ARTICLES

SIMPLETECH: SIMPLIFYING TECHNOLOGY FOR THE ELDERLY

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ABSTRACT

SimpleTech is an android application that includes a simplified version of the calling feature on a smartphone. In this way, this application is able to simplify the smartphone for an elderly user with mental or physical disabilities who would, otherwise, have difficulty navigating the interface of a smartphone. This application was developed using AndroidStudio, and the first version was developed in a four-month timespan. This version includes four large and distinctly coloured buttons. When these buttons are pressed, the app calls the user’s most frequent contacts, with one button allocated for contacting emergency services. By setting itself apart from its competitors, SimpleTech will be able to take over this relatively new market and ensure success in both the present and future. Additionally, technology is an ever-growing industry, which means that there will be a constant need for applications like SimpleTech. Currently, the reaction to SimpleTech (version 1) has been overwhelmingly positive and the results of the test cases have been successful as well. Future versions of SimpleTech that include an improved user interface and new features will be the focus of future research.

KEY WORDS

Computer Science; Elderly; Smartphone Application; Coding; Technology

INTRODUCTION

Technology is growing rapidly and the widespread use of smartphones continues to increase globally. In fact, there are over 2.6 billion smartphone subscriptions globally, and this number has continued to grow exponentially in recent years (Gilleard & Higgs, 2008). By 2020, it is predicted that there will be 6.1 billion smartphone users globally (Gilleard & Higgs, 2008). At the same time, the number of elderly in North America amounted to over 44.7 million in 2013 and is expected to grow to 98 million in 2060 (Smith, 2004). Around 2 in 5 seniors indicate that they have a “physical or health condition that makes reading difficult or challenging” (Dobransky & Hargittai, 2006). In addition, more than half of the elderly population has a “disability, handicap, or chronic disease that prevents them from fully participating in many common daily activities” (Dobransky & Hargittai, 2006). These unfortunate conditions have reduced many elderly individuals’ ability to own and/or use most digital devices that currently exist in our society. Although there are built-in accessibility settings on android devices, most of these are not ideal because they only make miniscule changes. Alternative competitor gadgets including phones

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that are customized for seniors do exist, like “The Jitterbug Flip”, but none of these products have been successful in providing complete accessibility. These simplified phones cost a lot of extra money, and in most cases, will replace the phones that they already owned. As the budget of seniors can be limited by debt and low retirement funds, costly technology might not be a sustainable option for them (Uppal & LaRochelle, 2015). Even the senior smartphone apps that allow them to access this “simple phone”, like the “Simple Senior Phone” application, have multiple issues that are pointed out on their reviews on the app store. For example, a frequent complaint is that these applications allow the user to easily exit the application, which makes them unreliable. Although other applications try to simplify the smartphone by only including essential features (like the call feature, messaging feature, etc.) they have too many buttons, which would confuse a user with a visual disability. These are just a few of the many issues that make the other solutions currently available inaccessible and a hassle to use.

SimpleTech was created as a more reliable and accessible android application that will allow elderly to easily access and use the smartphone technology that is currently in existence. Its features give SimpleTech a unique identity relative to other smartphones and/or applications. Compared to its competitors, SimpleTech uses clear buttons, colours, and text to break down the obstacles that an elderly user with physical challenges would have when using a smartphone. With the number of smartphone users increasing exponentially, there will be a necessity for a solution to make sure that elderly individuals with disabilities are able to use smartphones with ease (Smith, 2004). Moreover, since most elderly have some sort of physical impairment SimpleTech could offer an accessible solution that could provide the assistance these individuals require.

MATERIALS AND METHODS
Currently, SimpleTech’s development team has created a working prototype on AndroidStudio, an android application development software that utilizes the programming language Java. SimpleTech Version 1, is an android application that provides the most essential feature that an elder would want to use on a smartphone: the call feature.

SimpleTech’s main screen has 4 big buttons with a simple colour scheme to ensure that the buttons are easily distinguishable and the text is easily readable for the elderly users who may be visually impaired. The first 3 buttons on this display screen are shortcuts that allow the users to contact their 3 pre-programmed numbers in just a click of a button. This way the caregivers can set up these 3 “favourite” numbers beforehand for the important people that the seniors need to contact on a daily basis. With this feature, the senior user does not need to worry about forgetting important phone numbers. In addition, they will not be confused by various icons as they simply have to press one button and it will call the desired number.

Not only does SimpleTech include these 3 buttons, but there is also another button for contacting emergency services (Red button in Figure 1). Due to the health problems that most elderly face, there is a risk of them having a health emergency while they are alone. Accordingly, SimpleTech allows the elderly to quickly contact emergency services in the event of such an emergency. Depending on where the user lives, SimpleTech is able to set the closest/most relevant emergency service number using the built-in GPS location tracker.
After creating both the application itself and the business plan, the android application was also downloaded onto an android phone and tested for various test cases. These test cases were a certain set of conditions that the application was put through to ensure that it worked under various circumstances, ensuring reliability and validity. For instance, the application was tested to ensure that it could start two calls concurrently (and put one call on hold), and that the text size remained proportionate to box sizes in various phone models.

Furthermore, in order to test this smart phone application on potential users, we went to a senior home and took a survey of 5 elderly individuals that made phone calls at least 10 times in a week. Two of the survey questions asked were: “Do you find smartphones difficult to use?” and “Did SimpleTech help you make phone calls more easily than a regular smartphone?”. There were only 5 survey participants, as most of the elderly individuals that were potential participants did not have or use smartphones or cellphones.

RESULTS

The results of SimpleTech’s test cases and survey feedback from elderly homes were positive. There were four main test cases (see Table 1) that were tested on SimpleTech V1.0 and the results of three of the test cases were true, meaning that the test case did what it was supposed to do, while only one of test cases was false. This false test case was that the text size did not remain proportionate to the boxes when the application was tested on an Android phone.

As shown in the survey results (see figure 3), all elderly individuals who owned a smartphone find it difficult to use their phones. Also, 80% of the elderly individuals believe that SimpleTech helps them make phone calls more easily than a regular smartphone.

Table 1: SimpleTech Test Cases and their Results

These are the various test cases that were tested on SimpleTech to ensure its reliability and accessibility.

<table>
<thead>
<tr>
<th>TEST CASE</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Phone permissions disabled but application still runs and starts up.</td>
<td>TRUE</td>
</tr>
<tr>
<td>2) User exits and open up application but it does not take more than 30 seconds for application to start up.</td>
<td>TRUE</td>
</tr>
<tr>
<td>3) Application can start two calls concurrently (one on hold at a time).</td>
<td>TRUE</td>
</tr>
<tr>
<td>4) Text size remains proportionate to box sizes.</td>
<td>FALSE</td>
</tr>
</tbody>
</table>

Figure 2: Call/Dial Screen of SimpleTech

When an elderly user clicks on one of the call buttons on the menu screen it directs them to a regular call screen except they can only press the “end call” button so that the calling process is simplified.

Figure 3: Survey results to “Do you find smartphones difficult to use?”

A survey was conducted on elderly individuals to determine whether there was a true need for this application, and it was proven to be a need as shown by the 100% yes responses to the above question.

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calls easier than a regular smartphone (see figure 4). Moreover, 60% of seniors said that their phone usage frequency would increase with SimpleTech. Similarly, 80% of the survey participants said they would feel more comfortable using a smartphone if they had SimpleTech.

DISCUSSION

Through looking at the positive survey and test results of SimpleTech, it is clear to see that there is huge potential for SimpleTech to become successful in the market. Three out of the four test cases were successful, while only one of the test cases had a false result. By testing out various scenarios that the user could have for SimpleTech Version 1, it was easy to fix any errors that existed. For instance, the text size did not stay proportionate to the screen sizes for various android phone models, thus it was necessary to go back to the code and add in a feature that automatically scaled the app for multiple screens. After this was done, the test case was repeated until the result was true. These test cases are essential to SimpleTech’s success as it ensures the validity of the application, thus more test cases will be conducted on SimpleTech Version 1 and any other version that is produced in the future before it is released on the market.

Although the test cases results were very important, the results of the survey conducted were equally as important. This is because the surveys allowed potential users to provide concrete feedback on both the application itself and its future modifications. These surveys were very important in ensuring that our users had a true use for this product, and they helped to determine the main benefit the app provided to users. Although the majority were pleased with SimpleTech, some feedback and improvement points were received from some of the elderly participants which is a very important step in this survey process. A major feedback that was received is that the buttons are too close together in SimpleTech and this is something that will be changed in SimpleTech V2.0. These suggestions that came directly from SimpleTech’s target market will prove to be very useful as it will help to shape SimpleTech as being a more user-friendly application.

CONCLUSION

Technology is an exponentially growing field that will continue to grow for many years to come. Therefore, there will be a constant need for products for elderly, especially since the majority of the Canadian population is starting to enter the elderly stages of their life (Statistics Canada, 2015). Specifically, since most elderly live with some sort of physical impairment it is easy to see that SimpleTech will be very successful in the market both in the present and the future.

Through leveraging its unique features, SimpleTech will be able to differentiate itself from its small competitors and has the potential to take over this market. Unlike any of its competitors, SimpleTech makes sure to include only the essential features of a smartphone that an elderly user would need by understanding the true needs of the targeted users, which will ensure success in both the present and future. This point was proven through the positive results of both the test cases and survey feedback.

Looking forward, SimpleTech will be put on the market after it has gone through regression testing and meticulous beta testing. Additionally, SimpleTech’s team will continue to improve the product by adding more features in future versions and improving the user interface using the feedback that was received. At the end of the day, SimpleTech’s mission is to make it easier and quicker for elderly users with physical and mental disabilities to call their family, friends, and emergency services. The research and feedback collected in the past few months provides an optimistic outlook on the future and potential of SimpleTech.
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REFERENCES


