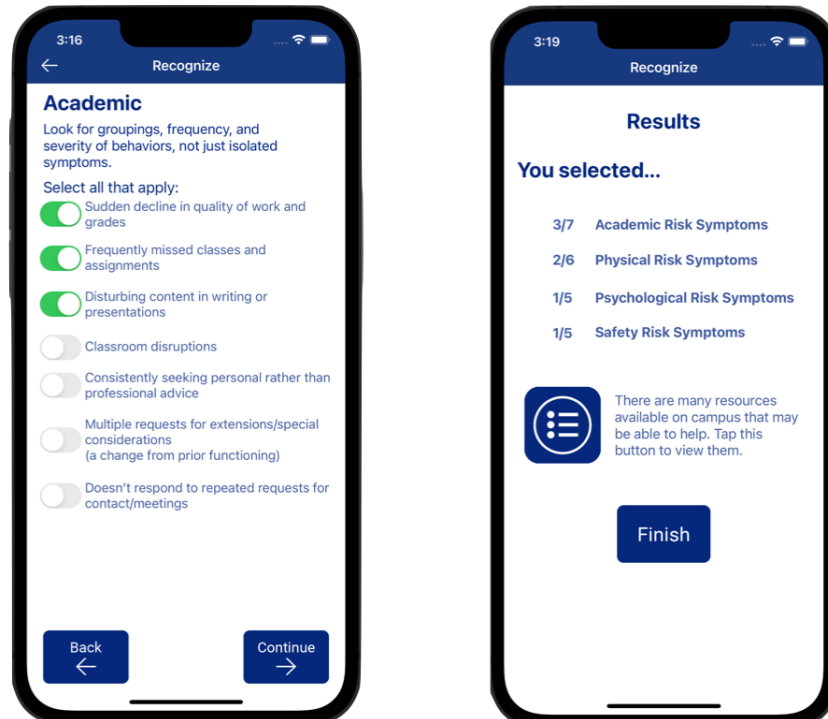


Figure 2: Recognize Survey

The first section in the app is the Recognize section. Similar to the Red Folder, this section lists possible signs and symptoms of someone having a mental health crisis. Unlike the Red Folder which is paper, this list is interactive and the user can select the signs and symptoms they are noticing in the individual they are concerned about. The symptoms are broken up over several pages with each page listing one category of possible symptoms (physical, behavioral, etc.). After a user selects the applicable symptoms on each page they are presented with a screen which lists the number of symptoms they checked off next to the total number of symptoms in that category. It is important to note this does not generate any sort of diagnosis and is purely designed to trigger introspection in the user. Figure 2 shows one of the survey pages (left) and the final screen where the user is presented the summary (right).

The next section is the Respond section. This section takes the tips for talking with someone who is experiencing a mental health crisis from the “Red Folder” and puts them in the app with linguistic adjustments suggested by our outside expert from the English department.

Third is the Refer section. This section of the app takes the flowchart found in the paper Red Folder designed to help someone determine who to refer a person in crisis to on campus and turns it into an interactive questionnaire. A user’s selection on one screen will prompt either additional questions or result in information as to whom the appropriate resource on campus to contact would be. Figure 3 shows one of the questions (left) and the result of selecting yes to that question (right).

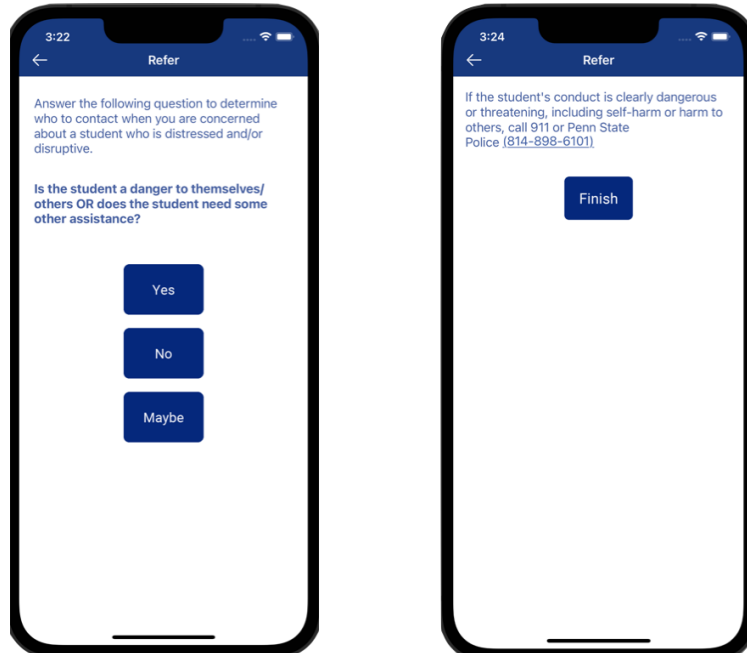


Figure 3: Refer Questionnaire

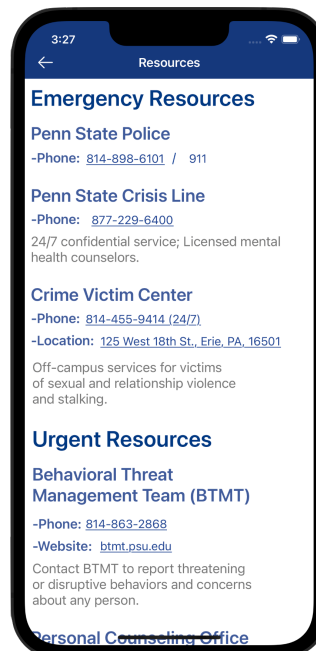


Figure 4: Resources List

The last section is the Resources section. This section is a list of resources available on campus. Like the others, this list of resources comes directly from the “Red Folder”. Unlike the paper “Red Folder” it is more useful since all the phone numbers, email addresses, and physical addresses have been turned into actionable items on the screen. For example, if a user selects the phone number for the Counseling Center, they are asked if they want to call that number and if they select yes, they are brought to the phone dialer for their device and the number is

prepopulated for them. All they need to do is press the dial button to place the call. Figure 4 shows some of the resources list.

4.2. Advantages of App

Given LionHELP is a smartphone app, it can be easily distributed to everyone on campus via the Apple App Store and the Google Play Store since campus community members only need to search for the app name to find it (or alternatively be given a QR code to scan and be taken directly to the app in their app store). Moreover, when there is a need to make an update to the app (ex: change the phone number for one of the resources) the change can be made in the code, published to the app stores, and then once approved by Apple or Google (depending on the platform in question), the update is pushed automatically to the end user ensuring they have the most up to date information.

The distribution of the app will also represent a potential cost savings to the school since there is no charge to disseminate the app on the Apple App Store or the Google Play Store. This is because the app is available at no cost on these platforms since both Apple and Google have maintained that any app which is free to download will incur no cost to the developer. This differs from disseminating a paper folder made of glossy cardstock paper as the more copies the school makes, the more cost there will be each time an update needs to be made. This also means it wouldn't be financially feasible to give everyone on campus (students, faculty, and staff) a copy.

The app can also increase awareness of the signs and symptoms of a mental health crisis on campus. It ensures that everyone in the campus community has the resources they need to help themselves or other members of the campus community should they be needed. With this app it is now much easier to contact resources and get connected to help when necessary.

4.3. Disadvantages of App

The biggest disadvantage of this app is there is now an onus on the school to keep this app up to date. This means there needs to be someone to serve as the app's custodian and take responsibility for keeping the information (and the code) up to date. This person will also have to be responsible for naming a successor should that person choose to move on from the institution. Failure to do so could result in an app that provides inaccurate or ineffective information which could prove to be problematic or even dangerous.

4.4. Reception and Adoption

The reception on campus from the administration as well as the counseling centers at other campuses within the state system has been incredibly positive. There has been much excitement regarding this app and in the future the app being adopted by other campuses in the school system.

On campus the adoption has been slow. As of the time of this writing, there have been 44 downloads of the Android version [9] and 110 downloads of the iOS version [10] for a total of 154 downloads comprising about four percent of the campus student population. Despite the small number of downloads, for the iOS version the daily usage average is 1.41 sessions per week [10] which indicates the app is being used. For reasons unknown, this statistic is not

available for the Android version at the time of this writing. Clearly, while the app has not received a high number of downloads, this does show the app is being used. Without question, a stronger marketing push will be needed to increase downloads and get more significant data regarding the weekly usage.

4.5. Student Outcomes

In completing this project, students indicated the most difficult part of the development effort was learning how to write programs for iOS and Android, but they were able to overcome this by practicing and using online tutorials [11]. As demonstrated by the fact the students created a fully functional app it is obvious the students were able to learn the necessary skills to write these apps for iOS and Android. The students leveraged similar tutorials and online resources to learn other skills they needed to generate their composition drawings which were used to guide their implementation. The students overcame the issues with COVID by leveraging collaborative tools such as Microsoft Teams, Zoom, and JetBrains Space to collaborate, share files, and share code.

5.0. Conclusions and Future Work

While the current install base of the app is low, the fact the app is getting usage is promising. Clearly a more aggressive advertisement campaign is required to increase awareness and adoption by the campus population. Despite the low adoption, students who worked on this project did feel like they had learned something about app development. Once the issues with the awareness of the app have been remedied, there is potential to increase the functionality of the app to allow campus community members to file care reports directly from the app to the school's behavioral health management team and provide functionality to help people who may have learning disabilities (diagnosed or undiagnosed) get connected to resources on campus to get the help they need.

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