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Undergraduate Research in Informatics
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Final Paper

**Design of effective health related mobile applications &
Impact of interactive systems (mobile phone, computer,
sensors) on users' daily behavior to foster a healthier life.**

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1. Abstract

In our society today, there are many people who are unhealthy and obese. Part of this reason is because of all the new technologies we have at our disposal like video games, smartphones, computers, etc. All of these things make our lives more enjoyable and easier, but they have also made us lazy because of how convenient they are. Although these technologies have contributed to our unhealthiness and obesity, they can also help us solve these issues. Our research topic is how the design of effective health related mobile applications and the impact of interactive systems (mobile phone, computer, sensors) on users' daily behavior can help foster healthier lifestyles. Our research goals are that we wanted to find out how successful people are in using computers and interactive systems to help foster a healthier lifestyle. We also wanted to see how many people actually use these applications on a day-to-day basis. We also wanted to see if it actually does make a difference in people's lives when they use an interactive system to help foster a healthier lifestyle. From the research, we will find out what people like most in these kinds of applications, what kind of people actually use these applications, and how effective these applications are.

2. Introduction

Our research topic is how the design of effective health related mobile applications and the impact of interactive systems (mobile phone, computer, sensors) on users' daily behavior can help foster healthier lifestyles. We divided our project into three different categories. Our first category was how mobile applications can help lose weight. Our second category was to study and look for existing mobile applications for workouts and weight loss that were popular amongst consumers. Our third and last category was to study and look for applications that were good for tracking balanced and healthy diets. We used surveys, our own experience using applications, and various websites and studies. We also wanted to compare mobile devices to no technology and the cost effectiveness in order to approach our research goal.

3. Research Problem

Like we said earlier, our society that we live in today is completely driven by technology. This can be looked at as a good thing and also as a bad thing. The good thing is that technology makes our a lives a lot easier. The bad thing is that these technologies have made us a lot unhealthier. Although these technologies can contribute to an unhealthy lifestyle, they can also be very helpful for us becoming a lot healthier. Our research problem is that there are all of these technologies, such as mobile applications, that can help make your lifestyles healthier, but no one really takes advantage and uses these. There are thousands of FREE mobile applications out on the market that can keep track of your diet, keep track of your workouts, count your calories, etc. People should take advantage of these helpful applications out there to achieve healthier lifestyles. From our research, we want to find why people aren't using these mobile health applications.

4. Background

As technology continues to increase, there is a growing interaction between interactive systems and people seeking a healthier lifestyle. As information becomes increasingly available and as well as easier access to data with a mobile device, user's seeking a healthier lifestyle have greater access to information than ever before. Mobile Apps centered around fostering a healthy lifestyle, offer users tools to help them achieve a variety of different fitness goals, including weight-loss, athletic training, calorie tracking, and general healthy living. Whatever the lifestyle goal, there are thousands of different applications available to help the user achieve it.

5. Related Work

In the related work area, our team worked on searching all different aspects of the impact of interactive systems (mobile phone, computer, sensors) on users' daily behavior to foster healthier lifestyles. David worked on Athletic Training; Connor worked on Weight Loss; Jiyao worked on tracking dieting; Joe worked on New apps/innovations. When researching particular health applications, it was difficult for our group to determine which applications are the most effective in fostering a healthy lifestyle for a user. Many new applications are constantly being developed; some which could be much more effective than others, but because of the lack of popularity they are not used by people. To solve this problem, we decided on which applications fit into these categories: athletic training, weight loss, and diet tracking. When we decided on which applications to thoroughly research, we took popularity as well as effectiveness into consideration by reading user reviews. In our research, we found a lot of good applications that were top-rated amongst consumers.

1.
   - Look up food and track your calories
   - Track your exercise
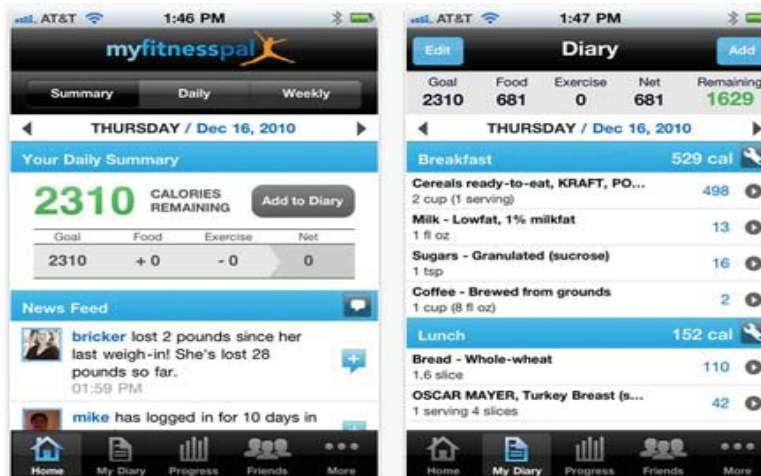   - Lets you know how many calories to eat per day based on your weight loss goals

2. Gym Hero
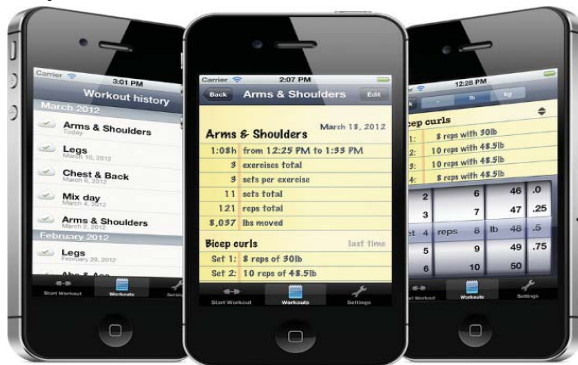
   - Easy to use

- ○ Provides detailed summaries of workouts
- ○ Optional auto-fill to show you what you did your last workout

3. My Fitness Pal

- o Takes your height, weight, goal weight, and lifestyle into account before giving recommendations
- o Breaks your total goal weight into monthly goal weights, which is a helpful motivator
- o You can also access calorie counts and nutritional information from local restaurants

4.
- ○ Scan the barcode of the food packaging and it will give you the calorie count and the processing techniques.
- ○ Good for people who try to eat organic foods

6. Research Methodology

We researched many different fitness apps for a variety of fitness goals, looking for the most popular and beneficial apps. The research methods we used were surveys, in-person interviews, and academic research.

A. Secondary Research

When we did our secondary research, we wanted to find articles that had studies that showed the usage and effectiveness of interactive systems and mobile applications. We were actually very successful in finding some quality information. First of all, I want to talk about an article that was found online and written by Rhona Finkel that is titled, "What's the Matter with Mobile Health Apps Today?" This article gives a lot of good statistics about the usage of mobile apps related to health. The article says that the percentage of Americans who have downloaded mobile apps since 2010 has remained about the same. "From 2010 to 2012 the percentage of Americans who have downloaded mobile health apps has stayed stable–at 10%, according to the World of DTC Marketing. And that's despite the fact that the number of available apps has grown exponentially, from 2,993 in the beginning of 2010 to 13,619 in April of 2012" (Finkel). This article also talks about how once a person downloads an app, they rarely use it and forget about it, which we also found in our research that we did on our own. "As of 2009 the Apple Insider found that the vast majority of [free] apps downloaded from the App Store are in use by less than 5% of users after one month has passed since the download" (Finkel). The graph below shows how the usage declines over time for apps. It says that only 20% of users return to an app the day after it's downloaded and only 5% return after a month, and nearing 0 after three months.
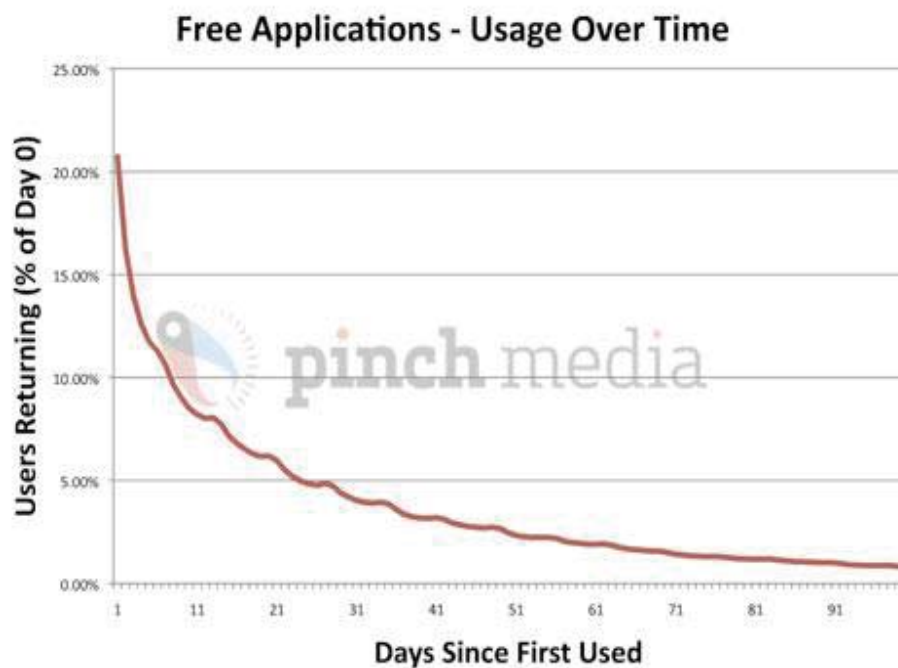
Another thing the article talks about is the quality of the applications. A doctor in the article goes on to say, "Most of these apps are actually awful. There may be 12,000 apps out there but they're not 12,000 good apps. They're mostly bad apps that people rarely use." (Finkel). The article also says that most mobile apps require too much time and effort to input all of the information needed for these apps to be successful for you. That is also what we have found in our own research. The less work for the user and the more automatic input, the better the application. Although this article talks about the downfalls of

mobile health apps, it does give a glimpse of the future of healthcare and mobile apps. "Juniper Research, an online platform that focuses on "identification and appraisal of high growth opportunities across the mobile telecoms, content, and applications sector" state in their 2011 Press Release states that mobile healthcare and medical app downloads should reach 44 million by the end of this year, rising to 142 million in 2016" (Finkel). Another article written by Stacey Peterson says, "The mobile health technology market—including devices, applications, and services—is expected to exceed $8 billion by 2018, according to research company GlobalData. That's up from $500 million in 2010, a 44% compound annual growth rate. The rapid growth is being fueled by the increasing availability of a variety of healthcare applications" (Peterson).
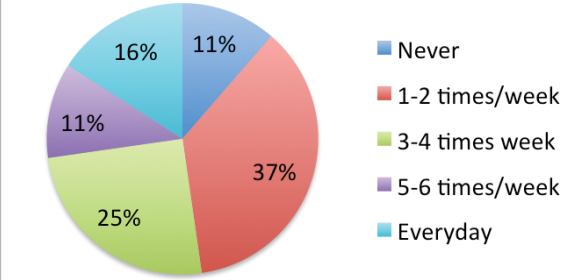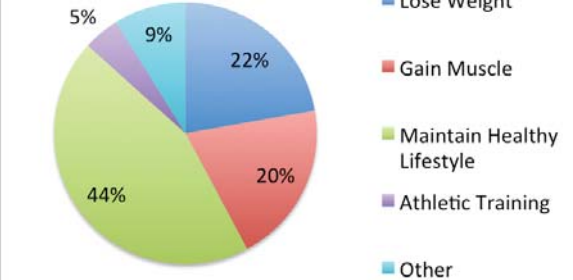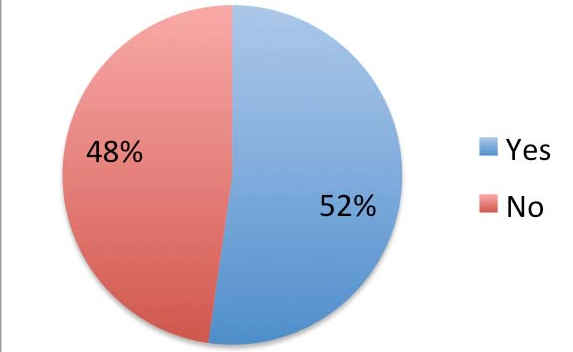
B. Primary Research

After researching the different types and uses of the apps, and determining that the apps were indeed beneficial to achieving goals, we decided to develop a survey to determine; how many people have downloaded one of these apps to help them achieve their goals, how often they use the app, if at all, and how beneficial they find the app to be in achieving their specific goals. The results of our survey concluded that most people are familiar with the apps and have at least one fitness-related app downloaded on their phone, but the vast majority download it, and then never use it, or use it very infrequently. We wanted to determine why this was. Why do people download the apps and then never use them? To answer this question, we conducted interviews with 10 of the people who took our survey. We asked them if they used a mobile app and whether they found it effective, and if not, why they don't use them. From the responses from these interviews we concluded, that people don't use mobile apps for a variety of different reasons; too complicated, don't think they need them, too much time/work, etc. Below are just some of the responses we got from the in-person interviews:
- "I believe that mobile phone apps can help people become healthier, by notifying them of food that may be healthy or unhealthy or different forms of exercise that can be beneficial."
- "I don't think they can help encourage a healthy lifestyle."
- "I don't really need help (or at least I don't think I do) managing my lifestyle.
- "They can encourage people to be more proactive with exercise and eating healthier."
- "I think that apps could be used to help people access information that could help make healthy lifestyle choices, such as food choices, etc. I just don't know how many people have access to smart phones or would know how to use the apps."
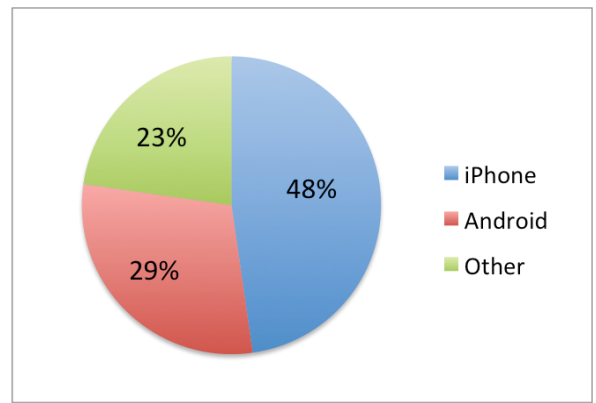
7. Results and Analysis

For our results and analysis, we decided to send out surveys to people via Facebook and Email to see how many people actually download and use mobile applications for weight loss, exercise, or dieting. We also wanted to see if people would be willing or interested in using mobile applications to help with weight loss, exercise, or dieting. Below are the questions and results from our survey. Our sample size was 44 people.

Questions	Responses
1) How often do you exercise? a. 0 b. 1-2 times a week c. 3-4 times a week d. 5-6 times a week e. Everyday	
2) What are your goals when exercising? a. Lose weight. b. Gain muscle c. Maintain healthy lifestyle d. Other (specify)	
3) Have you ever thought about using mobile apps to help you track a balanced healthy diet? a. Yes b. No	

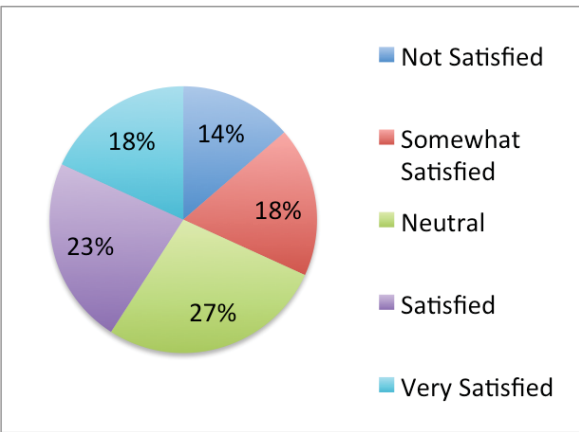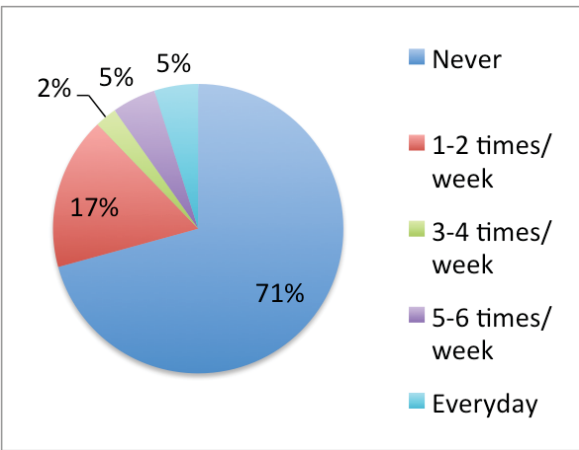|	
4. What mobile device do you use? a. iPhone b. Android c. Other	iPhone 48% Android 29% Other 23%
5. Have you ever downloaded a mobile application on your phone to help with weight loss, exercise, or athletic training? a. Yes b. No -If so, how successful was the application in achieving your workout goals?	Yes 43% No 57% Not Successful 14% Somewhat Succesful 29% Neutral 24% Successful 14% Very Successful 19%
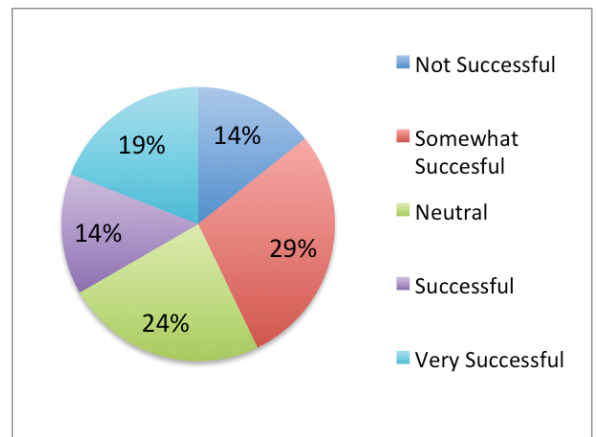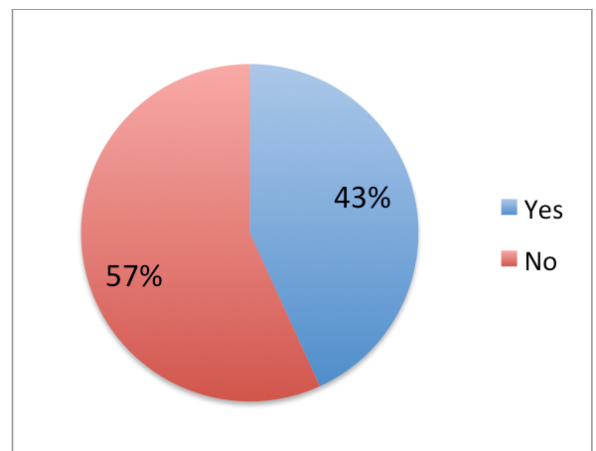
6. Were you satisfied with the application? Not satisfied …........................Very satisfied	**Not Satisfied** 14% **Somewhat Satisfied** 18% **Neutral** 27% **Satisfied** 23% **Very Satisfied** 18%
7. How many times a week do you use a mobile application on your phone to help with weight loss, exercise, or athletic training? a. Never b. 1-2 times a week c. 3-4 times a week d. 5-6 times a week e. everyday	**Never** 71% **1-2 times/week** 17% **3-4 times/week** 2% **5-6 times/week** 5% **Everyday** 5%
8. Would you ever be willing to use a mobile application of some sort to help with weight loss, exercise, or athletic training? a. Yes b. No	**Yes** 82% **No** 18%
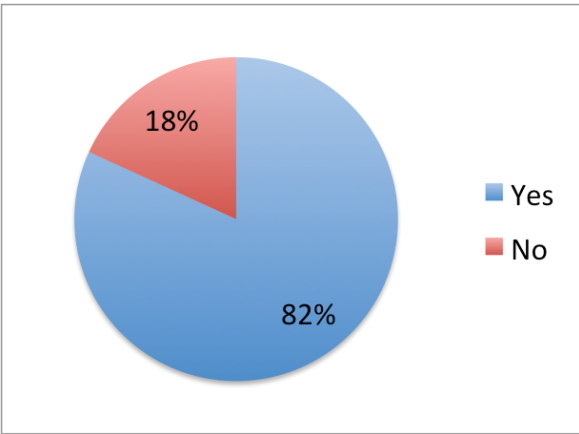
8. Conclusions

We found that there are beneficial mobile apps helping some people reach their fitness goals. There is also a large market for these apps, as many people we surveyed had at least one fitness related app downloaded on their phone. However, the vast majority of people just don't use the apps. They download them and let them sit on their phone. We found through our interviews that the people of all ages have downloaded the apps, but they don't use them for different reasons. Young Adults don't use them because it's too much extra work to input the data. For people aged 40+, the reasons for not using the applications, were that they felt the apps were too complicated, and they weren't as technology-savvy as the younger generation who grew up with this technology. In conclusion, the problem with these applications seems to be that the user wants the benefit of the application (healthier life, body, etc.) and downloads the applications. Once they have it downloaded, they figure out it doesn't work as well as they think it would and they stop using them. In regards to fitness-related mobile applications, users want an app that has minimal user input required. We believe that a potential app that collects information independent from the user and allows the user to analyze the results, would be well-received by users because it takes the complexity out of the app, and makes for less user-work, which is the top reason for the lack of popularity among the apps.

9. Recommendations for Future Work

If our project was to be continued, our group suggests researching from specific individuals that are known to use Health and Wellness mobile applications, such as athletes at Indiana University. If we were to research a group of people that used these mobile health applications, we could get a better perspective of how these applications function, as well as problems encountered when used over a long period of time. (Recall that most of our participants researched did not use these mobile applications over a long period of time). If we could gather enough data from frequent users of mobile health applications, then when can find out more specific things that could be improved on these applications.

Certain graduate students who have reviewed our project informed us that it would be more useful to divide our researched/interviewed participants into certain age ranges (e.g. 18-28, 29-39, etc). By using this method, we could have a better picture of which age group has benefited from using mobile health applications. The reason why our group did not do this is because we did not have enough participants respond to our surveys and interviews for the duration of this project. Our group would send out more surveys to people in Bloomington as well as conduct more interviews to get a larger amount of data to analyze.

If our group was able to conduct enough interviews to find the main issues wrong with these mobile health applications, then we could develop a prototype of a health application that addresses issues users frequently encounter. After developing a prototype, our group would then program an application and create our own mobile health application, or improve existing ones. Finally, our group would run experiments on our finished program, which would help us see the effectiveness of our program.

Works Cited

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